

National Commission on Forensic Science

Meeting #12

January 9-10, 2017

**Department of Justice, Office of Justice Programs Building
810 Seventh Street, NW,
Washington, DC**



NIST
**National Institute of
Standards and Technology**
U.S. Department of Commerce

National Commission on Forensic Science
Meeting #12
January 9–10, 2017
Department of Justice, Office of Justice Programs Building
810 Seventh Street, NW, Washington, DC 20531

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1. Introduction

The twelfth meeting of the National Commission on Forensic Science (NCFS) was held on January 9–10, 2017 in Washington, DC, at the Office of Justice Programs (OJP) building. The meeting began with opening remarks from Dr. Victor Weedn, Senior Forensic Advisor to the Deputy Attorney General; Dr. Willie E. May, Director Emeritus of the National Institute of Standards and Technology (NIST); and Dr. Kent Rochford, Acting Director of NIST, and new Co-Chair of NCFS. NCFS Co-Chair, Deputy Attorney General Sally Q. Yates, was unable to participate in this meeting. On January 9, following the opening remarks, the Honorable Pam King, a member of the Subcommittee of Procedures and Operations (SPO), presented the SPO update, which focused on the draft NCFS Summary Report, *Reflecting Back—Looking Toward the Future*. Leadership from the Department of Justice’s Office of Legal Policy discussed the Forensic Science Discipline Review (FSDR) and Uniform Language for Testimony and Reports, which was followed by two sessions on scientific foundations that provoked thoughtful discussion regarding the different perspectives of the issues surrounding scientific foundations of scientific practice. The first scientific foundations session was led by Dr. Christopher Palenik (Vice President, Microtrace), Dr. Michael Peat (Editor, *Journal of Forensic Science*), and Dr. David Allison (Professor and Associate Dean for Research & Science, University of Alabama at Birmingham). The presenters of the second scientific foundations session included Dr. Eric Lander (Co-Chair, President’s Council of Advisors on Science and Technology), Dr. Christophe Champod (Professor of Forensic Science, University of Lausanne, School of Criminal Justice, Faculty of Law, Criminal Justice and Public Administration), and Dr. Alan Leshner (Chief Executive Officer, Emeritus, American Association for the Advancement of Science).

On January 10, Bureau of Justice Statistics (BJS) statisticians Matt Durose and Anthony Whyde provided an update on their forensic science survey activities. Following the BJS survey update,

a research panel presented on the current status and landscape of the extramural forensic science research infrastructure. This panel included presenters NCFS Commissioners Gerald LaPorte (Director, Office of Investigative and Forensic Sciences, National Institute of Justice) and Rebecca Ferrell (Program Director, Biological Anthropology, National Science Foundation), as well as Jose Almirall (Director, International Forensic Research Institute, Florida International University) and R.E. Gaensslen (Professor Emeritus, Forensic Science, University of Illinois at Chicago). Dr. Cedric Neumann (Assistant Professor, Department of Mathematics & Statistics, South Dakota State University) and Dr. William Thompson (Professor, Department of Criminology, Law & Society, University of California, Irvine) discussed jury interpretation of forensic evidence and how jury judgements are affected by testimony. A second research panel included presentations by Federal agencies to discuss their current forensic science research activities. Panelists included Julia Dolan (Chief, Forensic Science Lab–Washington, Bureau of Alcohol, Tobacco, Firearms, and Explosives), Susan Ballou (Forensic Science Research Program Manager, National Institute of Standards and Technology) and Cary Oien (Senior Forensic Scientist, Federal Bureau of Investigation).

Subcommittee reports from 4 of the NCFS subcommittees were provided on both Day 1 (January 9) and Day 2 (January 10) of Meeting #12. On Day 1 (January 9), (1) Accreditation and Proficiency Testing, (2) Medicolegal Death Investigation, and (3) Human Factors presented a total of 4 final draft work products to be voted on by the Commission. All 4 work products were adopted by the Commission by achieving the required two-thirds majority vote. The summary of the voting results are outlined in Section 4: Voting Results. On Day 2 (January 10), (4) Reporting and Testimony presented one final draft work product, which was sent back to the subcommittee for revision following Commission deliberations. No vote was taken on this Reporting and Testimony work product. Reporting and Testimony also discussed an initial draft work product, which was open for its second 30-day public comment period at the time of the meeting.

On Monday, January 9, there was one (1) public comment. No public comments were made during the open public comment period on Tuesday, January 10.

Meeting materials, including pdf files for presentations, initial and final draft work products, public comment adjudication summaries, and subcommittee reports, may be found on the NCFS website at <https://www.justice.gov/ncfs/meeting-materials-term-2#m12>. Archived videos from the webcast of the entire meeting are available for viewing at <https://www.nist.gov/topics/forensic-science/ncfs-meeting-12-webcast>.

2. NCFS Meeting #12 Agenda



NATIONAL COMMISSION ON FORENSIC SCIENCE



January 9-10, 2017

Department of Justice, Office of Justice Programs Building

810 Seventh Street, NW, Washington, DC 20531, Main Ballroom, Room #3101

AGENDA – MONDAY, JANUARY 9, 2017

- 9:00 a.m. – 9:30 a.m. **Call to Order/Opening Remarks**
Victor Weedn, M.D., J.D., Senior Forensic Advisor to the Deputy Attorney General
Willie E. May, Ph.D., Director Emeritus, National Institute of Standards and Technology
Kent B. Rochford, Ph.D., Acting Director, National Institute of Standards and Technology
- 9:30 a.m. – 10:15 a.m. **Subcommittee on Procedures and Operations (SPO): NCFS Summary Report**
Hon. Pam King, NCFS Commissioner, SPO Member
- 10:15 a.m. – 10:45 a.m. **Accreditation and Proficiency Testing Subcommittee Report**
Linda Jackson and Patricia Manzolillo, Co-Chairs
Final Work Products for Vote: Recommendation on Accreditation of Digital and Multimedia Forensic Science Service Providers
- 10:45 a.m. – 11:15 a.m. **Medicolegal Death Investigation Subcommittee Report**
John Fudenberg and Randy Hanzlick, Co-Chairs
Final Work Products for Vote: Views on Recognizing the Autonomy and Neutrality of Forensic Pathologists; Recommendation on Model Legislation for Medicolegal Death Investigation Systems
- 11:15 a.m. – 11:45 a.m. **BREAK (lunch distributed)**
- 11:45 a.m. – 12:15 p.m. **Human Factors Subcommittee Report**
Justice Bridget McCormack and Professor Jules Epstein, Co-Chairs
Final Work Product for Vote: Views on Use of Checklists in Forensic Science

- 12:15 p.m. – 1:00 p.m. **Update on Forensic Science Discipline Review and Uniform Language for Testimony and Reports**
Office of Legal Policy, U.S. Department of Justice
- 1:00 p.m. – 1:30 p.m. **BREAK**
- 1:30 p.m. - 3:05 p.m. **Scientific Foundations Session #1**
- 1:30 p.m. – 2:00 p.m. *David Allison, Ph.D., Distinguished Professor and Associate Dean of Research and Science, University of Alabama at Birmingham*
- 2:00 p.m. – 2:20 p.m. *Michael Peat, Ph.D., Editor, Journal of Forensic Science*
- 2:20 p.m. – 2:40 p.m. *Christopher Palenik, Ph.D., Vice President, Microtrace*
- 2:40 p.m. – 3:05 p.m. Question and Answers for Scientific Foundations Session #1
- 3:05 p.m. – 3:20 p.m. **BREAK**
- 3:20 p.m. – 4:45 p.m. **Scientific Foundations Session #2**
- 3:20 p.m. – 3:40 p.m. *Eric Lander, Ph.D., Co-Chair, President's Council of Advisors on Science and Technology*
- 3:40 p.m. – 4:00 p.m. *Christophe Champod, Ph.D., Professor of forensic science, University of Lausanne, School of Criminal Justice, Faculty of Law, Criminal Justice and Public Administration*
- 4:00 p.m. – 4:20 p.m. *Alan I. Leshner, Ph.D., Chief Executive Officer, Emeritus, American Association for the Advancement of Science*
- 4:20 p.m. – 4:45 p.m. Question and Answers for Scientific Foundations Session #2
- 4:45 p.m. – 5:00 p.m. **Public Comment Period**
- 5:00 p.m. **Commission Meeting Adjournment**
-

AGENDA – TUESDAY, JANUARY 10, 2016

- 8:30 a.m. **Call to Order**
- 8:30 a.m. – 9:30 a.m. **Bureau of Justice Statistics (BJS) Survey Update**
Matt Durose, Statistician, Bureau of Justice Statistics
Anthony Whyde, Statistician, Bureau of Justice Statistics
- 9:30 a.m. – 9:45 a.m. **BREAK**
- 9:45 a.m. – 11:30 a.m. **PANEL #1: Research Panel I – Extramural Research**

R.E. Gaensslen, Ph.D., Professor Emeritus, Forensic Science, University of Illinois at Chicago

Gerald LaPorte, M.S., Director, National Institute of Justice's Office of Investigative and Forensic Sciences

Rebecca Ferrell, Ph.D., Program Director, Biological Anthropology, National Science Foundation

Jose Almirall, Ph.D., Professor of Chemistry and Biochemistry and Director, International Forensic Research Institute, Florida International University

Nicholas Petraco, Ph.D., Professor, John Jay University

11:30 a.m. – 12:00 p.m.

BREAK (lunch distributed)

12:00 p.m. – 1:00 p.m.

WORKING LUNCH: PANEL #2: Jury Understanding of Statistics

Cedric Neumann, Ph.D., Professor, South Dakota State University

William Thompson, Ph.D., Professor, Department of Criminology, Law & Society, University of California, Irvine

1:00 p.m. – 1:45 p.m.

Reporting and Testimony Subcommittee Report

Judge Jed Rakoff and Matt Redle, Co-Chairs

Final Work Products for Vote: Views on Report and Case Record Contents

Introduction of Draft Work Products Open for Public Comment:

Views on Statistical Statements in Forensic Testimony

1:45 p.m. – 2:00 p.m.

BREAK

2:00 p.m. - 3:30 p.m.

PANEL #3: Research Panel II: Federal Forensic Science Research

Initiatives

Cary Oien, M.S., Senior Forensic Scientist, Federal Bureau of Investigation

Susan Ballou, M.S., Forensic Science Research Program Manager, National Institute of Standards and Technology

Julia Dolan, M.S., Chief, Forensic Science Lab-Washington, Bureau of Alcohol, Tobacco, Firearms and Explosives

3:30 p.m. – 4:15 p.m.

Wrap up

4:15 p.m. - 4:30 p.m.

Public Comment Period

4:30 p.m.

Commission Meeting Adjournment

3. Meeting Summary

Monday, January 9, 2017: The meeting opened at 9:00 A.M. and adjourned at 5:00 P.M.

Opening Remarks

Dr. Weedn provided the opening remarks on behalf of Deputy Attorney General Sally Q. Yates with a discussion of the Attorney General’s response to the recommendations adopted by the Commission at Meeting #10. Attorney General Lynch’s memorandum of her announcement for NCFS Meeting #12 can be found at <https://edit.justice.gov/ncfs/page/file/930411/download>.

Dr. May introduced the new Acting Director of NIST and Co-Chair of the NCFS, Dr. Kent Rochford.

Subcommittee on Procedures and Operations (SPO) Status Report

The SPO update focused on the draft NCFS Term 1 & 2 Summary Report, *Reflecting Back—Looking Toward the Future*. The organizational structure of the report was discussed and feedback was requested from the Commissioners. Through discussion, three items were agreed upon: the report should 1) acknowledge that the Commission did not originate the tasks identified in the *Looking Toward the Future* section of the report, and recognize that those tasks have been undertaken by various forums for many years; 2) highlight the uniqueness of the Commission; and 3) acknowledge the impact of the Commission’s recommendations on state and locals.

This topic was revisited later in the meeting and a vote was taken to determine whether this summary report should include a statement that the Commission should continue in its current form. As a business document a simple majority of >50% “yes” votes was required to approve inclusion of this statement. A total of 42% “yes” votes were received, and therefore no statement would be included regarding the continuation of the Commission. The process for revising and voting on this document would be discussed during the next SPO conference call.

Accreditation and Proficiency Testing Subcommittee Report

The Accreditation and Proficiency Testing subcommittee introduced the final draft *Recommendation on Accreditation of Digital and Multimedia Evidence Forensic Science Service Providers*, which was posted for two public comment periods, and the co-chairs presented the comment adjudication. An amendment was made to retain the list of the 9 critical steps to accreditation (as outlined in the previously adopted NCFS Views document) in the second bullet under the *Recommendations* section of the document. These steps were inadvertently deleted in the final draft. In addition, under the last bullet in the *Recommendations* section, an amendment was made to add the text “as listed above” to the end of that bullet, to refer to the critical steps. This work product achieved the required two-thirds majority vote for Commission adoption.

Medicolegal Death Investigation Subcommittee Report

The Medicolegal Death Investigation subcommittee introduced 2 final draft work products for Commission vote: *Views on Recognizing the Autonomy and Neutrality of Forensic Pathologists* and *Recommendation on Model Legislation for Medicolegal Death Investigation Systems*. Both work products achieved the required two-thirds majority vote for Commission adoption.

Human Factors Subcommittee Report

The Human Factors subcommittee introduced a final draft work product for Commission vote: *Views on Use of Checklists in Forensic Science*. This work product achieved the required two-thirds majority vote for Commission adoption.

Forensic Science Discipline Review and Uniform Language for Testimony and Reports

The DOJ Office of Legal Policy (OLP) updated the Commission on the status of the Forensic Science Discipline Review (FSDR). They shared an expectation that, given approval, implementation of the FSDR would begin in the next couple of months. A draft statement of work and request for information is expected to be issued within the next 60 days. Based on the response, the statement of work will be finalized and the request for proposals (RFP) process will be under way.

OLP also informed the Commission on the next steps for the Uniform Language for Testimony and Reports (ULTR) project. In an effort to continue the transparency process, OLP plans to release an Issue for Comment on the Uniform Language and hold a round table. The Issue for Comment will invite commenters to provide proposals as to how to draft guidance for use by forensic examiners in providing testimony. The roundtable will invite various stakeholders to present their vision of the Uniform Language. Next steps would be to then publish the ULTR 2.0 in the spring of 2017. Commissioners discussed issues for consideration such as institutionalizing a continuous quality control/quality assurance program, incorporating training, and including accommodations for non-English-speaking witnesses.

Scientific Foundations Session #1

This Scientific Foundations session #1 provoked thoughtful discussion regarding the different perspectives of the issues surrounding scientific foundations, to include scientific validity, literature, peer-reviewed publications, and reproducibility. Dr. David Allison began this session with a discussion of the taxonomy of how science can go wrong and the factors that lead to issues with scientific reproducibility, experimental design, and rigorous reviews, as well as a discussion on proposed solutions to avoid errors and accurately communicate scientific results. Dr. Michael Peat followed this discussion with an overview of the *Journal of Forensic Science* (JFS) and a discussion of JFS's efforts to advance forensic research, education, and practice by publishing peer-reviewed manuscripts of the highest quality to strengthen the scientific foundation of forensic science in legal and regulatory communities worldwide. The final speaker, Dr. Chris Palenik, implored stakeholders to encourage the traditional strengths of forensic science amidst quality management, statistics, and error rates. This was in an effort to encourage new types of evidence and analytical approaches to be introduced into the crime laboratory, and further cultivate free application of scientific thought. Commissioners discussed the distinction

between the value of investigative leads and that of scientifically valid evidence, what should be presented in court, and what qualifies as true science.

Scientific Foundations Session #2

The second Scientific Foundations session continued the discussion of scientific foundations, the challenges surrounding them, and identifying ways to advance research to address these challenges. Dr. Eric Lander opened the session with an overview of the President’s Council of Advisors on Science and Technology (PCAST) report, *Forensic Science in the Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods*, and discussion of the criticality of empirically testing methods to establish reliability. Dr. Christophe Champod followed with a discussion on the expectations and appropriateness of experts deciding on an identification and formulating informed judgments, and the importance of transparency in expert reporting in the future. Dr. Alan Leshner closed the session by discussing the need for a coherent, government-wide strategic plan that articulates the research agenda in forensic science and assigns roles to the various agencies. Commissioners discussed method validation, expert testimony, proficiency testing, and PCAST.

On Monday, January 9, there was one (1) public comment from Billy Leiserson.

Tuesday, January 10, 2017: The meeting opened at 8:30 A.M. and adjourned at 4:05 P.M.

Bureau of Justice Statistics Survey Update

DOJ’s Bureau of Justice Statistics (BJS) statisticians presented on the BJS Census of Publicly Funded Forensic Crime Laboratories, which provides a snapshot of the workload and operations of crime labs nationwide and the resources devoted to completing the work. BJS discussed the data in terms of resources, services, and quality assurance practices.

Upcoming BJS data collections were also presented, to include the Census of Medical Examiners and Coroner Offices and the Law Enforcement, Management and Administrative Statistics Forensic Science Supplement. Commissioners discussed methodology, data collection, and budgets.

Research Panel I—Extramural Research

The extramural research panel illustrated the current status of the extramural and academic research infrastructure. Dr. Gaensslen discussed the challenges with the current academic research infrastructure and publishing forensic science research, and some of the ways to address these areas moving forward. Mr. LaPorte and Dr. Ferrell spoke about the research programs and grant-funding opportunities offered by their Federal agencies, how the research agendas are determined, and what the associated peer-review processes involve. Dr. Almirall addressed the strengths and successes of International Forensic Research Institute’s forensic science research program and graduate training program. Commissioners discussed the investigative value of evidence, publications, the NIJ Forensic Technology Center of Excellence, funding determinations, and peer review.

Note: Dr. Petraco was unable to speak on this panel. His presentation is available with the meeting materials on the NCFS website.

Jury Understanding of Statistics

The Jury Understanding of Statistics panel was developed to inform NCFS discussions related to a draft Views work product on Statistical Statements in Forensic Testimony. Dr. Bill Thompson and Dr. Cedric Neumann facilitated discussion on understanding how jurors hear or mishear identification expert testimony presented at trial. The panelists presented issues with communicating evidence and likelihood ratios, and how interpretations made by defense and prosecution might trigger misleading interpretations. The speakers offered recommendations on how forensic science findings should be presented to improve the practice of the forensic practitioners and assist the consumers of the inherently probabilistic information that forensics scientists may provide through reports and testimony. Commissioners discussed study designs, prosecution and defense understanding of the evidence, the *CSI* effect, and expert testimony.

Reporting and Testimony Subcommittee Update

The Reporting and Testimony subcommittee introduced one final draft work product for Commission vote: *Views on Case Records and Report Contents*. However, concerns were voiced regarding the substantive changes made to the document through the adjudication of public comments process. The Commission decided the work product needed to be further revised, as well as posted for an interim public comment period, before reintroducing it to the Commission for a vote at Meeting #13.

The subcommittee also discussed the initial draft work product, *Views on Statistical Statements in Forensic Testimony*, which was posted for public comment at the time of the meeting. The Commission discussed the content of this work product, the lengthy comments that have been received thus far through the public comment process, and Commissioner concerns. Moving forward, the subcommittee will adjudicate the public comments at the close of the current public comment period, develop a revised work product that will be posted for an interim public comment period, and introduce a final version to the Commission for a vote at Meeting #13.

Research Panel II: Federal Forensic Science Research Initiatives

The Federal Forensic Science Research Initiatives panel included presentations by ATF, FBI, and NIST to discuss current forensic science research activities with the Commission. Mr. Cary Oien represented the Federal Bureau of Investigation; Ms. Susan Ballou represented the National Institute of Standards and Technology; and Ms. Julia Dolan represented the Bureau of Alcohol, Tobacco, Firearms and Explosives. These representatives shared their agency's philosophies and research priorities. They discussed how their agency identifies, selects, prioritizes, and conducts their research projects and highlighted collaborations with other agencies to carry out their mission. Commission discussions included questions regarding instrumentation and databases.

No public comments were made during the open public comment period on Tuesday, January 10.

4. Voting Results

Vote	Document or Vote Question Asked*	NCFS Business (<i>ex-officio</i> voted)	% Yes	% No	% Abstain	Total Votes	# Yes	# No	# Abstain	Comments
January 9, 2017										
1	Does the NCFS Summary Report include a sentence that NCFS continues in its current form?	yes	42	39	18	38	16	15	7	
2	Recommendation on Accreditation of Digital and Multimedia Evidence Forensic Science Service Providers	-	84	13	3	31	26	4	1	No: Bonner Denton, Greg Champagne, Phil Pulaski, Deirdre Daly; Abstain: Nelson Santos
3	Views on Recognizing the Autonomy and Neutrality of Forensic Pathologists	-	94	0	6	31	29	0	2	Abstain: Dean Gialamas, Sunita Sah
4	Model Legislation for Medicolegal Death Investigation Systems	-	90	0	10	31	28	0	3	Abstain: Marc LeBeau, Greg Czarnopys, Sunita Sah
5	Views on Use of Checklists in Forensic Science	-	94	3	3	31	29	1	1	No: Marc LeBeau; Abstain: Arturo Casadevall

5. Attendee List

12th Meeting of the National Commission on Forensic Science, January 9-10, 2017			
Full Name	Title	Company/Organization	Attendee Type
Albright, Thomas	Professor	The Salk Institute	Commissioner
Allison, David	Distinguished Professor	University of Alabama at Birmingham	Speaker
Almirall, Jose	Professor	Florida International University	Speaker
Antell, Kira	Senior Counsel	DOJ Office of Legal Policy	Speaker
Athanas, Karin	Government and Regulatory Affairs Manager	American Association For Laboratory Accreditation	Subcommittee member
Ballou, Sue	FSR Program Manager	National Institute of Standards and Technology	Speaker
Bell, Suzanne	Professor	West Virginia University	Commissioner
Bieber, Frederick	Professor	Harvard Medical School	Commissioner
Butler, John	NIST Fellow & Special Assistant to the Director for Forensic Science	National Institute of Standards and Technology	Commissioner & Vice-Chair
Casadevall, Arturo	Professor and Chair	Johns Hopkins Bloomberg School of Public Health	Commissioner
Champod, Christophe	Professor	Ecole des sciences criminelles / University of Lausanne (Switzerland)	Speaker
Crouse, Cecelia	Crime Laboratory Director	Palm Beach County Sheriff's Office	Commissioner
Czarnopys, Gregory	Deputy Assistant Director Forensic Services	Bureau of Alcohol, Tobacco, Firearms and Explosives	Commissioner
Daly, Deirdre	US Attorney, District of Connecticut	U.S. Department of Justice	Commissioner
Denton, M. Bonner	Professor	University Of Arizona	Commissioner
DePalma, Lindsay	Contractor	National Institute of Justice	Commission staff
Dolan, Julia	Chief, Forensic Science Laboratory-Washington	Bureau of Alcohol, Tobacco, Firearms and Explosives	Speaker
Durose, Matt	Statistician	Bureau of Justice Statistics	Speaker
Epstein, Jules	Professor	Temple Beasley School of Law	Commissioner
Ferrell, Rebecca	Program Director	National Science Foundation	Commissioner
Fudenberg, John	Coroner	Clark County Office of the Coroner/Medical Examiner	Commissioner
Gaensslen, Bob	Professor Emeritus	University of Illinois at Chicago	Speaker
Gates, S. James	Professor	University of Maryland	Commissioner
Grose, Wesley	Crime Laboratory Director	Los Angeles Sheriff's Department	Proxy Commissioner
Hanzlick, Randy	Forensic Pathologist	Retired	Commissioner
Hervey, Barbara	Judge	Texas Court of Criminal Appeals	Commissioner
Hollway, John	Associate Dean & Executive Director	Quattrone Center for the Fair Administration of Justice at Penn Law	Proxy Commissioner
Honey, David	Director, Science and Technology	Office of the Director of National Intelligence	Commissioner

12th Meeting of the National Commission on Forensic Science, January 9-10, 2017			
Full Name	Title	Company/Organization	Attendee Type
Howley, Susan	Public Policy Director	National Center for Victims of Crime	Commissioner
Huestis, Marilyn	Professor	University of Maryland School of Medicine	Commissioner
Hunt, Ted	Chief Trial Attorney	Jackson County (Kansas City) Prosecutor	Commissioner
Jackson, Linda	Director	Virginia Department of Forensic Science	Commissioner
King, Pam	Judge	Minnesota 3rd Judicial District	Commissioner
Lander, Eric	Director	Broad Institute of Harvard and MIT	Speaker
Lawrence, Troy	Sergeant	Fort Worth Police Department	Commissioner
LeBeau, Marc	Senior Forensic Scientist	Federal Bureau of Investigation	Commissioner
Leighton, Julia	General Counsel (retired)	The Public Defender Service for the District of Columbia	Commissioner
Leiserson, William		B.L. Insights, LLC	Public commenter
Leshner, Alan	CEO Emeritus	American Association for the Advancement of Science	Speaker
Manzollilo, Patricia	Laboratory Director	U.S. Postal Inspection Service	Commissioner
May, Willie	Director Emeritus, NIST	National Institute of Standards and Technology	Speaker
McGrath, Jonathan	Senior Policy Analyst	National Institute of Justice	Designated Federal Officer
Motta, Thomas	Senior Science & Technology Policy Advisor	Federal Bureau of Investigation	Proxy Commissioner
Nerheim, Michael	Lake County State's Attorney	Lake County State's Attorney's Office	Subcommittee member
Neufeld, Peter	Co-Director	Innocence Project	Commissioner
Neumann, Cedric	Assistant Professor of Statistics	South Dakota State University	Speaker
Oien, Cary	Senior Level Scientist	Federal Bureau of Investigation	Speaker
Palenik, Chris	Vice President	Microtrace LLC	Speaker
Peat, Michael	Editor, Journal of Forensic Sciences	Journal of Forensic Sciences, American Academy of Forensic Sciences	Speaker
Petraco, Nicholas	Associate Professor	City University of New York, John Jay College	Speaker
Philpott, Kate	Independent consultant	Self-employed	Subcommittee member
Pulaski, Phil	Chief of Police	Muttontown Police Department	Commissioner
Rakoff, Jed	U.S. District Judge	U.S. District Court, Southern District of New York	Commissioner
Redle, Matt	County and Prosecuting Attorney	Sheridan County and Prosecuting Attorney's Office	Commissioner
Rochford, Kent	Acting Director	National Institute of Standards and Technology	Speaker, and new Co-Chair of the NCFS
Salyards, Jeff	Executive Director	DOD Defense Forensic Science Center	Commissioner

12th Meeting of the National Commission on Forensic Science, January 9-10, 2017			
Full Name	Title	Company/Organization	Attendee Type
Santos, Nelson	Deputy Assistant Administrator	Drug Enforcement Administration	Commissioner & Vice-Chair
Scanlan, Timothy	Deputy Chief	Jefferson Parish Sheriff's Office	Proxy Commissioner
Schrotter, Frances	Sr. Vice President & COO	American National Standards Institute	Commissioner
Scott, Kevin	Director, Policy Analysis Unit	DOJ Office of Legal Policy	Speaker
Sudkamp, Laura	Laboratory Director	Kentucky State Police	Subcommittee member
Thompson, William	Professor	University of California, Irvine	Speaker/Proxy Commissioner
Turman, Kathryn	Assistant Director	Federal Bureau of Investigation	Commissioner
Weedn, Victor	Senior Forensic Advisor to the Deputy Attorney General	U.S. Department of Justice	Speaker
Weiss, Danielle	Contractor	National Institute of Justice	Commission staff
Whyde, Anthony	Statistician	Bureau of Justice Statistics	Speaker
Word, Charlotte	Private Consultant		Subcommittee member
Wroblewski, Jonathan	Principal Deputy Assistant Attorney General	DOJ Office of Legal Policy	Speaker
Wulff, Paula	Unit Chief, Forensic Science Law Unit	Federal Bureau of Investigation	Subcommittee member

The following transcript is provided for informational purposes only and may not provide exact quotations from the meeting proceedings. For a full account of this NCFS meeting, please visit the following link for the recorded webcast: <https://www.nist.gov/topics/forensic-science/ncfs-meeting-12-webcast>

6. Transcript

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NCFS DAY #1, MONDAY, JANUARY 9, 2017

Part I

JONATHAN MCGRATH: Good morning. My name is Jonathan McGrath with the NIJ and the DFO for the National Commission on Forensic Science. Welcome back to the Office of Justice Programs for meeting number 12 of the Commission. I'd like to thank everybody and welcome everybody once again back to DOJ and extend a thanks to NIST for hosting us for the previous meeting in September, and I will pass the torch over to Dr. Weedn and Dr. May to kick things off for the opening. Thank you.

VICTOR WEEDN: Well welcome, and happy New Year. Welcome to this twelfth meeting of the National Commission on Forensic Science. Unfortunately DAG Yates is attending an event in Boston this morning, and she sends her regrets.

Commission Membership. As you know, Commissioner Stephen Feinberg passed away on December 14th. We were notified only a few days before that of his significant illness and impending death. And we sent a Certificate of Recognition of his work for this Commission, other public service efforts, and his many achievements over the decades, which I hope you all saw. The Department is grateful for Stephen's commitment and service to the Commission. May his memory be a blessing. Let's pause for a moment of silence.

Thank you.

As it is a matter of course for the NCFS to fill Commissioner positions when they become vacant, DOJ is now soliciting applications for a Commission member with expertise in statistics. The application period has been extended until Thursday, January 26th due to the holidays. And application instructions are available on the NCFS website and in the Federal Register.

As Dr. Vincent Di Maio stepped down from the Commission following the September meeting, Dr. Randy Hanzlick was appointed by the Attorney General to fill this Commissioner position to represent the Medical Examiner community. I think most of you know him through his previous work and presentations as a member of the NCFS MDI subcommittee, but for those who do not, please know that Dr. Hanzlick is

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a revered member of the pathology community, previously at the CDC, a former President of the National Association of Medical Examiners, and recently retired from nearly two decades as the Chief Medical Examiner in Fulton County, Georgia. He has previously co-Chaired with John Fudenberg, the SWG, or Scientific Working Group on Medicolegal Death Investigation, and will now co-Chair with John Fudenberg the MDI Subcommittee of this Commission.

Randy, we are appreciative that you are on board.

Updates on the NCFS recommendations. At the tenth meeting of the NCFS in June 2016, you voted to adopt two recommendations, one on a national disaster call center and another on pretrial discovery. We are pleased that once again the Department has been able to review and respond to these recommendations within two Commission meetings. I know that the Attorney General's declaration was shared with you, and I hope that you have had an opportunity to review it.

The National Disaster Call Center. The Attorney General has designated Mark Michalic the DOJ Emergency Preparedness and Crisis Response Coordinator to explore with the Department of Homeland Security and the Department of Health and Human Services the possibility of establishing a national disaster call center capability. These discussions are currently ongoing. Specifically, a meeting was held with FEMA to discuss the capacity of the National Emergency Family Registry and Locator System, NEFRLS, to track missing and deceased persons. A meeting with HHS is to be held today, and I and NIJ officials who are responsible for the National Missing and Unidentified Persons System, or NSUPS, program have participated in many of these discussions.

Pretrial discovery. I am pleased to share how the Department responded to this recommendation and the important contributions the NCFS has made in advancing Department policy on discovery.

When the Commission began its work on this recommendation and related views document so many months ago, it spurred us to look internally at our own policies and to assess our policies and practices in cases with forensic evidence. We convened meetings with subject matter experts to better understand how DOJ forensic labs work with DOJ prosecutors and to what extent practices differed across the country. Department policy on discovery is guided by the January 2010 Memorandum for Department Prosecutors issued by then-Deputy Attorney General David Ogden, that explains the Department's discovery obligations. This is now referred to as the Ogden Memorandum, and you can find it if you make a Google search. And it is really the go-to resource for our prosecutors.

The Ogden Memorandum lays out specific steps to follow and encourages broad and comprehensive discovery. The Department agrees with the Commission that "the need for pretrial discovery of forensic evidence in criminal cases is critical." After looking closely at the Ogden Memorandum, and given the rise in the complexity of forensic evidence, the Department decided to provide additional guidance to the prosecutors as how they need to comply with the Ogden Memorandum in cases with forensic evidence. That guidance is an Addendum to the Ogden Memorandum. We have just issued it to the Department prosecutors and made it public. Specifically, we believe this guidance achieves the Commission's intent to ensure "comprehensive discovery in criminal cases that involve forensic science evidence."

Because this is brand new guidance, we plan to assess how it meets the needs of the Department, and the Office of Legal Policy will revisit this issue in coming months to ensure that the goal of broad pretrial discovery of forensic evidence has been advanced.

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MDI Recommendations. As you know, DOJ asked the Office of Science and Technology Policy, OSTP, to coordinate an MDI interagency working group last year to examine the NCFCS recommendations on accreditation and certification in the medicolegal death investigation community. And as a result of those proceedings, as of last week they have posted their report strengthening the medicolegal death investigation system accreditation and certification, a path forward. You can find this by Google searching OSTP and MDI.

In response to this effort, I am pleased to announce that this morning the National Institute of Justice, NIJ, posted a solicitation for the first federal grant program specifically dedicated to strengthening the medical examiner and coroner system in the United States. This competitive program is designed to support the enhancement of MDI services with two important goals: One, to increase the supply of qualified forensic pathology practitioners by supporting forensic pathology fellowships. And two, to strengthen the quality and consistency of MDI services by providing resources necessary to achieve accreditation. Additional information can be found on the NIJ website.

The FSDRs and ULTRs. I am pleased to announce that the Forensic Science Discipline Reviews are poised to begin their implementation phase imminently. The Office of Legal Policy will further comment on this later today along with their efforts on uniform language for testimony and reports.

The PCAST Report. This Department has undertaken unprecedented efforts to examine and strengthen forensic science and its use in the courtroom. Specifically that evidence is properly identified, collected, and maintained. That the evidence is properly examined and analyzed to reach sensitive, accurate, precise, robust, and meaningful conclusions supported by the scientific literature, and that those conclusions are properly testified to.

As you all know, PCAST issued a report in September 2016 entitled Forensic Science in Criminal Courts: Ensuring Scientific Validity of Featured Comparison Methods that weighed into this debate. The Department shares the underlying report that the scientific conclusions of forensic experts should not go beyond what the available science and research supports. And that there is a need for increased attention and funding for forensic science. However, as is no surprise to anyone, DOJ has scientific and legal disagreements with aspects of this report. The Department stands by the forensic sciences as practiced in their forensic laboratories and by their forensic professionals whose quest is to bring important information to courts in order that justice be carried out. However, the Department does respect the contribution of PCAST that it is making to the discussion on the use of forensic science in the courtroom. And we will continue our efforts to support reliable, consistent, and scientific forensic evidence.

In this meeting we specifically turn our attention and thoughts to the scientific foundations of our forensic sciences and the research and development to advance those foundations.

Future of the Commission. There's no need to remind all of you that the Commission's current two-year charter expires in April of 2017, about three months after the next Administration begins its term. As we have said in previous meetings, it is ultimately up to the next Administration to decide whether they want to continue this Commission or not. We have Department staff at NIJ and elsewhere who work closely with you, and they will continue working with you during this transition. As always, we appreciate your valuable efforts in helping to improve the forensic sciences in this country.

Thank you.

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WILLIE MAY: Good morning, everyone.

Last Tuesday, January 3, 2017, I retired from the federal government after 45-1/2 years of service, all at NIST. About three weeks ago yesterday, I was the commencement speaker at the University of Alabama Huntsville, and I shared with the graduates that over that 45-1/2-year period of time, I had taken 20 sick days. And that includes two fairly serious operations. And I took so few sick days because I didn't have a job. I had an interesting, exciting, fulfilling, and rewarding career. And throughout my research – first my research and then my management career – at NIST there were very many things that I'm very proud of. And certainly working with the Department of Justice to strengthen the science that underpins the forensic evidence used in the U.S. criminal justice system was certainly one of those.

Co-Chairing this Commission along with Deputy Attorney General Sally Yates has been truly a delight. But you, through your subcommittees, have identified and tackled a number of important and thorny issues that are not limited to issues ranging from the need for accreditation and proficiency testing of labs to cognitive bias on the part of witnesses, jurors, and so forth.

There have been 39 documents that you have approved. And I understand from John, and blame him if the number is wrong, there are six more that will be under discussion at this meeting.

Thank you for your very hard work in discussing these challenging issues and preparing views and recommendations for the Attorney General to consider.

I understand that Commissioner Pam King and others have prepared a summary report, or at least are in the process of preparing a summary report, on the progress of this Commission over its existence, and I'm really – I'm looking forward to reading that report.

I, along with my colleagues at NIST, we also saddened to hear of the passing of Commissioner Stephen Feinberg. Certainly he has contributed a lot to the deliberations of the Committee, at list this Commission, and certainly he was instrumental to NIST in standing up our new Institute – new Center of Excellence on Forensic Science, CSAFE, so we really owe him a lot and was very happy to sign on the certificate expressing our appreciation on behalf of all of you. And we're so happy that we got it to him while he was still conscious and cognitive so he could see our appreciation before he passed.

Upon my retirement, I guess the Associate Director for Laboratory Programs, the smiling gentleman you see there, Kent Rochford, has always been – that position, when I had it and when Kent assumed it about a year ago – serves as the Deputy Director of NIST and also Deputy Undersecretary of Commerce for Standards and Technology. So once the Director is absent, removed, whatever, the ADLP becomes the Acting Director of NIST until the President nominates and the Senate confirms a new Director. So he'll serve in this capacity until that time. And I'm guessing probably six months to a year.

Kent is not new to NIST. He's been a NIST employee for roughly 20 years. He left twice, but we roped him back both times. And I specifically went out and begged Kent to take this job. I wanted to make sure that NIST was left in very, very good hands, and I'm very pleased that I was able to convince him, twist his arm, bribe him to come and take this job.

As I said, he's been at NIST more than 20 years. His last position for the last year has been the Associate Director for Laboratory Programs, which means he runs the science – he has run the science at NIST.

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Before taking over this responsibility, he was the Director of our Communications Technology Laboratory. In fact, that's what we really brought him back to NIST for. This operating unit, as you see, is responsible for public safety communications research and doing the research and testing to support this nationwide network for first responders. They are also looking at issues of improving the efficiency of spectrum sharing, and also developing R&D programs to support next-generation communications.

So that's the very exciting job (inaudible) pry Kent away from to come and take over the responsibility of Associate Director for Laboratory Programs knowing that, one, we were going to have an election and a new Administration, and independent of the outcome, I was going to retire this year.

NIST and this Commission will be in good hands with Kent, I assure you.

Before allowing Kent to further introduce himself to you, I'd like to announce that the proceedings of the 2015 International Symposium on Forensic Science Error Management were completed and made available on the NIST website, oh, a few weeks ago. So go to the NIST website, and you can see the proceedings of that meeting.

We are currently in the process of planning our second symposium on this same topic. That meeting will be held on the NIST campus in Gaithersburg July 24 through 28. So stay tuned and we hopefully will see a number of you at that meeting.

Now, I'm retiring from the federal government, I'm not retiring from life. I will remain on as a guest scientist at NIST. I don't know how much science I'll do, but I'll be a guest at NIST and have an office. And one of the things that I'll be doing is serving as one of the NIST chief evangelists. Spreading the word about who NIST is, what we do, and why you should care. I will be joining the faculty at the University of Maryland effective February 1, and I'll also be running for presidency of the American Chemical Society. So I'm not good at honey-do, so I'll stay busy.

So with that I'd like to introduce you to Kent Rochford. Kent.

KENT ROCHFORD: Thank you, Willie. And I'd like to thank him for his dedicated work with the Commission and compliment him for his efforts over the years at improving measurement science at NIST and around the world. Willie has been a fierce advocate and a strong supporter for bringing NIST capabilities to the table in an effort to help strengthen forensic science.

So under Willie's leadership, NIST has increased its role in forensic science. Our internal research programs continue to grow in an effort to address the needs of this community.

Two months ago we held the 2016 Forensics at NIST Conference to inform the community regarding progress with our research programs and our Center of Excellence, now known by its acronym CSAFE, the Center for Statistics and Applications in Forensic Evidence.

Later in this meeting, Sue Ballou from the NIST Special Programs Office, will provide a detailed review of our portfolio in forensic science research at NIST.

Since I took the position of Associate Director for Lab Programs at NIST about a year ago, I've been drinking from a fire hose to get up to speed on the many capabilities and commitments that NIST has. Forensic science is one of the core topics that NIST is involved in. We have other core topics at NIST,

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including mass communications, advanced manufacturing, cyber security, energy and environment, resilience, health and bioscience, and quantum science.

Given the deep expertise that NIST scientists have in these many topics, NIST is being asked to assist in more and more challenging areas related to measurement science. This Commission has asked NIST to perform technical merit evaluations on forensic science methods and practices, and we're holding discussions at NIST now to understand how to best accomplish these proposed tasks.

Dr. Rich Cavanagh spoke at the last Commission meeting regarding potential pilot programs that we are considering. This afternoon you'll hear from Dr. Eric Lander, co-Chair of the President's Council of Advisors on Science and Technology. PCAST issued a report last September that generated a number of responses from the forensic science community. The PCAST report makes a number of requests of NIST including performing foundational validity evaluations on forensic science methods and issuing an annual public report of findings. Now taking on additional work will require additional funding, but NIST is exploring how we might proceed in this important area.

Regarding NIST's work on the organization of scientific area committees for forensic science, I wanted to make you all aware that the OSAC annual report was released since the last Commission meeting, and this can be downloaded from the NIST website. In addition, the NIST OSAC Affairs Team continues to produce a monthly newsletter with up-to-date summaries of ongoing activities within OSAC. Next month the American Academy of Forensic Science, at the meeting in New Orleans, public status reports will be provided on activities from each OSAC subcommittee.

I look forward to getting to know each of you as we work together to help strengthen forensic science. Thank you for your efforts and your commitment to the activities of this Commission.

WILLIE MAY: So I think we have about maybe five minutes for questions, comments regarding Victor or any comments that I made before we go to the next session.

NELSON SANTOS: (Inaudible.)

WILLIE MAY: Okay, Bonner

BONNER: Willie, I want to thank you for your efforts. First knowing you as a world-class chemist, analytical chemist, and later your leadership at NIST and advancing NIST's capabilities and power in the field. Also I think I speak for the rest of the Commission, I know I speak for myself, I thank you very much for the leadership and guidance you provided the Commission over this period of the last several years. Thank you very much for your efforts.

WILLIE MAY: Thank you. Thank you very much, Bonner. Thank you, Commission.

NELSON SANTOS: Julia.

JULIA LEIGHTON: I think I got it now.

Ditto to that. Thank you very, very much for everything you've done.

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But I'd like to turn to the DOJ announcement with respect to discovery, and I apologize if I'm the uneducated here and not as familiar with the Ogden Memo as I should be. But I was looking back over what our recommendation was and reviewing the memo that was put out, and I'm not sure that I see any change. And so I was wondering if you could help me identify what you see as "the change" that's happening in response to this. And there were a couple of things that struck me. It seemed to me that the memo was substituting the case file, access to the case file, for a detailed written summary. And I think we made it clear that we were looking for something different than that. It also talked about if SOPs are not online, that a case-by-case decision should be made about whether the defense is entitled to it in part by the arguments that the defense makes. And I think we tried to address that in an earlier recommendation where we asked that they be online, and you came back and said that you put them online, but there was a follow-up question to that because we also said make them available electronically, you know, in the interim while you're trying to get things online. And I thought you were going to take that question back. It seems to me inconsistent with the recommendation that the documents be transcribed, that they be online, that they be available electronically, and the notion that DOJ is going to put them online, but in the meantime we're going to hold back and do a case-by-case assessment rather than make them available electronically.

And it also seemed that there was some limiting of the disclosure of communication logs, which, as you know, has been a subject of conversation with this Commission about the importance of being able to identify those with a cognitive bias or contextual bias that they may introduce into the process.

And last from what I was looking at it seemed like you were talking about qualifications but didn't address the specifics of publications and testimony, which we took some time talking about and made some modifications about the time period from Rule 26.

So those were the things that jumped out at me, but overall I couldn't see the statement in there of how we are going to do things differently than we've done before. It was sort of how to better prepare, but not what's the difference, what's the change that's responsive to the recommendations that were fairly prescriptive.

VICTOR WEEDN: Thank you for your question. Let me point out that one of DOJ's experts in this area is in the room, and maybe you could have a conversation with him after the meeting or as an aside.

What I can tell you first in terms of making the materials available electronically, I think we generally do that now as we can. When there is a subpoena or a request for the materials, I think DOJ is generally pretty forthcoming. But we clearly are trying to put them online. We have announced that we would do that within 18 months as of the last meeting.

The issue of whether or not there is a change or not, we believe that it was very important that prosecutors really were quite forthcoming and broad in their discovery. There is a feeling that there wasn't good guidance out before, and so now we try to have good explicit and specific guidance. And as you heard, we're going to revisit this. While this may not be as broad as you would have perhaps wanted, in terms of response we really had a very significant deliberation on this issue. We went outside our normal procedure to really hold several meetings and discussions as how to address this. And we saw this bigger than just the NCFs recommendations. That was a touchstone. When we saw that this was first an issue for the NCFs, we began those discussions, so even before we had the final recommendation. So it's been going on for numbers of months. I can't say a full year, but something of that order.

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And so it was a very significant thing that we feel we came out with, even if it's not fully complying or going all the way to a Civil Rules of Procedure 26 type document.

JULIA LEIGHTON: I appreciate that this is a very, very difficult conversation at the Department of Justice. I think it's actually been a difficult conversation for a very, very long time. I think Janet Reno came with a very different view. So I'm not unmindful of that. But I guess I didn't hear an answer to my question, which is how does this move the ball forward? How is this a change? Other than you're still talking about it.

VICTOR WEEDN: No, we're not just still talking about it. We issued guidance. That guidance was very specific. It's not only out there for the prosecutors, it's out there for the public, and you can refer to it in your defense motions. We believe that this will cause a greater pretrial discovery process. And we say that – or I say that – not saying that we weren't trying before. We actually generally try to make all the records available from the forensic science labs. But we recognized that it was not uniformly addressed in this way. So this guidance hopefully brings us up to speed. We want to look at our practices. Give us some time to see to what extent we really are complying and moving forward and coming closer to where you think we ought to be. And then we're going to look at it again to see where we really do need to make further changes.

NELSON SANTOS: Jules, and this is – it's Jules. We need to move on after this question please because we've got a lot to cover.

JULES EPSTEIN: There we go. Thank you. Sorry.

Good morning and thanks. I just have a quick question. I'm hearing, and if I'm wrong I'm wrong, and I don't know if this is answerable, but I feel obliged to say it. The significant disconnect between the NIST response to PCAST and the DOJ response to the PCAST report. If I understood it correctly, the NIST position was this seems pretty important, we're going to see if we can find funding to do what PCAST suggests to be done. And the DOJ response, and I wrote the word down, are we support what's going on in current forensic discipline testimony but we respect the report. I don't get it, and I'm sorry but I just feel obliged to state that that's incompatible. If you respect a report that says there are foundational problems, there shouldn't be a wholesale continuing to do things as they've been done. Whether that's an answerable point, I don't know, but I wanted it to be acknowledged. Thank you.

WILLIE MAY: Just say that from the NIST perspective we looked at the report as presenting important and interesting problems in measurement science. So we did not look at it from the legal perspective, we looked at it solely from a scientific perspective. So those were interesting and challenging measurement problems that had been brought to us, and we agreed to explore them in the constraint of the resources that we have.

VICTOR WEEDN: So, I think we used the word “respect” in the sense that different people have different views and opinions, some were expressed in this report, and we appreciate that it furthers the dialogue. We also – I also – indicated that we actually agree with the report in terms of the fact that there should be more research in this area. I'd really like to see increased funding in this area.

Second is that we do agree that our evidence presented in court should have a good, scientific foundation.

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Those are general principles where we agree with the report. There are specifics in the report that we definitely disagree with. So I think that my statement is actually compatible with the report. We have our disagreements. And I think that would be clear to anybody. Yes we, DOJ, does continue to support the current practice. Does that mean it couldn't be better? No. Does that mean that we couldn't do more research that helps advance our testimony in courts? Of course. You know, we're all about that actually. There is no desire by anybody, I think any forensic scientist, to go forth and say things that we don't think are untrue. And to the extent we can be saying more that's useful for the criminal justice system, we'd like to do that. So we have that as a common goal.

NELSON SANTOS: Thank you. Okay, we're going to move on to the next topic. Pam, are you ready?

HON. PAM KING: Sure.

NELSON SANTOS: Okay. Before we go to Pam, I just want to ask everyone, we've got – especially during the breaks, we've got some remote speakers coming in. If we can all get back at the time, it would really make things go a little smoother. There's probably going to be a lot of questions, so I ask that you come back after your breaks as quickly as possible.

So I'm going to turn it over to Pam and the SPO report.

HON. PAM KING: Thank you.

Okay. So I want to spend the time that's been allotted here to discuss the document that I and a great many other people have been working on. I put together a super boring PowerPoint, mostly to keep me on task. So I apologize for its dullness.

Anyway, I want to essentially cover these topics. I want to talk about the sort of purpose and intent of this document from the SPO's perspective. How is it that it was created. Give you a few highlights, and then, frankly, what I'd like most is discussion.

So with that I want to start with sort of what the purpose of this document is. Just for any of you that haven't been paying attention or maybe forgot, we as a group have been having this discussion now for a number of Commission meetings where we were looking towards the April meeting, the conclusion of this particular chapter of this Commission, and what did we collectively want to say about this. So the SPO, I initially came up with sort of some – well, with feedback from everybody in this room – some suggestions about what that should look like. And we really believed that putting together a comprehensive report that both sort of summarized in one document what it is that this group has been doing and has accomplished as well as acknowledging all of the things that we haven't quite got to or that maybe need to be picked up by somebody at some point.

So that was really what this document was geared towards trying to accomplish. How it was created was – first of all it should be very, very clear this is a business record. The SPO is not in a position to be doing views documents or recommendations or anything. That's not the point or the purpose of that group. And we wanted to do this as a business record of this particular Commission because we also want to make sure that everybody at this table has an opportunity to weigh in and vote including ex officio members. So for that reason, this is a document that doesn't take any real position as to whether or not something should or shouldn't be done. It's simply taking all of the great ideas that have come out of the

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subcommittees, have come out of the discussion that we've had in this room, and placing them into one place so that it can be referred to for purposes of planning for the future, I guess.

To do that we took all of the input that was provided to subcommittee co-Chairs, as well as all of the discussion that we had at the last meeting, I took some notes about that, and then anybody else that had provided an email or other communication with respect to what are the ideas that we want to utilize.

So I worked with the staff, with co-Chairs, with other Commissioners and people who were just willing to volunteer, to put this document together, but it really was born out of all of the input from everybody in this room.

So that's how it was created. And I want to pause for a minute because I know it has been referred to as Pam is writing. Pam King did type some of this. But the fact of the matter is that this is not my document. There are a ton of people that worked on this, and particularly the staff, some folks from the Office of Legal Policy have contributed tremendously to the way that this document is put together. So although I may have spent a few days or hours at a keyboard, this is not my document. This is this group's document because there is a vast majority of people in this room who have contributed to it. So for all of you that have taken the time to review drafts, who have taken the time to help with organizing, I thank every single one of you, and I would do it by name but then I'd forget somebody and I'd feel bad. So if you helped, thank you.

With that – clicker broke – it's a good slide to keep up and it's kind of boring anyway, so I'm just going to continue to move on and we'll see if we can get the clicker to work at some point.

The one thing that I wanted to start with is sort of this structure or intent and just general comments on that, and then what I thought we would do is just go through – there is essentially three separate sections to this document. What we did is one of the challenges of doing this was how in the world do we organize the work that we've done in categories that make some sense or give some structure to the document itself. So we did come up with three different sections. Those sections include the first one is Foundational, then Operational, and then Relational. And they are defined within the document in that particular way. It just gave us sort of a roadmap for how to categorize certain types of documents into groups. So you'll see that in both the area that talks about what we've done, where we've come from, as well as then the feedback that was put into the looking towards the future follows that same format. It may not be perfect, but that was sort of where we were going with it.

I did get some comments from Commissioners before this meeting and after the Commissioners had an opportunity to look at this. One of the ones that I would really like to get some discussion on is if it's clear what the intent is, one of the things that was discussed is that we don't want to make any sort of opinion or recommendation with respect to the structure, which I tried to stay away from, but there was also some strong feelings among some Commissioners that maybe we do want to make a statement about whether or not this Commission should continue. So you'll see in the very sort of last paragraph of the document in its entirety there is a statement there recommending or suggesting that this Commission continue. And in some ways I think from what I've heard from comments already, it creates sort of an inconsistency with respect to we're not commenting on what the process should be, but we think this is a pretty good process. And maybe there are some better ways to do that, maybe there's some general changes that could be made, or maybe we just take that part out. So if anybody has any just sort of comments generally, and then we can go through the different sections. Questions?

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Julia?

JULIA LEIGHTON: This is my morning.

I would not shy away from a recommendation. We're a federal advisory commission. Now it may be that we don't have agreement on one, and that would be a different reason. But I think that if we do shy away from an ultimate recommendation, I'd like us to at least consider saying what's worked here. And I think when I think about what's worked here, it ends up, to me, being an argument to go forward.

And what I think has worked here is that part of the process has been actually for all of us to get to know each other, to argue openly, to put our cards on the table as it were, and then to start to find middle ground, to start to find common ground. And it's been bumpy at times, but if it wasn't, then clearly not all perspectives would have been at the table.

And so while I certainly am not going to say it's perfect, I'm not sure that it isn't perfect for what it's designed to do which is to bring a variety of stakeholders together. I'd be the first one to have said that this should have been dominated by scientists, it should be run by scientists, it should be about science, but the powers that be haven't chosen to move forward that way, and there's no indication that that's what's going to happen. And therefore I think that it is this structure that is the next best thing. And it's better than just letting it all drop.

So I'd actually ask that we think about what has worked here, and, to the extent that we think, collectively, it's made some progress, I think we should consider making a recommendation. I would hate to see the next Administration just let it go altogether. I think we've started this conversation about science, and forensic science, and improving forensic science, and that it would be very sad to see us reverse course on that.

I also think that to just restart with a whole new group, with a whole sort of fresh slate, I can't imagine that there's anything, and I look to Nelson and John, to think, yeah, you probably could start a new group having learned things from this group that would go a little more smoothly, but you'd still face a real uphill battle to get it to gel again. To make it work again. And so if anything is going to happen, then I think it should be this, and I think it should be this group to the extent that people are willing, and I know there are some who have devoted extraordinary amounts of their time, and I know Nelson and John have probably got some thoughts about whether they want to be the ones. But I think to just scrap it altogether and start fresh, or not do it at all, is to give up on the work we've done. And despite my apparent complaints about the work we've done, it is – I've learned to have a long view. A very long view.

HON. PAM KING: Thank you, Julia. Gerry?

GERALD LAPORTE: So I don't disagree with what Julia said, but I do think that there is a conflict in the last sentence of the Conclusion that says the current members of the Commission recommend that the incoming Administration continue this federal advisory committee to tackle these tasks. I mean I think anybody that's reading this, you make a good business case scenario, you point out the positives, and even that last paragraph says a lot of good things, but I don't know if we're necessarily in the position to make a recommendation in this kind of document.

HON. PAM KING: It certainly would be a – I mean it's certainly not a recommendation in the sense of a recommendation that we would be putting forward for public comment and so forth because this is a

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business record so we're not asking and, you know, the Attorney General, I don't think, is going to be in a position to necessarily do that. That's going to have to be the next Administration in its entirety. So maybe – a couple of thoughts I've had would be to say that – change the language first of all from “recommend” to “believe” which at least makes it clear that we're not telling anybody to do anything. And then maybe the other thing we could do would be to take out the “to tackle these tasks” because maybe it should continue but I know there were other Commissioners who were like, well, these are good ideas that are in here but some of them may not be appropriate for the Commission to tackle, it may be somebody else that would be more appropriate. So if we did a little bit of wordsmithing, that might help a little bit. I don't know, Gerry, what you think about that idea, but –

GERALD LAPORTE: I think that sounds like a great idea.

HON. PAM KING: Okay. Other people who have comments? Arturo?

ARTURO CASADEVALL: Yeah, I want to support what Julia said and add something else that is very important, and that is commissions like this develop institutional memory.

HON. PAM KING: I'm sorry?

ARTURO CASADEVALL: Commissions like this develop and institutional memory of problems that they tackle. And I want to give you an example, a very successful example, from the world of science. In the 1970s there was a tremendous debate as to whether cloning should be done. And in fact there was a moratorium. And the opinions around the table in those days were even more fierce than they are in this Committee. And the United States established a Recombinant Advisory Commission, which then went on over the years to work through all the issues, and is still going today, and has given us the recombinant DNA revolution which is going on and is providing food and all this. And it's an example where you create these bodies, even though there is a lot of tension, the issues tend to be worked out. And also the community looks at it that they exist and there is a place in which things can be verbalized. So I strongly think that we should make a recommendation that something like this continue.

HON. PAM KING: Barbara? Oh, sorry Cecelia. Were you up first? I don't know. Go ahead.

CECELIA CROUSE: Pam and I had an opportunity to speak on Friday about how I overall felt about this document. First of all I think it's a very important document, and I told Pam that it obviously took an inordinate amount of effort to put it together.

I did have several concerns, however, and Julia, one of them is the fact that when does – we're policy, and I'm a practitioner, and I've been trying to meld those two for the past three years. That's actually been a new endeavor for me. There are parts of this document that I really feel that the Commission can go forward on. But there are definitely those that I just – I don't know if this is the right structure to answer some of these questions. We – we – I, in my comment, deferred to the enormous amount of effort that the OSACs (sp) are making in a lot of these areas. And one of them, I don't know if you're going to go through them individually, but to assess or address digital evidence, that, Arturo, sounds like something that a Commission would need because I just don't have a handle on that and don't have a handle on software source material, and I really feel that this Commission has accomplished a lot. I think it's taken a lot of grief, but I think it's also been able to expose some of the issues that have come out with the NAS report, and the iwigs (sp), and there's been a lot of things going on since 2009, a lot. And I'm not sure this document gives credit to that. I think a lot of the questions that – it appears as though these are questions

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being asked for the first time, and they're not. There's many, many of these that actually we've tried to address, not only here but for the last six, seven, eight, nine, ten years. So my feeling is that it should be more of a belief based on what we're trying to address versus everything that's been documented here.

HON. PAM KING: So, Cecelia, with that change in the last sentence, does that help to meet some of the concerns that you have?

CECELIA CROUSE: Yes, it does, actually, compared to what we had – or what you had, sorry. But I still think the document lacks giving credit to what's already been answered out there, or attempted to be answered. We did not come up with a lot of these ideas ourselves. They have been going around and around for a very long time.

HON. PAM KING: I don't want to put you on the spot, Cecelia, but I'm just trying to think about ways that we can potentially add that in or make that piece more acknowledged. Now I know that there were two suggestions. One is to change the portion about doing the survey and acknowledging VJS's work in that particular area as well as adding in the reference to the biological evidence manual that was put together – I can't – I'm losing the words.

CECELIA CROUSE: No, they're –

HON. PAM KING: Will those references help in your concern as well or –

CECELIA CROUSE: Yes.

HON. PAM KING: Okay.

CECELIA CROUSE: There's actually quite a few documents out there that address how to handle evidence. There's quite a few documents out there that – VJS, I'm so glad that they're going to present their 2014 – they've answered a lot of the questions. I know the biggest question we had was how many one and two person operations are out there and how are they going to be affected by what we do. I'm not saying that the documents that came out specifically were able to address that. But if VJS needs some guidance to do something that they haven't already given us, and if you read those two documents, they're quite extensive actually. And I think there's a lot of information in there that we were trying to ask. And it's 2014, but we have that information.

Again, the one on evidence. There's a whole document out there that could be used as a template.

But the biggest one was under rationale when it talked about trained forensic science users, law enforcement, lawyers, judges, and the public. And Training on Science and Law Subcommittee here provided an excellent document and they proposed subject matter disciplines. But there's a lot of – like I brought up at the last meeting, where there was a grant for \$500,000.00 to find out how important is it – and this is my interpretation – how important is it that jurors understand the validation of an analysis, what does that weigh in how they feel about the expert witness. And the bottom line was that the judges need to make the decision. Because the jurors maybe didn't really understand the import of it.

So it sounds as though, in the rationale, again, that we're the first ones to ask these kinds of questions, and there's been lots of NIG grants that have been given to individuals to find out what that interdigitation is

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between law enforcement and the laboratory. And I just think that's left out here and that it needs to be recognized that some of these can be answered. And I don't know if we do it by policy, but that's our job.

HON. PAM KING: Okay, thank you. Barbara?

BARBARA HERVEY: I don't mean to sound arrogant, I'm sure no one in here does. But with the expertise that's in the room I think recommendation is a good idea because we have spent a lot of time. And if in the last paragraph you say that we recommend that we continue to tackle these tasks, I don't see why that doesn't incorporate what you want to do. I mean, you can enumerate for example such and such and such, but these tasks aren't necessarily just these. I mean, these are examples of things that we've done. This is supposed to be a summary of what we've done, but that doesn't exclude the other things that we should be doing. And I personally think we've made a lot of progress, so I would recommend it because everybody here has put a lot of time and effort and thought into this, and I think we've made good progress. That's all.

JULES EPSTEIN: Cecelia, I want to make sure here what you're saying, because then, if I am, I think there's a relatively simple fix. We didn't invent this, we're not the only ones working on it, is that the gist of it? So why don't we essentially say that? In other words there can be – I don't want to call it a disclaimer, but it's a disclaimer, right? We didn't invent this, but there is something different about this Commission, which is we're sort of the one place where it all comes together. So yes, there's an effort here and an effort there. And our job, if I understand it – I think I do – is to be the umbrella and sort of the watchdog. So a friendly amendment to your comments because I get them. It shouldn't be that we invented the tire. It was invented – the wheel, right? It was invented before us. It's to simply say that of course we acknowledge and we're happy about it. That movements to improve forensic science have been going on, I guess in one sense, since there's been a notion of forensic science, and otherwise one could certainly say – I date it to at least Janet Reno, right? That's in my crabbed view of the history of the world.

Anyway, my suggestion is rather than footnote here and document there, that there be a very general statement that says we're part of a bigger thing but our job was to have this in a perspective from up above and sort of also bring all these disparate voices together. Does that do the trick?

CECELIA CROUSE: Yes. And what I told Pam on Friday was this actually argues for a national institute of forensic science, is what it does. I'm not saying it should come to an end by any means. I'm just saying that we need to think about what our capacity is and what else is out there exactly, Jules.

HON. PAM KING: I think it's Jonathan and then Jim and Matt and Julia. So Jonathan.

JONATHAN MCGRATH: Thanks, Pam. No, I'll be brief. I just want to comment on the discussion about using the recommendation language. I think that's something that staff have struggled with, you know, with the two types of documents. We've got the views documents, we've got recommendation documents, and we've worked with several of the subcommittee co-Chairs to articulate exactly what is being said in the documents, and I know some of the wordsmithing language that we've used to differentiate the two have been, you know, maybe we believe rather than recommend, or we strongly encourage or we value, we have some additional language. So I just want the Commissioners to consider the language here, too, because we really don't want to present a recommendation within a Commission business document. But I really appreciate the comments that Julia and Arturo suggested as well because I think some of these comments can be worked into the wording to really show why you strongly

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encourage these things, you know, to really highlight that institutional base that this Commission has brought together. I think that is very important. So thanks.

S. JAMES GATES: Thank you, and good morning to everyone. In looking at this document there's something that I thought was kind of important to get out which is that this is, at some level, an outward-facing document, that it speaks outside of the general community in a way that I don't think there's ever been a structure for doing before. And that this body has performed that task in a way – and that's really important.

From my perspective, part of what's been going on ever since the Path Forward report is that outside scientists, like myself, have been looking at your science. And, you know, it has been episodic because the Path report sort of brought this to the fore. The Commission has again brought this to the fore that you want to have the outside conversation with the scientific community. And I think that that's an extraordinarily important thing for this community. As I've gotten to know this community on my service here over the last several years, I've become very much an admirer of a lot of the members who understand what the nature of the crisis is and why the community really needs to move forward in a way to make progress. I also understand the constraints that other members of the community have and the perspective on a conservative evolutionary process. But I don't see how, in the absence of a body like this, I do not see how the Committee has a consistent driver that has the confidence, both in the community and speaking in an outward-facing manner, to get this job done. So I think this document is extraordinarily important. Recommendation, belief, I'm not sure what the right language – to me it's a statement of principle, because I think that's what's really going on with this document. That you're stating a principle that the community, I hope as a whole, will buy into.

And the other thing that occurs to me about this is if this work is as important as I think it is, then maybe a different forum is the place for it to go forward. Maybe it should not be something totally under the auspices of the government but, in fact, that some of the professional organizations in the community could think about standing up a structure that serves this function.

But as I said, absent a body like this, I don't see a consistent driver for making progress.

HON. PAM KING: Okay, Matt. Matt, I'm going to have you make your comments and there's a number of tents up. I also want to go through the three categories just so that we know what is in them in case someone might not have had the time to read the entire document, and then I'll go back to questions. So I just want to hear from Matt and then pause. I apologize for that.

MATT REDLE: I think that one thing that everybody might agree on with respect to this and our concluding remarks is that whether or not this structure continues, it's not as though a job has been completed and that there is an ongoing need to provide support to the forensic science community. And there needs to be a recognition that there should be a ready dialogue going on between the forensic science community and other scientific communities, and that there needs to be communication between the forensic science community and their ultimate consumer, the criminal justice system. And so whether it's in this form or not, it could be in some other form, there could have been lessons learned from this exercise, the job is not finished and there ought to be more work done to continue the progress that we've made in trying to provide greater validation and greater transparency to the process.

HON. PAM KING: Thank you, Matt. Just so that we can go – can we go back to the PowerPoint, because it's really riveting. Before we get to other Commissioners' comments, I do want to go and just briefly go

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through these three categories. There is a foundational, operational, and relational. There's sort of the definitions in the areas that we tried to put both, like I said, those document that have already been passed by the Commission into, and then looking forward really trying to find places where each of those would fall just from an organizational standpoint.

In the area of foundational, the three main points that were made within this particular area was the recommendation to – or the suggestion – that someone should undertake the survey for law enforcement agencies to conduct forensic science analysis, the development of policy recommendations including the Uniform Code of Professional Responsibility and implementation of the National Code of Ethics, and then addressing digital forensics. And those are, again, just briefly summarized within this document. The intention here is simply to identify what the things that we don't think we've gotten to are and not really make any necessarily opinion as to how those – what needs to be done or what should be done. Just to say, here's the things we didn't quite get to. And, again, I did take some comments from Commissioners who reached out to me by email, and I can certainly incorporate some of those into these areas. But those are the foundational ones.

In the area of operational, which we may or may not get to – there we are. There were four that sort of got grouped into this particular area. You can see them up on the screen. Again it's providing guidance in the evidence prevention and retention, and that was an area where in the area of biological evidence there is some good guidance out there, but that came out of one of the subcommittees.

UNIDENTIFIED SPEAKER: (Inaudible.)

HON. PAM KING: Whoops, sorry. People might object to that. Thank you, Jules.

UNIDENTIFIED SPEAKER: (Inaudible.)

HON. PAM KING: Well, you know.

UNIDENTIFIED SPEAKER: (Inaudible.)

HON. PAM KING: Right, right. Well, you know, spelling was not my forte. Yeah, that would be the wrong word.

Okay, so generally those are the things that fall within this operational area. And, again, we were just – these are things that came out of different subcommittees that were suggestions from different groups. And I agree with Cecelia, there shouldn't be anything about this document that suggests that these are somehow new concepts or that we just invented these things. These are certainly things that have been issues out there that lots of very, very competent groups have tried to tackle and work on over a period of time. All this document is trying to say is we didn't get to this stuff, so somebody needs to. And we can talk a little bit more about that. But that was in operational – and I'll fix that word.

And then in the relational area, this will work. This was sort of the bigger area. There was actually five different things identified within this, and, again, you can see them up there. Training was certainly within this group. Recommendations about autopsy findings. Key principles of defendant victim notification process is in this particular group. Some research recommendations. And then focusing on communication and understanding.

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So those were the areas that, again, suggestions coming out of subcommittees, people coming to me or to other staff or other people on the SPO and saying here's what we think. So those were the things that we had identified in those areas, and that's all I want to do is just preview them, and then we can go back to discussion.

So I think, Julia, you had your tent up as well as Suzanne. I don't know if you still have comments you want to make.

JULIA LEIGHTON: I mean, I think Jules and Matt really got at it and I'm hopeful that – and I, too – you know, believe, strongly encourage – I think the facts of what we've done and that in our role as sort of an umbrella, and I think that that maybe being more specific about the role of umbrella – I hope, Cecelia, would help – which is that we, just as we have been doing, we take the work of the (inaudible), we take the work of the iwigs, we take the work that's been done in silos and try and pull it together and talk about how does this intersect with the criminal justice system. How does this – how can it be improved as a tool within the criminal justice system. And I think, yes, I agree, (Inaudible), we need a national body. That's what the NAS report called for. But it doesn't exist, and my concern, I think that if it isn't continued, the importance of having universities step up or some other way of doing this is that it won't have the gravitas of being a nonpartisan federal advisory commission and it really is continuing the dialogue with DOJ. And, you know, if I was to make any small tweak, because the thing is you make a tweak and then everybody wants to change it wholesale and then you will end up starting from scratch, almost, would be to formalize how good NIST has been about being responsive to the comments here. And that's it. Thank you.

HON. PAM KING: Suzanne.

SUZANNE BELL: Thank you. I would like to echo that. I think whether we use "recommendation", the wording is not critical, but one thing I think exactly what Julia was saying is, for example, we made a recommendation, the scientific and approved it, and said we'd like to see a post-doc program. And immediately, almost, within weeks, there was one. So that, I mean – and I think what's not as clear is how NIST has responded to these recommendations. And of course I come from the scientific part of it, so I see – you know, and I'm glad – I'm really looking forward to today's discussions, but you think about what's going to happen to the PCAST report? Regardless of what you think about it, where does it go? Who's going to make the next steps for that? And I do agree that it argues for an independent body, but we may not have that opportunity, but maybe we should be a little bolder, if we can agree. But it's really important, I think, for me also to understand the big picture of how what we've done has influenced what goes on outside of the scope of what we can discuss, like to DOJ and to NIST. Just to have an idea of what impact the documents that we've had, because our kind of documents don't really impact, you know, they're not something that is as concrete. So, for example, our concerns about scientific literature being cited, are they being used? Are these views documents? That would help also, I think, to make it clearer that the documents went beyond the room. So I support some kind of wording to that effect. And maybe being a little bolder.

HON. PAM KING: Okay. Thank you. Judge Rakoff.

JUDGE JED RAKOFF: So on the one hand I think we would be deluding ourselves if we thought that the determination of whether or not to continue this Commission will be made on the basis of whether we recommend it or not. But on the other hand, if we don't say something about encouraging or believing that this Commission should continue, then this report will be viewed as our obituary. And, well, we

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didn't do everything that we wanted to do in our lifetime, but it was a good show, and now, you know, dig the grave. So I do think it's important that we say something to – whether it be belief, encouragement, recommendation, I don't think that matters as long as we indicate that we believe the Commission should continue.

I think – I heard Cecelia's interesting comments, but I'm not aware of any group other than OSAC that is making specific recommendations to the Department of Justice where the Department of Justice has committed to respond, and on the whole their response has been very positive. I respectfully disagree with Julia. I think on the discovery issue, just to take that as an example, the Department moved a fair way in our direction, they just didn't want to admit that that was the way it came about. But many other recommendations, of course, they have –

UNIDENTIFIED SPEAKER: (Inaudible).

JUDGE JED RAKOFF: Yes, I will.

UNIDENTIFIED SPEAKER: Thank you. (Inaudible).

JUDGE JED RAKOFF: I'd be delighted to do that.

And more generally, just looking at it from the narrow standpoint of judges, I don't think there's any meaningful communication between the, for example, the forensic practitioners or even the scientists and the judges. But judges do pay some attention to what this Commission says and does, so I think it plays a role there that is not played by the other very wonderful groups that you refer to and wonderful reports.

Now there are some down sides I suppose. I can't – the only thing worse than coming to Washington in the middle of winter is coming to Washington in the middle of summer, but, you know, you take the negatives with the positives. But I would very much strongly encourage that we have something in there about wanting it to continue.

HON. PAM KING: Okay, so we are beyond our time, and so –

VICTOR WEEDN: We just got permission to take 15 more minutes from these guys, so – if you'd like.

HON. PAM KING: Okay. Apparently someone with authority –

NELSON SANTOS: Pam, just one comment I think we need to be aware of. I think if we're recommending anything, I know it's just a language thing, but it turns from a business document to work product. I think we need to be careful with that wording.

HON. PAM KING: Right.

NELSON SANTOS: When you're recommending something to the next Administration, so.

HON. PAM KING: Thank you, Nelson.

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All right, well we have 15 more minutes. The other thing that I want to make sure that we get, if there are topics that people think are absent from this document that got missed somehow, I would like to hear that as well. Bill, you had your tent up I think next and then Jules, so.

WILLIAM THOMPSON: On the issues left out, I see when you're looking toward the future and what this Commission might do in the future, you mentioned the human factors issues that arise in connection with medicolegal death investigations. And while I certainly think that's an important issue to explore, I think the human factors issues relating to cognitive and contextual bias are likely to arise in a much broader range of areas. And I just wanted to say this Commission is uniquely situated to address those issues because those issues raise difficult questions about what exactly we mean by a bias. You know, when does considering of contextual information, when is that something that an expert should be doing and when is it something that's considered biasing. And those are policy questions about the role that the scientist plays in the legal system that I think are – I think this Commission is uniquely well situated to address. And I think OSAC may be less so. And so I hope the Commission continues to address those kind of questions. If you'd like some language, I would just suggest taking what you have and maybe broadening it a little bit, and I'd be happy to provide suggested language if you like.

HON. PAM KING: Okay, thank you. Jules?

JULES EPSTEIN: So my suggestion for this concluding portion is that it reflect two sentiments. One is, hopefully, if everyone ultimately endorses that yeah, we should keep going in some shape and form, that the paragraph should remind the reader that we are a multitude of constituencies in this room. We are lawyers and judges and scientists within forensic science, and scientists outside of forensic science, and people in law enforcement, and I'm sure I've missed some categories. And that all of those different constituencies urge that this continue because the work is not done. So that it's actually stating more explicitly that across the board there is concurrence in the notion that more needs to be done.

The second is to add into that Judge Rakoff's critical point, which is more constituencies will listen to us than to any other individual segregated entity. So that if we can combine those two points, and then the rest I suggest is wordsmithing, we can take out the word "recommend." You could actually just say, these constituencies, name them, all recognize the work is not done. We also recognize that the Commission, like no other entity, is a voice that all our constituencies listen to, final sentence, the federal advisory commission should continue.

But I think that if we link those two, that's pretty important. Thank you.

WILLIE MAY: I don't know whether – actually Jules and Judge Rakoff said what I was about to say, was that I think that it's important to make the case for this continuation and not just lay it out as a nice thing to do. Obviously this report should chronicle the activities of the Commission over the last several years. I think it should be very clear how this Commission represents the entire stakeholder community. It's not one point of view that's been put forward, but one that comes and is representative of the entire stakeholder community. And though this Commission was appointed by the Obama Administration, somehow I think you need to make it clear that this is not a partisan report or a partisan activity, that it really represents, and again, the feelings of the entire stakeholder community. That's it.

Now, obviously, I drank the Kool-Aid on this Commission a long time ago. But looking at this as objectively as I can, certainly I think that the Commission's work is not completed. That I think this is a resource that has been put together to look at this issue like never before in the history of this country, and

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I think it will serve the country very well to continue this. And I think it's just a matter of making that point very clearly.

HON. PAM KING: Thank you. Gerry, you had yours up. Jules, are you up again or down again? Gerry.

GERALD LAPORTE: Pam, I think one of the things that is missing from this document is that – I think we've all heard this number, but more than 90% of forensic science takes place at the state and local level. And I don't think we've been really honing in on the impact of our recommendations that go directly to the state and local forensic practitioners. And I'm going to read a comment because – well I don't know if anybody in here even knows this, but NIJ receives the funding for this Commission, and we have to put a spend plan together every year for this, but this is right from the Senate and House Committees. The Committee is concerned – and this is directly related to the Commission – the Committee is concerned that the Administration's Forensic Sciences Initiative lacks the involvement of the state and local practitioner community making the community an observer, not a participant, in addressing forensic reform and thereby running the risk that the initiative will not take into consideration existing proven standards and processes used within the community.

So there is a concern at a level way above us with respect to the funding. And in fact I believe that the \$1 million that we receive annually for this Commission is not up for renewal at this point in time. So I think one of the things that we're kind of overlooking is we're all sitting here in this room, and we're members, and we're all going to say that yeah, we've been doing a great job, but we really haven't taken into consideration what the state and local practitioners in the forensic science community has thought. Or the impact to them. So we can sit around here and talk all day about the great things that we've said and done. And I can just – just on a personal – more than a personal note – but just like Suzanne brought up, we've created a solicitation for medical examiners and coroners, and I'd say from this Commission I receive \$125 million every year to spend on forensic science. And we have to make extremely difficult decisions. And some of the recommendations that come from this Commission do help me in rationalizing and justifying funding certain programs, which I think is a good thing. So that's why we created the Medical Examiner Coroner Solicitation. That's why we – we've tweaked a lot of solicitations, things that people don't even know about in this room – based on the discussions that take place here. But, once again I think – now, from an NIJ standpoint, our focus is on state and local, so that's where we focus on. So everything that I try and pull out of here and then build into our solicitations is a focus on state and local practitioners.

HON. PAM KING: Barbara.

BARBARA HERVEY: I'm kind of curious what you would like to have with regard to state and local because a lot of the stuff that I have learned from participating in this, we either do, or enhance, or work on continuously in the state of Texas, and I'm sure I'm not the only state represented here that's doing the same thing. So if there is something in particular that you all would want to show what the impact on the state and local – I mean, just talking to Judge Rakoff and the difference between the federal system and the state system, you know, our subcommittee talks about that all the time. And so I don't know what it is that needs to be done to know that this is impacting state and local practice.

GERALD LAPORTE: So, Judge, that's a great question. I just think we – and I don't know how to articulate all of that into a document, but yeah, I think those are the things that we do need to discuss a little bit more and figure out a strategy on how to articulate what that impact is.

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BARBARA HERVEY: Because a lot of the state and local universities have asked us, in Texas and, again, I'm sure I'm not the only state, to put together programs based on what they are getting out of this Committee and want to have programs on not just wrongful convictions, but the intersection between forensic science and the law. So I think there's a lot of activity in all of the states with regard to what we've all done here. And so whatever the federal government needs as far as evidence of that, I'm sure we could gladly produce.

HON. PAM KING: Matt.

MATT REDLE: And to Judge Hervey's point, about six, nine months ago, something like that, Wyoming hosted a regional meeting of the heads of state police agencies. And they happened to have it in my jurisdiction. And I was asked to attend and to speak at it. And basically the discussion was dealing with the agency heads on what we had done up until that point. They had a lot of questions about things that were coming out of the Commission, recommendations that we were making, the rationales for it. And so some of us may not necessarily be aware that it is creating a ripple out there, but it is creating a ripple out there.

HON. PAM KING: Okay, we have one minute, so Jules.

JULES EPSTEIN: I just have a question. Gerry, because you raised this, if I understood what you said, this year's current proposed budget, for lack of a better word, doesn't have a line item for this group. Is that the gist of it?

GERALD LAPORTE: So the way it works right now, and I didn't want to get into this long explanation, but we're on a continuing resolution. So all of the programmatic money that we had last year, we do have this year. So those statements, if our money was to be taken away, then that would –

JULES EPSTEIN: Be another year.

GERALD LAPORTE: Yeah. So the other thing is there is a belief that there is a potential continuing resolution that will take us through the remainder of the year. So whatever – if we go through the remainder of the year, then we just get the same funding that we did in the past. And that does include the money for the OSAC as well. So we get \$4 million, of which \$3 million goes to NIST, \$1 million goes for the Commission.

JULES EPSTEIN: And the only reason I'm asking that was in terms of the timing of finishing this document. Unless we finish it at this meeting, it obviously will not be finished until April. And my question is, timing wise, do we need to come up with a process to revisit this document tomorrow and get it out?

GERALD LAPORTE: I think that's up for discussion.

JULES EPSTEIN: I'm just asking for your subject matter expertise in terms of this financial decision making, what's the timeliness issue?

GERALD LAPORTE: So from a financial standpoint, we're fine for the next meeting. But then it ultimately comes down to the decision of the next Administration on whether they want to continue this. But right now financially we're set up for the next meeting. We're good.

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JULES EPSTEIN: I'm sorry if I wasn't clear, but the question is do the folks who will be deciding if there is money after the next meeting need this now or can we wait until April to get it to them. I'm sorry if I wasn't clear.

GERALD LAPORTE: So when you say "the folks," it's Congress. So Congress makes that decision. So they're the ones that are ultimately making the decision on the appropriation. It's going to be up to them.

UNIDENTIFIED SPEAKER: (Inaudible.) I mean, is it in the asked budget? I mean, I know it might not be funded, but has it been asked for for 2017?

GERALD LAPORTE: Because of the position that we're in, nothing is being asked for right now. So.

JULIA LEIGHTON: So if I understand, I think it usually is sometime after January that all government – all federally-funded executive agencies and the like will be asked to submit budget requests. So I assume that it's usually like February, March when it's a change of Administration when they'll be drafting their next ask. So I don't know that it has to be done by tomorrow, but I suspect it might be nice to find a way to get it done in advance of the April meeting so that the people that are drafting the ask have it under consideration.

GERALD LAPORTE: I think ultimately you have to get this document to the next Administration so that they can make decisions. That's what it comes down to. So then the ask comes with the decision on whether to move on or not to move on.

JOHN BUTLER: Maybe I can jump in and say we'd like to – we can take time as we have it throughout the meeting. Certainly we'll have time in the wrap up, we can discuss this more, if that's okay, Pam, and move on to the next section. So what we'd like to get to is just quickly review what the general plan is here and – let's see if this works okay. Oops, need to change my screen. See if this works.

Okay, so we have an issue with the AV here so actually filming my screen, so instead of being connected to my screen. So let's see if we can do this, this works.

UNIDENTIFIED SPEAKER: (Inaudible.)

JOHN BUTLER: Oh, all right. This is not – okay. Ah, okay. We'll do it this way. We'll just do it without being in PowerPoint mode right now. That works.

Okay, so we've just gone through the summary report. We're going to have the accreditation proficiency testing next. Then we'll have the medicolegal death investigation. There's two documents that will be up for potential vote. And then human factors, we'll have one document. Then we'll have an update from the forensic science discipline reviews. And then this afternoon we'll have two panel sessions that will address the scientific foundations.

Tomorrow we will have the reporting and testimony will be going in the afternoon, and they have one potential document up for a vote and there's another document that they have for discussion that's out for public comment right now. We'll also hear from the Bureau of Justice Statistics Survey update, and then we'll have a lunchtime panel on the jury understanding of statistics. And we also have two panel discussions tomorrow on research.

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And, again, the reason we've chosen these particular panels is because of feedback from the Commissioners that we've received to talk mainly about foundational validation and then to talk about research issues. So these are the things we'll be able to hear from tomorrow.

So the documents we'll hear from in just a moment, we have the recommendations on accreditation of digital and multimedia forensic service provided. We'll let the Committees go into these in more detail. And the one that's out for public comment right now that will be introduced at this meeting is the views on statistical statements and forensic testimony. There's been a number of comments that have come out already on the website, but just to point out for anybody in the public that's watching this, if you'd like to make further comments on these documents, they're available through the 25th of January to make comments.

So I just wanted to review quickly who is actually here. We have all the ex officio members here, and so if we are able to vote on the business document, which would be the summary report that Pam's been talking about and that we've been discussing, we could do that tomorrow at the wrap up time period. If we'd like to do that, that's something we can discuss so give some thought on that. And then in terms of the voting members who are not here, Greg is not here so Tim is here in his place as a proxy. Dean Gialamas was not able to be here so Wes Grose is here. And Bridget McCormack was not able to be here so John Hollway is here. And then Paul Giannelli at the last minute was unable to be here so Bill Thompson is sitting at the table on his behalf. Sunita Sah has provided some votes already via email. And of course Stephen Feinberg, as we already know, was unable to be here and unable to designate a proxy, so we have 31 people that when we have a vote, there's 31 people and 21 votes will therefore be needed in order to reach the two-thirds majority required to pass any documents.

So with that we'll turn it over to Patricia and Linda to go on to the next subcommittee there.

MATT REDLE: John?

JOHN BUTLER: Yes?

MATT REDLE: A question.

JOHN BUTLER: Um hmm.

MATT REDLE: When the document that Pam is working on comes back to us, the document as already identified is not a views document, it's not a policy recommendation document. But when it comes time for approval, I'm assuming that that will involve a vote, and my assumption would also be that ex officio members would also be permitted to vote on that. I just wanted to make sure.

JOHN BUTLER: That is correct. Ex officio members will be able to vote on the business document.

NELSON SANTOS: Which is why it's critical that there is no recommendation in there so that it is a business document and it's silent on what it's recommending, otherwise it becomes a work product.

Patricia MANZOLILLO: So Linda and I have our – what we think might be our final document from our subcommittee, but I guess we'll see about that. And this is the accreditation of digital and multimedia forensic science service providers. So we've talked about this at a number of meetings. Our first iteration went out for public comment before meeting nine, and we received such a volume and feedback on that,

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which was the intention, that we basically just took it back and rewrote the document and changed quite a few of the recommendations. We then put that second version out for public comment again before the last NCFS meeting, and we received significantly fewer but still some very good public comments which we have adjudicated. And we met as a subcommittee on October 27, we went through those. We categorized those into I would say nine themes which we then put into our adjudication document. And we made a few, I think, minor wording changes to accommodate some of the suggestions, not necessarily changing the intent or the meaning of the document, and that is what we have presented now for the final vote.

So I will quickly just go through in case you didn't have a chance to see what the nine themes we had in terms of public comments. Some were specific to digital evidence issues. Some were more general in terms of accreditation overall and were similar to some of the comments that we had seen on the earlier accreditation recommendations that the subcommittee and Commission ultimately voted on.

So one specifically was that the ISO IEC17025 standard was not suitable for digital evidence. We do make note that yes, they have been applied, but there may be other standards out there that would be applicable as well. But they have been successfully applied to digital evidence forensic science service practitioners at this point. So.

There was some opposition to the implementation of one of our other views documents, the critical steps to accreditation, and we just tried to explain what the purpose of that views document was and how it was intended to help people move forward towards accreditation.

The recommendation about federal prosecutors where practicable only using accredited providers, there was concern that this would hinder the work going on in the field. And we did try to explain that, again, we had put specific language that, of course, the Attorney General had previously put into the recommendations to give an out when needed.

We did make sure to include when we were recommending subject matter experts to determine the best standards and supplemental requirements, that we had unintentionally left out existing groups. We didn't mean to do that, so we did change some language to make sure that we were including the existing technical experts in the field, such as SWG DE, into our specific recommendation.

Some concern the recommendation was punitive rather than encouraging. That wasn't the intent. The intent is to get people moving in the right direction. So again we tried to change some language.

Again, recommending that the size and scope or breadth of the digital and multimedia evidence field is really unknown. I think we can say that possibly about some other disciplines as well depending on what we're talking about, but that more work needed to be done to accurately identify who was going to be impacted. And we don't disagree that that should be done, but that we still felt it was important to move forward at this time.

Lack of strategic implementation. Again, much more high-level policy-type document, not specific in the weeds.

Confusion over accreditation versus certification, how the two play different roles. So we addressed that as well.

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And then one final one which was something we hadn't seen before that a concern that subcommittee members who benefit financially from increasing accreditation, that they shouldn't have had a role in developing this. And so we did make the point that the subcommittee was made up of a group to bring knowledge and experience from a variety of different backgrounds and that our subcommittee members had actually specifically abstained from voting on things to avoid conflicts of interest in this area.

So that was our adjudication document.

So do you want to – can we bring up the redline?

LINDA JACKSON: So John is bringing up the redline document to show what the changes are. And I wasn't going to go through those specifically but there is one where we had inadvertently deleted language in the recommendation regarding the recommendation, the critical steps to accreditation where we had stricken the language which actually delineated what those critical steps were, and that was an error. It should not have been stricken in the redline version, and so John had said that we could just – he could not accept those changes so that we could know what we're voting on and put that language back in so that those are delineated specifically as to what they are. And so if you could do that, that would be lovely.

So does anyone have any questions about the document as it stands now?

Troy.

TROY LAWRENCE: Quick question. If we're going to add those steps back in this bullet, do we also add it at the last bullet because it's the same thing?

UNIDENTIFIED SPEAKER: (Inaudible.)

TROY LAWRENCE: The last bullet. It just says all digital forensic labs should be accredited.

UNIDENTIFIED SPEAKER: (Inaudible.)

TROY LAWRENCE: Cause we say that they should implement the steps which we listed up above. Do we need to list them again or do we –

LINDA JACKSON: I will defer to Jonathan there to know whether or not those need to be delineated twice or because they might be considered separately, or whether it's sufficient to have it once.

JONATHAN MCGRATH: I'll put my wordsmithing pencil to this. Can we just include, you know, where it says, to include the immediate implementation of the critical steps to accreditation as listed above? Would that be sufficient?

TROY LAWRENCE: That's fine.

JONATHAN MCGRATH: Okay.

LINDA JACKSON: Thank you.

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JONATHAN MCGRATH: Good catch there.

JULIA LEIGHTON: I'm sure it hasn't escaped people around the table that this document went through some huge changes, and, you know, that's what compromise looks like. I'll speak for myself. I do not think the issues are as insurmountable as the community has claimed to seek out accreditation. And I continue to take the position that rigorous quality management is not a luxury and can't be treated as an add on. It is an integral part of an operation. We expect no less of hospitals and medical labs. We should expect no less of forensic digital service providers.

So I'm going to vote for this. I worked with the committee. I'm thrilled at the work that both Linda and Patricia did to build this compromise. But if this isn't an indication that there's still work to be done, there is still work to be done to bring forward an appreciation that quality management is not a luxury, it is not an add on, it is where you start when you build any organization. And so I – as I said, I will also call for a vote, since nobody else put up their tent, but I really encourage DOJ to move forward on this without delay. That it shouldn't take a recommendation from this body to – you know, the Department of Justice has plenty of accredited labs. It can move forward on this. It can provide leadership in this area. It shouldn't have to wait to hear from us.

So thank you, and I'd ask that we move to vote on this document.

LINDA JACKSON: Thank you, Julia. One thing I'll point out just based on your comment is one thing is we did add some additional language on is the differentiation between the ISO standards that are quality-management drive, the 17020, 17025, versus the ISO documents that are more process driven, the 27000s, to try and provide a little education of why those are complementary and not exclusive. And so hopefully that was a good addition as well.

So I guess if no other comments, we can bring this up for a vote. And I don't – do our clickers work now, John?

JOHN BUTLER: We'll make them work. All right.

Okay, so do we have a second for that motion?

JULES EPSTEIN: Second.

JOHN BUTLER: Okay, Jules has a second, so –

UNIDENTIFIED SPEAKER: What's the (inaudible)?

JOHN BUTLER: One, two and three, as they always have been. Yes for one. Two for no. Three for abstain.

Ex officios shouldn't be voting on this one, but we'll see what we have here.

Okay. So 84% yes, 13% no, and three percent abstain, so it looks like we have passed on that. So very good.

Anything else from your subcommittee?

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LINDA JACKSON: Not at this time. Obviously certification is something that's listed in the document that was called Pam's document that is now our document, and so that's certainly something that, you know, we've worked on briefly but have not really completed.

NELSON SANTOS: Just a comment. Since this is a recommendation and the Department has two cycles, it's unclear what's going to happen with this recommendation depending on the Administration's view of this, so this current Administration more than likely, and I'll look to OOP, will not be responding to this, is that correct? Okay.

JOHN BUTLER: Okay, we're up for MDI then if we want to move on, and we're now on schedule.

JOHN FUDENBERG: And we'll get you right back ahead of schedule, John.

Good morning everyone. We have – the Medicolegal Death Investigation subcommittee has two documents for final vote. The first is the views on recognizing the autonomy and neutrality of forensic pathologists. And the second is recommendation on model legislation for medicolegal death investigation systems. So, John, would you like me to go through each of the – we received two public comments on the autonomy document. And they have the adjudication summary is provided in the packet. Happy to go through those or just answer any questions if anybody has any.

The two comments that we received were – the subcommittee agreed with those and I don't think were too controversial. Any questions? Okay. Could we move to vote on that document?

JOHN BUTLER: All right. Do we have a motion to vote on the first document, which is –

UNIDENTIFIED SPEAKER: (Inaudible.)

JOHN BUTLER: Okay. This is the views document recognizing autonomy and neutrality of forensic pathologists. And now vote. So we have, again, yes for one, two for no, three for abstain.

We should have – there should be three more people that should vote. Press your clicker again just in case it didn't go through.

We're up to 30. Okay, 31. That should be it. Okay. Ninety-four percent yes. Six percent abstain. So the document passes.

JOHN FUDENBERG: Okay, thank you. And the second document is the model legislation for medicolegal death investigation systems. Again we received six public comments, all of which were addressed. They're – just for clarification, the fifth public comment where it said we should reference the NIJ death investigation, I believe we said we did and then the final version didn't and we'll make sure that that's referenced. Very good point.

There was a few comments about whether or not this recommendation should address the coroner jurisdictions and coroners' offices being eliminated and converted to medical examiner systems, and this was a debate that took place in the subcommittee. I think we – the subcommittee all agreed that we were not going to address that particular topic and our goal was to improve both coroner and medical examiner systems and this model legislation could be used by states to do just that.

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So any questions on this document?

Do we have a motion to vote?

UNIDENTIFIED SPEAKER: So moved.

JOHN FUDENBERG: Second?

UNIDENTIFIED SPEAKER: Second.

JOHN BUTLER: Okay, as before, one yes, two no, three abstain.

So we're at 28. Twenty-nine. Make sure your clicker is working. Two more. Thirty. Thirty-one. There we go.

Okay, 90% yes and ten percent abstain, so this document passes.

JOHN FUDENBERG: Okay. Thank you everyone.

JOHN BUTLER: Anything else you want to discuss from your subcommittee?

JOHN FUDENBERG: No.

JOHN BUTLER: Okay.

NELSON SANTOS: Let's take a break and be back in 30 please. So what's that? 11:20. Can we do that? 11:25. 11:30 please.

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Part II

NELSON SANTOS: All right we're going to get started with the next session please. Okay, the next subcommittee report is human factors. Please take your seats so that you can give all of your attention to Jules. Jules, the floor is yours.

JULES EPSTEIN: All right. Human factors report quite briefly because there's so many other things to talk about today. I'm going to do this in an expeditious way. Our report is in the binder. The issues not before you today include the continuing work of Bill Thompson and his coterie on follow-up to the ... I won't call it a survey, but the questionnaire, and gathering of data. And Bill has advised us that sometime in the next couple of months we'll have some work product, maybe in the form of an initial report.

Our committee spent months, and I think they were very productive months, internally, having discussions on information management and related issues in medical-legal death investigations. Hopefully at some meeting in our continued existence, we will be able to make sort of presentation about that. It's not in any shape for a views document or a recommendation but, really is a kind of thing that

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needs further discussion and airing.

A project we would look forward to is collaborating with reporting and testimony, actually on an issue that we're going to hear a presentation about tomorrow. Which is meaningfully communicating and making comprehensible forensic evidence testimony as well as testimony about error rates and things of that nature. In other words, making sure the jurors, and frankly the judges and the lawyers, can understand stuff.

PHIL PULASKI: The judges will never understand.

JULES EPSTEIN: Present company included. Okay.

JULIA LEIGHTON: No way.

JULES EPSTEIN: No way, all right. With that, we have one document here that was vetted at the last meeting. It's up for final vote, it's our checklist document. And John Hollway both because he spearheaded that as a sub-committee member and because he's the proxy for Bridgett today, will present that. And I challenged him, given how well the last two things got voted on, I expect no less. You're welcome.

JOHN HOLLWAY: Given the time constraint Jules has put me under, motion to vote. I'm kidding. So the checklist document, as Jules said is something that was vetted before this group. At the last meeting, there were five comments, Cecilia's being the most substantive and were dealt with, at least verbally at the meeting. And then some additional footnotes and citations were added to document in response to her comments. The other public comments were in one way or another essentially supportive of the view conclusion. Which is summarily stated that the human facts committee, after looking at various other industries in which checklists have been useful, found parallels between those areas and the forensic science field and has the view that additional research to determine where checklists might be useful is warranted and beneficial to the field. That's my presentation. I open the floor for discussion.

There being no raised placards, if somebody feels the urge to move for a vote, I think we're in order.

JULES EPSTEIN: I move for that we approve this document.

PETER NEUFELD: I have a question.

JOHN HOLLWAY: We're just so close.

PETER NEUFELD: No John, it's funny ... it's great ... the document is great ... it addresses important issues. Does your group consider the notion of recommending checklists for lawyers as well? No seriously. I think we'd all benefit from it and I don't know why it's limited just to forensic science providers.

JOHN HOLLWAY: To the extent that lawyers that are within the preview of the commission. Certainly I think that's included within the views. I don't think we are attempting to tell attorneys how to conduct the

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adjudication of cases involving that but, it certainly is a reasonable potential application of the field.

JULES EPSTEIN: May I jump in?

JOHN HOLLWAY: Sure.

JULES EPSTEIN: I should add that our sub-committee heard a presentation from Jeff Adachi.

JOHN HOLLWAY: Yeah that's a good point.

JULES EPSTEIN: ... Chief public defender for San Francisco who, if I recall correctly, got NIJ funding to do exactly that type of inquiry to see. And I believe it was ... it's mentioned in the report. So it's out there that this is not limited to the forensic practitioner's side but, was beyond our brief.

Okay now I will now, for the second time, move that we move to vote in favor of this and request a second.

Oh sorry, couldn't see. Who's that, Randy?

RANDY HANZLICK: Sorry, I just ... the attorney from San Francisco might be a great person but I noticed in this two and a half paged document that he is mentioned three times in there. And it seemed like there was some redundancy there that might just want to be stripped out. I don't know if that was intentional but he's mentioned at the beginning, and the middle, and the end and, it's the same point that's being made.

JOHN HOLLWAY: It wasn't intentional. I think the ... to the extent that we've received comments on the document, they really don't go to the substance of the conclusion but, more asking for additional citations for where checklists have been used and we were trying to be responsive to those comments. I'm hesitant to make further changes to the document since we're moving to vote on it. And I guess I would say that I think ... that while your comment while well received, is technical rather than substantive and we'd like to move forward on the substance.

JULES EPSTEIN: Anybody ... so we do have a motion and a second. Are we okay to put the vote up on the screen?

NELSON SANTOS: Okay go for it and vote now. It's ready to go.

All right, there we go. We got our 31. Okay, 94% yes, 3% no, 3% abstain. So with 94%, it passes.

JULES EPSTEIN: That completes our business.

NELSON SANTOS: No more business from human factors? Okay. All right so my question would be to OLP. Are you guys ready? Do you want to start or would you ... oh of course, Kiera. And then after their presentation we can go back, if we got some time, to the discussion on the summary report.

HONORABLE PAM KING: This morning I failed to put in my opening remarks, a comment about

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another project of the Department of Justice, which has to do with eyewitness identification. This just came out Friday, and so over the weekend we sent to you the AG declaration, the pre-trial discovery guidance, and the eyewitness identifications. And I just wanted to bring that to your attention. We feel this is another important product. While it may not be exactly in the preview of this national commission, we thought it would be of interest. And I do want to say that it really was a very deliberate document. It took a lot of input from a lot of people. We don't come down specifically on sequential versus photo arrays. We recognize that while there was some scientific literature really suggesting sequential, that subsequent scientific inquiry, has put that in a little bit in doubt. So we're still agnostic on the issue. Some components of DOJ use one some use the others but any rate, I wanted to make sure that I mentioned it to you.

JONATHAN WROBLEWSKI: Can everybody hear me? Good afternoon everybody. Enjoy your lunch, keep going. My name is Jonathan Wroblewski I'm the principle deputy assistant Attorney General in the office of legal policy. Some of you may have heard, but a couple months ago there was an election and, I have, I'm on detail assignment to the office of legal policy and my detail, comes to an end before the next commission meeting so this is likely, the last time that I will be appearing before you and I just want to let you know what a pleasure it's been it's been a joy working with this wonderful team, at the office of legal policy. You all know Kira who's to my right and Kevin Scott who is to her right. And, we plan on continuing our work, on forensic science and, but you'll likely be hearing from other besides me, at the April meeting.

I did also want to, say how sad I was, to hear about the passing of Dr. Feinberg. I got to know him just a little bit over the course of the last, the last year and, it was a great pleasure, we had a, statisticians round table, which I'll reference during the presentation, where I got to spend a significant amount of time with him and, it was a joy and a privilege to know him a little bit.

So we're going to talk just a little bit and we want to update you a little bit on, what we've been doing, especially around the forensic science discipline review, some of the recommendations of the commission, as well as the uniform language on testimony and reports. First though I should say that, it's been, a pleasure for me and an honor for me to do this work around forensic science and I think it's fair to say, that there are many things that, we in the department, have done that you all may not be, completely happy with, but at the same time I think it's absolutely fair to say that, this Department of Justice under the leadership of Attorneys General Holder and Lynch have taken really unprecedented steps, to both examine and then to strengthen forensic science, and especially it's use in the courtroom.

We have been you know committed to improving the science through research and a whole lot of other steps, we want the evidence collected at crime scenes to identify both the innocent and the guilty, and we're committed to ensuring that the use of forensic science in the courtroom, is consistent with, available research. And we've taken many, many steps over the course of, the last several years, we'll talk about just a couple of them, over the course of the next fifteen minutes or so.

As I mentioned what we'd like to just update you on is, a few of the recommendations, from the commission and the steps that we have taken as well as the forensic science discipline review, and the

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uniform language for testimony, and reports.

So by the start of this meeting the commission has passed about 20 recommendations, to the Attorney General and, I think a year or more ago the department committed to responding to each of those recommendations, within two meetings of the date when it was passed, and we have met that goal. We have adopted most of the recommendations, including the very important recommendations related to universal accreditation of forensic laboratories, and we announced earlier the responses to recommendations on the national call center, and also discovery. And let me just talk briefly about the discovery recommendation, we agree very much with the commission, that the need for pretrial discovery, in forensic cases, is absolutely critical and spurred by the commission's recommendations.

We undertook a significant review within the department. It was led by our national coordinator, on criminal discovery, Andrew Goldsmith, and what it resulted in was guidance that the Deputy Attorney General issued last week? Last week. Last Thursday. Two federal prosecutors on how they can provide, comprehensive discovery in criminal cases that involve forensic science evidence. It doesn't follow exactly and precisely the language, that was taken which tracks, a civil rule, a rule in the federal rules of civil procedure, but I think it's fair to say that in almost every respect it adopts the commission's recommendations and, calls for broad, and very open discovery. This is new guidance, and we will be, we in OLP have been directed to review implementation, as it's now become effective.

Let me talk about the recommendations that are coming up, that we will be reviewing between now and April. The commission passed four recommendations in September of 2016 and they're scheduled to receive responses at the April 27 meeting, those involve a variety of things that are, listed in the PowerPoint including proficiency testing and technical merit. We have already begun reviewing those recommendations, and, we will be sending our analysis, to the next administration and they will have an opportunity to consider the recommendations and report back, by April.

Next I want to just touch on the forensic science discipline review, and we have been here a number of times over the course of the last year, involving the commission and involving the public on this. If you recall, the purpose of the FSDR and it was announced by deputy Attorney General Sally Yates back in February, is to, ensure that testimony stays within supportable research and data and what we're going to do, is to look back at various disciplines and testimony that had been provided for those disciplines, to try to identify, cases where that testimony stayed and cases where it did not stay within the supportable research and data.

And we have gone about developing the FSDR. I think it's fair to say in a very, very transparent way, we've been here a number of times we have published a number of requests for public comment in the federal register, and let me sort of walk through those, steps with you. First we were here if you recall in March, where we introduced a framework, for the FSDR that was within a month after the deputy Attorney General announced that we would be undertaking this. Then we went about drafting a methodology and developing a methodology we came back to the commission at the June meeting and we presented that methodology. We received some comments that the commission meeting but we also published the draft methodology in the federal register for comment we received many comments about

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that.

Once of the comments that we heard from several members of the commission is that the key role that statisticians needed to play in developing the methodology, we took that to heart and we put together, the statistician round table that I mentioned before that we held in July of 2016. I found that to be an absolutely fascinating, experience I learned an awful lot from that. We revised our methodology and in the September meeting we came back here and we presented that revised methodology, and we hope to be we are beginning the process of implementing the FSDR, this month and next month and there are some steps that you will be seeing. First we are developing a statement of work, remember this review is going to be conducted largely by a contractor there will be an employee who will be the executive director of the project, but we're developing a statement of work, and we plan to issue a draft statement of work and request for information sometime, in the next 60 days or so, and based on the response to the request for information, we think that we'll inform and allow us to edit our draft statement of work, and get the RFP process underway, and so that we can begin this later on in 2017 but that's our intent at the moment.

In addition as I mentioned there's going to be a project director, and that will be a department, a new department employee and we're in the process of approving the plan to fill that position. We will be posting for that position. We will let the commission know about it. It will post it publicly. We encourage you to share it widely, with anybody who might be interested in running the project.

With that, I think I'm going turn it over to Kira to talk a little bit about where are on the Uniform Language for Testimony and Reports.

KIRA ANTELL: So, on the Uniform Language for Testimony and Reports. Where we think of the forensic science discipline review as being retrospective, the Uniform Language is really a forward-looking project, to give the best guidance to our forensic examiners moving forward as to how they can testify. And we're really excited about this project, and I think, based on some the comment we've received, a lot of people are excited about it as well.

Again, briefly, the development process. Again this has been a transparent process. We put out some initial rounds of the Uniform Language for public comment. We put those out last summer. We received about 173 comments. We worked through those comments. We developed a revised format that we shared with you at the last commission meeting in September. And we have a plan for moving forward, and I'll talk about each of these. The next steps would be to issue an Issue for Comment on Uniform Language. And also to plan and have a round table. And then, hopefully, publish the ULTR 2.0 in the spring of 2017.

So what is this Issue for Comment? Well, the Issue for Comment is that, we heard a lot of different information from different stakeholders, and lots of different people reached out in those 173 different comments about, what they thought of what we put forward. But we didn't hear a lot of alternative ideas for what people thought these documents could look like. And we thought this was an opportunity for us to put out, really, a request for people to tell us what they think proposals could look like. So we plan to issue an Issue for Comment where we're going to invite commenters what they think Uniform Language

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could look like for forensic examiners and providing testimony. We plan to do that, though we're going to suggest that they pick from among certain disciplines, so that we're able to compare what we get back, people, obviously, commenters are always welcome to select whatever disciplines they think would be helpful.

The round table, as Jonathan said, I don't think you can overstate how critical that statistician round table was to get different stakeholder perspectives and to really begin to understand these different perspectives. And it was so helpful to us that we think we're going to a really similar process for the Uniform Language, where we hope to hold a round table. It's still in the final approval stages. But in this, we're going to invite people to come and present on what they think Uniform Language could look like. Again, we're really trying to get, when we put out our Uniform Language, it's really only informed by what we have conversations. And this is an opportunity for people outside the department to give us their ideas of what this Uniform Language could look like, recognizing that lots of different people would be using this document moving forward. So in this we plan to ask different stakeholders to provide us with their proposals. Forensic scientists, statisticians, cognitive scientists, and non-DOJ legal perspectives. And again, we would be sharing a meeting summary.

So, on that, we're hopeful that we're going to be able to provide an update in April, and potentially some initial format feedback, rather, from the round table. And we're hoping to continue to move forward, and be able to publish our ULTR 2.0 in the spring, informed by the round table, and all of the comment that we hope to get. So we're really looking forward to that.

JONATHAN JONATHAN WROBLEWSKI: If you have any questions, we're happy to answer them. Or try.

PETER NEUFIELD: Just more of a comment than a question. I think it's terrific that, obviously legal policy has taken on this challenge. It's-- in many ways, it goes to heart of the whole thing. And there's no question that we need the Justice Department to move forward in this area. And frankly, to become a leader, and with the expectation in that it will have a huge impact on states and locales, and examiners all over the country will try and, in many ways, replicate and learn from what you're doing.

I do think, though, that it's important to acknowledge as a learning moment that, I can recall, when we initially had discussions about this, that there was a kind of expectation that this would just go one, two, three. That simply by turning to the bureau to give us their statements on how they would describe the value of the testimony, would be very matter of fact that even if you expand to that to other federal laboratories, and let them expound on it a little bit, it would be expeditious and we could move on and have a standard by which to compare all these other case transcripts that you're going to be doing at the FSDR. And I think, you've realized, and I think it's important for this group to acknowledge, actually, that it became a much more complicated undertaking. That it's not that simply to come up with what is the appropriate language to be used by an expert witness when testifying about the probative value of a particular association. And the fact that you've learned all that is of a huge utility as you move forward as the largest law enforcement agency in the United States.

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JONATHANJONATHAN WROBLEWSKI: I completely agree with you Peter. I can't tell you how important the round table was with the statisticians. Because what it showed, to me anyway, was in that, these two worlds of science and law do not intersect easily and naturally. That to a scientist the answer is quantitative, or at most, it could or it couldn't be. And to lawyers who are charged with proving that somebody did some act beyond a reasonable doubt, and that the jury has to come up with some answer, that those are two very different undertakings. And we have to find a way to bring those two undertakings together, and at that juncture, those words do not come readily. And so, there's going to be, I'm convinced there's going to be much conflict for many, many years over precisely what those words are.

But I think we're struggling, correctly struggling, to try to find precisely what those words are. And we're doing it, I think, very transparently. We're involving not only the commission, not only statisticians, the public at large, forensic experts, prosecutors, defense lawyers, judges and so forth. And I think that struggle's going to continue.

KIRA ANTELL: Bill Thompson.

WILLIAM THOMPSON: There we go.

I wanted to agree with Peter. I think that what you're doing is tremendously important, but also tremendously difficult. I commend you on your seriousness of purpose in approaching this really important problem.

I have three question's I wanted to put to you.

So first is, where do we stand with ULTR 1.0? You proposed some specific language in the first round of ULTR. Is that now off the table? Have you decided that that's not going to work, and you've abandoned that? Or is that one of several possibilities that will be explored? So where does that stand?

Second, I wonder what you're thinking is about, or what role the proposals coming out of this commission ... There's a document to be considered later today. And then there are some documents that are in process in OSAC, that have to do with standards for reporting source determinations. Some of which are not entirely consistent with the commission's approach, or the ULTR's. And so, I'm wondering what you're thinking is about what role those proposed standards from OSAC, the commission, and other organizations might have in developing your ULTRs.

And I guess the third question is, acknowledging the difficulty of the issue. One of the difficulties is that we really don't know as much as we need to know about how late people respond to this kind of language. And that's an issue that's currently being studied by a number of people, but the research hasn't gotten as far as we'd like. And so, I guess the question is, should we consider or have you considered the possibility that any recommendations made at this juncture needs to be tentative, subject to revision, in light for further progress, either in terms of the normative analysis of what experts should be saying or in terms of the psychological social science analysis of how people understand those statements? Either one could affect it. So I'm wondering if you thought about whether it's possible to make a recommendations that's kind of tentative or subject-to-revision recommendation?

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JONATHAN WROBLEWSKI: So I think those are all great questions. And the answer I have for you it actually address all of them. For better or for worse, we are examining the specifications and the blueprints of this airplane while we're flying it. Okay? We have to. There are experts who are in court every day around the country. There are cases that are being investigated, there are charges that are being made, there are decisions being litigated. So that's the reality of the world that we live in. You are absolutely right that we don't know everything now, but let's also be honest with ourselves; we won't know everything in six months or a year from now or two years from now. We are going to be constantly learning. As we constantly learn, whatever the ULTRs are today or tomorrow, 1.0, 2.0, 3.0, I'm confident there will be a 4.0 and 5.0, because the science doesn't stop.

So getting to your first question first, where is 1.0? It's being revised based on the comments, until we get 2.0. We're trying to make the statements that our forensic experts and, hopefully, we will play some sort of leadership role and something will trickle down. We're hoping that we can find testimony and words that will convey to lay jurors, because that's what we have to do, the most accurate information we can with the goal of identifying both the innocent and the guilty and ensuring that justice is done. So we're learning from what we've started. We're going to learn more from the comments of 2.0. Wherever we are at the moment, there's going to be more.

Part of that learning, this gets to question number two, is the standards from other bodies. So we don't claim we have all of the knowledge. As I say, we've held round-tables before; we're going to hold more round-tables. We're taking the advice from the commission and the OSACs and everywhere else we can. We're going to develop as best we can, language that can be used by our forensic experts. So I hope that answers it. I hope it's a commitment that what we've brought. What I hope we will continue to bring is a commitment to continuous learning and continuously refining both the science itself and then also the words that are used to convey that science as we learn more.

That gets to, of course, your last question is, well we're going to learn more about how jurors ingest these words. Okay. Well as we learn more, we may have to change the words depending on how that is. So its continuous learning is the short version of the answer.

ARTURO CASADEVALL: So I want to add my voice to the encouragement to continue to do this and to note that even disciplines that have now completely accepted science, for example medicine, initially fought it. It took forever, I would say decades, to accept the germ theory disease. Any changes that you try to do often take a while. So this is just the nature of humans and I think that what you're doing is really important. Keep going. It's going to take a while.

PETER NEUFELD: Jonathan, I think it would help, because sometimes we have people in different applied sciences or applied law here. From what you told me, which I think is just terrific and maybe you could elaborate on it a little bit, is what you're really talking about here is institutionalizing a continuous quality assurance/quality control program with the expectation that routinely these changes that are learned about will be reviewed and will be implemented and the actual awareness of that phenomena will be incorporated into the process itself for the Department of Justice.

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JONATHAN WROBLEWSKI: Yes, I mean I think that's part of accreditation of labs is quality control. I think it's something that we're doing. That's what the FSDR is, in essence, about. The continuous learning is just going to have to also be part of it. I don't see the end any time soon. So I don't think this can be a one-off, whether it's the FSDR or review of the ULTRs or any particular discipline. I think we're just going to keep learning more. Dr. Gates?

DR. JIM GATES: Thank you. In fact Peter sort of beat me out of the gate on that question, because it was the continuous learning and the institutionalization of the process that I was wondering if you folks had actually thought about, because, to me that's going to be the most valuable thing that's going to come out of this. I wrote an article for the AAAS on my experience in forensic science about a year ago. One of the things that I pointed out was this issue of the time scales that the law traditionally has evolved over versus the time scales that we're used to seeing in innovation and science. I thought it was an extraordinarily difficult problem. As you strive to get your results, for which we commend you highly, this issue about institutionalizing the process is something that I'd like to hear your thoughts on, if you have some preliminary thoughts that can share with us?

JONATHAN WROBLEWSKI: Sure. Now when you talk about institutionalizing the process, the process is my big question. I'm not sure exactly what you have in time. Is it the FSDR process or is it general? Because we have an office within the National Institute of Justice that's devoted -- and I'm not suggesting that doesn't need to be changed in some way or another, but we have, institutionalized within the Office of Justice programs, efforts to fund and support research and other things. The ULTR process, the FSDR process, that is relatively new. I'll be perfectly frank also, it's been frustrating to see how long it's taken. For example, in the FSDR process, if we're going to have a transparent process, it's going to be quite slow. I mean, if we just came up with our methodology and said, 'okay, time to go', I think we would've been up and running a long time ago.

We chose not to do that, in part from the suggestions of the folks here and elsewhere and so, we came here and presented a methodology, put it out for public comment, revised it once. It's tough to get it perfect. So we're working through that, but yes, we've talked about institutionalizing it and we have a number of ideas about how to do that. Of course, we have to get through the first one first. (chuckles) So we're struggling through that now.

If there are no other -- oh, I'm sorry. How are you, Matt? It's nice to see you. I didn't see you, I'm looking out there.

MATT REDLE: Good to see you, too.

JONATHAN WROBLEWSKI: It's good to see you.

MATT REDLE: I think, to piggy-back on Dr. Dr. Gates' comments, I think what he's talking about is this constant process of as you go through the FSDR review, making the changes to the language that is used in court based upon what you've learned. I would commend you, as well, for that. I would also suggest to you that you're probably looking at a process that doesn't have an end point or an end product and that there will be innovation within the disciplines that may change greatly the language that people testify to

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or report. So I would join with the others in supporting that effort and I think that you've actually made great progress to this point.

JONATHAN WROBLEWSKI: Thank you. Julia? Nice to see you.

JULIA LEIGHTON: It's nice to see you. Since there's a moment here, I did want to take a chance to say that I did have a chance to glance over the eyewitness identification memo and I was very pleased with what I saw there. I commend you for that efforts there and for staying agnostic and asking for more research rather than saying yes or no to the issue of sequential. I did notice a couple things missing and I think it may have been beyond the scope, but I would encourage you to give some consideration to a little bit further upstream on the issue of training. The training on the issue of open ended questions to witnesses for descriptions and how to solicit information about what was seen and what's remembered and the issue upstream of not cross-contaminating witnesses, either through dispatcher calls, through overheard radio communications, conversations between officers. The last thing is to address the accommodations needed for non-English speaking witnesses and how to a handle those situations. Otherwise, I would just echo the comments around the table of how important this process is and how important it is to institutionalize it. I would challenge the refrain that's really been there since the NAS report came out in 2009.

You got to understand, we're doing cases every day. We're doing cases every day. That should scare you. We don't know. You are saying we haven't come up with the ULTR and yet, we're still doing this every day. That should be scary to everyone in this room and I would respectfully submit that PCAST has suggested a principle surrounding the idea of whether you can keep building this structure not knowing if your information's accurate. The department needs to seriously think about pulling back for a moment. It doesn't mean it's not there but really pulling back on what's being said and taking seriously the suggestion from PCAST.

Everything you say says to me you're taking that report more serious than your public opinions have been about it. I think it is that tension between ... We just can't resist doing the things we've been doing and, if you will, getting away with. And to somehow to step back and say we're going to pull back our advantage. Pull back on our advantage of what we've been able to get away with until we can get it right.

JONATHANJONATHAN WROBLEWSKI: Let me address two things that you said. First of all, on the eye witness ID, there are a number of these. I appreciate your identifying some areas that we need to address. We are addressing them, sometimes in a different manner. For example, the deputy attorney general issued a guidance to our law enforcement partners about an application of the Rehabilitation Act which deals with communication, in part deals with communicating with people and ensuring that we have effective communication and whether that effective communication needs to involved a translator or whether the effective communication needs to involve someone with some mental health background. We need to address those so I appreciate you identifying those.

With regard to the PCAST report, I would suggest that you're mischaracterizing our position. Our position is not we're trying to get away with anything and that we can so we will. Our position is that we

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don't believe that the PCAST line that was drawn between admissibility, which means you can keep flying the plane, or no admissibility, take the plane down, we don't think that line is the right line. The line they drew was known error rate. For example, I know we've talked about this before. We talked about it endlessly. If you have somebody, you have a burglary and the police officer arrives at the home and finds a shoe print and they take a picture of the shoe print. They take measurements of the shoe print. We agree with PCAST, there is no known error rate around the discipline of shoe prints and tire treads. The only thing that the attorney general said that we were not going to follow in that report, PCAST report said, "No testimony from any forensic expert on shoe prints." That's what they said. It's inadmissible unless there's a known error rate. We said, "No. We don't agree with that."

We can debate it at another time but they directed judges not to admit the evidence of shoe prints and tire treads. The way I read that and I think we way we read that was no evidence. Not that there are limits to what you can say from that shoe print but that shoe print is relevant evidence. The characteristics of it are relevant evidence. To have a forensic expert to be able to look at it and testify about it, we think, is important. We don't think that admissibility/inadmissibility decision to switch on and off should be determined by whether there is a known error rate. That's all we were saying and that was our position.

JULIA LEIGHTON: I'm going to defer my response to Jim Gates.

DR. JIM GATES: Thank you. First of all, as you know, Eric Lander will appear before this group shortly and I have been trying to make sure today that I did not step on whatever message he plans to deliver. However, on this particular issue, I think what the report was trying to imply was that testimonies should not be given about the absolute certainty of such testimony in the absence of error rates and that that's the message that maybe somehow we were not successful in our language in getting this point of view across. It's also true that the point of view of the report is you can't call it science. That's what bothers us the most. If you don't know how wrong you are or what is your potential for error, according to no lesser luminary than Einstein and Galileo, that's not science unless you know that piece of it. That's what was a big message of the report.

As I said, I don't want to say more because I'm sure Eric will be his usual shy self when he shows up.

JONATHAN WROBLEWSKI: I appreciate it and I'm not going to try to get into a huge debate here but I think it brings home exactly the revelation that the forensic -- that the statisticians round table brought to me. This is precisely the discussion we had. We're not claiming I can say that shoe print came from that shoe but there's something that can be said. There is admissible evidence that we believe can be presented and that was our position. We weren't trying to get away with saying, it's that shoe. If you look at the ULTR's ... I better stop now.

This is the discussion we had. This is the very discussion we had with the statisticians. You can't call it science but of course at the same time, that jury has to make a determination. Did the person who was arrested right there and there's some shoe print that's related to that person, was that person guilty beyond a reasonable doubt, which is hardly a scientific term. Beyond a reasonable doubt was that person guilty? That, to me, that's the rub. It's where the scientist meets those legal concepts.

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JULIA LEIGHTON: Great. With that, agree ready to go. Thank you. I hope to see you all in April. Thank you very much.

JOHN BUTLER: Pam is returning. She's been working on the document, to the summary document making some changes to that so that we can discuss if you'd like. Would you like to do that Pam or ... A couple of minutes?

HONORABLE PAM KING: Just to give people an update, I was trying to work with the comments that have been made by those around the table to put together a document that maybe we could still vote on at this meeting. I've made some changes to the document. Some of them are technical in nature but really working more on the conclusion. I'm not sure that I have the conclusion to a place where's it's going to be something that's acceptable to the group. I've emailed you, John, with a new...

HONORABLE PAM KING: He can't pull his email so I guess that won't work. Basically trying to just simply reflect on what I think the three important points or takeaways from this morning are. One is the make sure that the document very clearly acknowledges that we did not invent these issues or things to talk about, that this is something the community has worked on for a very long time in all sorts of different forums but that this body provides one forum in which those issues can be addressed, and really highlight the uniqueness of the forum itself, as well as doing a better job of acknowledging sort of the impact on state and local folks, as Gerry had kind of pointed out. I think we have some language that will work, hopefully. I don't know. John cannot get up his email, so I guess that won't work. But basically trying to just simply reflect on what I think the three important points or take-aways from this morning on this document are -- One is to make sure that the document very clearly acknowledges that we did not invent these issues or things to talk about, that this is something that the community has worked on for a very long time in all sorts of different forums. But that this body provides one forum in which those issues can be addressed and really highlight the uniqueness of the forum itself as well as doing a better job of acknowledging sort of the impact on state and local folks as Gerry had kind of pointed out. And I think we have some language that will work, hopefully, I don't know John can't get up his e-mail, so.

PHIL PULASKI: He can't get on his computer. That's the problem, right?

HONORABLE PAM KING: Oh.

PHIL PULASKI: I have them here.

HONORABLE PAM KING: Well, maybe you could just hold that up.

I don't know what else to say. Do other people have comments or things in having an opportunity to reflect from the discussion this morning that someone wants to raise at this time? Yeah, I can ...

PHIL PULASKI: Someone's going to bring that to John.

HONORABLE PAM KING: Yeah, Julia?

JULIA LEIGHTON: You know I sent you some comments that were more structurally oriented, and I

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don't know if you want to toss that out, but I had a concern that some of the items that were identified as foundational are actually operational. If by foundational and if by reliability and validity we're talking about scientific reliability and validity. I had proposed that the code of ethics actually be addressed as an operational issue. I don't think it addresses scientific reliability and validity, which does not mean to suggest that I don't think it's terribly important, but I think it's operational. It's how we do business, how we conduct ourselves, both labs, managers, and individuals.

I thought the survey also belonged in operational not in foundational. I think the survey informs us about operational aspects of how the practice is being conducted around the country and how we can respond to what we learn about how the practice is being conducted around the country.

I thought that the foundational sections really ought to focus. I think I ended up almost exclusively with the work of the science subcommittee. I think those projects and that work was best set forth there and satisfied that sort of notion of what we mean by validity and reliability. Likewise, the code of ethics is more like accreditation, which is more an operational issue.

HONORABLE PAM KING: Thank you, Julia. Arturo?

ARTURO CASADEVALL: No, sorry, just left over.

HONORABLE PAM KING: Just left over? Phil?

PHIL PULASKI: So I had to ask Pam during the break: Are we getting any feedback? Gerry, consistent with your comment, are we getting any feedback from the stakeholder community, so the stakeholder community: IECF Forensic Operations, Investigative Operations, National Sheriff's Association, National Association of Criminal Defense Lawyers, National DA's Association? Are we getting anything so as we sit here that can inform our document, so that we're not operating kind of in a fishbowl, and not seeing and getting any input through the glass? Anybody have any sense on it?

GERALD LAPORTE: Phil, what I would comment is I've spoken to people in the community, but I don't want to commit hearsay. We have an open session here today and tomorrow. If people are out there, I would just urge those organizations maybe that you mentioned that they make their own comments about the impact that they're feeling.

PHIL PULASKI: Yeah, I agree that's one of the ... Thank you. That's one of the reasons why I brought the topic up, because I get a lot of kind of hearsay, too, but I don't get an official position, and we should know what the official position is. We may disagree with it, but we should at least know what it is, and that should inform at least partially what we do going forward.

HONORABLE PAM KING: Jim?

JAMES GATES: I was re-examining a document, and on page seven under point four, I think is an appropriate place. We had part of this discussion this morning. It talks about established research base of effectively and accurately communicating forensic science information with the judicial system and the

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public, and a subset of the public is the wider scientific community. I think that's the place where the unique role that this group has played I think needs to be highlighted and called out as a need that the forensics community is going to have into the future. I mean, the point I was trying to make, and apparently I was not very effective, was that the larger scientific community will likely be called upon numbers of times in the future to look at forensic science from the perspective of non-practitioners. A body like this could be an extraordinarily effective communications mechanism for the forensic community to speak to the outside scientific community, and I don't see that in what we have here.

HONORABLE PAM KING: I'm still working on that one.

JAMES GATES: Okay.

HONORABLE PAM KING: Let's see. Linda, you're up next? Actually, I think Suzanne was up and then...

LINDA JACKSON: Before me.

HONORABLE PAM KING: Okay.

SUZANNE BELL: Thanks. Yeah, I just want to echo the comments that I didn't make very well before. We've heard about the implications, and we all have hearsay about what it means, what's going on, the ripple effects. What are they? I mean, for example, those of you that are judges, do you rely on the recommendations in Views documents that we've made? Those that practice law, do you use those? I mean we know, for example, when we made recommendations on research what the response was, but that's a small part of the larger world. It helps us to know what impact we're having, and I don't know. I don't know what we're having. I mean, I don't know how that affects forensic science in a day-to-day practice, so I think that would really help inform that, to have some idea of what that is rather than hearsay.

PHIL PULASKI: Okay Pam, we have the document up online now.

HONORABLE PAM KING: Question?

LINDA JACKSON: I just wanted to speak briefly about the conversation that was had earlier about the effects for state and locals, and some of the comments about the limited amount of state and locals that really can participate in a group like this with the makeup that it has to be. I was thinking that since one of the complaints that I've heard is that some of these ... Since we were making the recommendations to the attorney general; even though we were hoping for a trickle-down effect is that in some jurisdictions, or in many jurisdictions, it could be seen kind of as trying to pound a square peg into a round hole, because of the differences in the jurisdictions, whether it be the resources or the makeup of the lab or the laws in that state, that kind of thing.

One thing that we could move forward, consider doing would be to work on some sort of Views document where we proffer that it would be a good idea for states to put together a similar group such as

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this with a variety of stakeholders, where these types of things that we've been talking about here as the commission, that those could then be looked at at the different state levels, and actually take into account all of those things that are appropriate so that it acknowledges that not everything that's done in the documents that we've done might be exactly applicable in the jurisdictions, but that we would recommend that those be looked at in those jurisdictions.

BARBARA HERVEY: We could start that probably by getting a collection of what's already been done in the different jurisdictions to address many of these issues. Not only commissions or groups of stakeholders to discuss, but perhaps legislation or the specific training that's going on in the different areas. If we collect what's going on now and add to it, or share, or make sure the federal government understands that the trickle-down theory is actually being accomplished. We could start there.

HONORABLE PAM KING: We did get a copy of the document back up on the monitors that you can see.

SPEAKER 1: You have?

HONORABLE PAM KING: Sort of. This one is ... I just want to kind of go through, and hopefully people can see it. This is on the very, very beginning of the document. There was a sentence in there saying it is not designed to comment on the forum in which the remaining work occurs but to highlight issues that those involved in the commission did not have time to address during the commission's first two terms. I would suggest that we take that language out because it sounds to me like from the discussion, people are more interested in the conclusion which is that the commission, at least it's our opinion here, that this body continues. Just to make the document consistent, that was one of the changes with respect to track changes that I put in. I don't know if you could go to the next one. It's a ways down, I think.

This would then be next. Again, like I said, I'm doing this on the fly. This is the next one which was trying to get more at what Jim Gates was talking about with respect to the makeup of this commission. I think other members commented on this too as well as Julia that it is really unique in the way that it is designed and it was done so intentionally by those that created the commission. I tried to strengthen the language. This is in the looking back component or portion of it to acknowledge that it is unique, that it is designed to bring the stakeholders and the forensic science and judicial systems together with those in the broader scientific community to discuss, to make recommendations in important policy matters. Essentially, everything is the same.

Again, just trying to strengthen that language getting back to the core of what this group was designed to do in the first place and what makes that important. That was the next change that I'd made. I think this area here, sorry. I'll get on the right page.

PHIL PULASKI: The top, page five.

HONORABLE PAM KING: This is in the section that has to do with undertaking the survey from law enforcement agencies and the fact that in its original form, it did not take into consideration the work that

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BJS has been doing in surveying publicly funded laboratories. I wanted to make sure that there was some recognition and acknowledgment of that in this document. I added the language that you see up there in an attempt to gather some of this information.

The first recommendation from the commission was for a survey by the Bureau of Justice Statistics to further identify those state and local agencies who are conducting forensic analysis. BJS asks, (inaudible) conducts. It surveyed publicly funded forensic crime laboratories. Their latest report, which was issued in November of 2016, provides a lot of information about these laboratories and is helpful to the commission's work. Simply just acknowledging it. I'm not sure that this is the best. Like I said, I'm just trying to do some things to address some of the issues that were raised. Everyone's giving me a confused face. I'm sure she's not impressed by the language but that was the next one. If we're going to have some discussion about these, I don't have to speed through every one of them either but does anybody have any comments?

MARILYN HUESTIS: Yeah.

HONORABLE PAM KING: Marilyn?

MARILYN HUESTIS: I'm just not quite sure why this is in there because we're not really talking about what other agencies do or do not do. I don't see the appropriateness of this. I do know we're going to get a report tomorrow, I think, about this but we know that this was not done in conjunction with us as we had initially hoped it would be and that we were going to have input into it and everything. I don't see that this is appropriate for the document.

HONORABLE PAM KING: I know you worked really hard on this particular issue, Marilyn, so thank you for your comments. Cecelia, you're the one that had raised this. Did you want to comment in response?

CECILIA CROUSE: Yes. I thought it was very important that it be in here, Marilyn, and I'll tell you why. Because some of the questions that we're trying to answer are actually in this document. As far as I was aware, we didn't even know if we'd ever get a document from BJS and I think we should acknowledge what's been done at this point. It's like I mentioned before, one of the biggest concerns that all of us had was how many one and two person operations are out that would be affected by what we did amongst other questions.

I know you worked very hard on this as well. This is not a substitute for what we were trying to ask. I think it's important that we acknowledge that some of the foundational information we need with regards to maybe budget or financial or staffing or whatever is actually in these documents and that they should be acknowledged. I know you're disappointed with not having a report, report but ... I don't think it hurts to be in it. How about that?

HONORABLE PAM KING: I think one of your gentlemen was next. I'm not sure who. Judge Rakoff?

JUDGE JED RAKOFF: Yeah.

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JULES EPSTEIN: [inaudible] left two of us out.

JUDGE JED RAKOFF: I don't know how picky you want to get but if you want to go back to the bottom of page four, go down there. It says the following four foundational areas and then you lists three.

HONORABLE PAM KING:: [inaudible]. All right. Thank you.

JULES EPSTEIN: I want to go back to the state stuff. I'm afraid we're asking too much and deferring too much. Real quickly. It's important in this document to make clear and I sense Pam, some suggested language, that there are substantial state and local stakeholders on this commission. Number two, that there are additional state and local stakeholders on our subcommittees. Number three, whenever we have vetted any proposal and we've discussed this. Phil has been a great proponent, among others, of making sure we say how will this affect the local? You can fill in the blank. The local investigation, the local crime lab, the local whatever. If we describe our constituency and our cognizance of those concerns, we are acknowledging, at least in part, what has been raised.

I would add to that and I think this is correct, that many, many state and local stakeholders have been among the commentators to the various things that we have posted for public comment so that there's a second vehicle or a mechanism to incorporate or consider local impact. I don't encourage our going out and asking, did you like it or did you not like it? First of all, in memory of Steven Finberg, I'm going to say this. We'd never get a statistically correct answer, a reliable answer. It just wouldn't happen. I don't think that that's the metric. Some people don't like things are more vocal. It's just not a practical approach when the issue should be is its prompting discussion. That's undeniable.

I suspect if I went around the room, anyone here who has spoken at some sort of a conference or a professional meeting even in-house in a lab has had discussions that has said, here's what the National Commission is talking about or here's what we're proposing. Charlotte and I were just in Arizona with Arizona judges. I know Barbara Harvey has this all the time in Texas. It happens everywhere. Matt, you told us about it happening in your neck of the woods.

The importance is that it's being discussed. We will go down a rabbit hole that we don't want to if we do a popularity contest. The point is, and I think this is a fair statement, the work we have done has been talked about for good or bad by lots and lots of people and that's an important impact in and of itself.

The last thing, the idea of suggesting that states replicate what we do, I'll be between agnostic and opposed. Fifty-one of these is not a great idea. You don't want things going at counterpoint and then, well, 26 voted this way and 25 voted that way. That's very different from states that have forensic science commissions that are looking at issues already, saying, "Oh, here's something interesting, we will talk about it." My suggestion is that we keep the language, and again I'm not saying it's model. I sent some to Pam just to give her a starting point to emphasize what I said. We include, for a federal commission, a good amount of state and local stakeholders, we hear from them, and we are constantly evaluating what we do and what we recommend in terms of its impact where the great majority of forensic work occurs in the state and local systems.

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HONORABLE PAM KING: Perfect. Thank you, Jules. Matt?

MATT REDLE: Pam, with respect to the language regarding the survey, the way it's written, it talks about conducting a survey. In the overall scheme of things, and it's one of the, it is the first thing that we talk about. In a lot of respects, listing that and giving it that kind of prominence without explaining some of the rationale why that was important to us makes it easy to gloss over that and perhaps to gloss over other aspects of the report as well. I happen to believe that it is important because it's important to know the number of police agencies where we have these small units, it's important for us to try to discern what kind of standards or quality assurance or quality control measures they follow, and whether or not these are things that are required of them, or are they just out there, pardon the expression, cowboying their practice without any direction that has any real credibility. I think some kind of statement to that effect that what we're really trying to do is see what kind of standards are actually being followed in these smaller units so that we know the quality of the work.

HONORABLE PAM KING: Thank you, Matt. I have your notes too that I was trying to incorporate and I didn't quite get that far. Thank you for elaborating on that. Jim?

DR. JIM GATES:: Thank you. We will shortly be hearing from Eric Lander, the co-chair of PCAST, and PCAST had its last public meeting this past Friday. One of the things that that meeting was used for, since it is webcast, is to talk about PCAST engagements with the wider communities that actually undergirded the support. I'm going to ask a challenge to the staff here of the commission because one of the first comments I ever made about the commission was, "What kind of staff support do we have?" Operations like this aren't successful without appropriate engaged, dedicated, and just absolutely superb staff. My question was about staff and so this question's also about staff.

Is it possible for us, the commission, to look back over the life of our existence and find a tabulation of at least the number of external stakeholders at the local level that we have engaged? That's something that, like I said, we and PCAST, the staff there, actually allowed us to do that, so we can make in a definitive statement how widely cast was the debate that went on. It allows the commission, or PCAST and likely the commission, to be able to say, "You know, this is not this one size fits all, it all comes from the top kind of organization. Instead, it's an organization that went out and spoke to the people who were in the trenches, who know ground truth, and we were informed by their opinion. My challenge is actually to the staff if we can get that information, I think that might be a very valuable addition to this document.

The other thing about this document that I think is, at least in my mind, becoming more clear, and I thank Pam so much and the group that worked on this, is that this document is also setting out a model for something in the future. Maybe it's the 2.0 version of this commission, maybe it's something that's very different, but it's something that I think is needful, as I expressed earlier, and so this really is laying out a set of principles, a doctrine, and the kinds of things that a group like this can do for forensic science. Again, I commend you folks for really digging deep on this.

SPEAKER 2: Jim, can I ask a quick question about this? In terms of metrics, would it be like the number of public comments that were received and how many different people would it be-

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DR. JIM GATES: That could be included. That certainly could be included, but the point is to make sure that the message goes out that we didn't just go in a room and become the world's, well, that we didn't fool ourselves into thinking we had become the world's greatest debate society.

SPEAKER 3: Presentations that may have been made to various groups and so on. Okay.

HONORABLE PAM KING: I would point out that one of the appendix does list all of the sub-committee members as well, so that doesn't get exactly at your point, but I think that's a good suggestion that we might be able to shore that up a little.

PHIL PULASKI: Jules' comments are very insightful, and I agree. The discussion element has been dynamic. I think it's been astonishing. Just very, very positive. But, there is a more realistic effect on the recommendations and the acceptance of the recommendations that goes right to the working man and woman in the field, whether it's defense council, or they're in a laboratory, or they're a detective, or they're a chief, or whatever they are and there's a concern in the stakeholder community that what is a recommendation to DOJ will eventually become a recommendation within their own jurisdiction, whether it's a municipal jurisdiction or a state jurisdiction. That's why I agree popular vote is not what we're looking for, but there are representative groups that represent these communities and I would like to hear from them as to how they think we're doing in terms of what we put forward.

In terms of the adjudication process that you mentioned, I believe my memory serves me correctly and having put comments on the federal register on other documents, not with the commission, that our adjudication process is different from the normal statutory adjudication process. This is more of a streamlined ... Jonathan?

JONATHAN WROBLEWSKI: What do you mean? Because I know we've had the conversation about comments being adjudicated similar to what a consensus standard, standards of element organization process would use, and ours is not exactly that technical but we do have the operational document that describes-

PHIL PULASKI: I'm not criticizing the process, but I know it is different from ... I'm on a couple other advisory groups and when comments are posted on a federal register, there's a very precise way that they have to be dealt with by the agency. We don't [crosstalk 01:18:07].

JONATHAN WROBLEWSKI: Oh, right. Yeah, yeah, yeah. We're not using the same as the federal register, per se.

PHIL PULASKI: It may be that in order to get stakeholder, if it's necessary to get more stakeholder buy-in, because we haven't measure the stakeholder buy-in other than anecdotally, that maybe we might want to look at the adjudication process. I'm not 100% sure from the anecdotal information I have that everybody in the stakeholder community feels that the adjudication process necessary addresses their concerns in a manner that they like to see them addressed. These are just things I'm kind of throwing out. I know that there is a public comment period at the end of both sessions. I don't know who's in the audience and I don't know who's going to be making public comments or if they want to address this but I

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do have a concern that as we move forward with this document, that we get a sense from folks who represent the stakeholders what their thoughts are.

HONORABLE PAM KING: I think it was Cecilia and then Marilyn and then Julia and Jeff.

CECILIA CROUSE: In December, I received a request from AFS and they had received a request from the US Government Accountability Office. They were conducting a review and they wanted to know if AFS would respond to several questions regarding the National Commission. I have no idea what the results of that were but they certainly did reach out different entities and they wanted to know how that entity was involved with the commission activities, they wanted to know what role the federal government should play, they want to know how they would characterize the effectiveness of this commission, and they wanted to know how they felt about the extension of this. I don't know to whom to even address this but I don't know what the result of that GAO survey, or whatever it was, is but in answer to your question, Phil, I think that some of the entities that are directly affected by this commission sent something forward. I just don't know what the results of that is and I was wondering, Gerry, if you were aware?

GERALD LaPORTE: The GAO audit is still ongoing. I think that's about all I can say. They're doing their assessment. They reached out to you publicly which is great that you said that. I'm not allowed to say that. All I can say is it's an ongoing process but it has not been finalized yet.

CECILIA CROUSE: Well, because it was an email it's a public record at least in Florida.

HONORABLE PAM KING: Maybe one of the reasons that it's important for us as a group to think about whether or not we want to have a say in that as well since other people are being surveyed. Marilyn, you're up.

MARILYN HUESTIS: A couple of things, so I agree with Cecelia that it'd be nice to document that the BJS provided some valuable information to the commission but I think that we had, the subcommittee that dealt with this, we had specific information that we needed to expand the scope of laboratories that were doing this work and also how much of it was going to private labs, how much of it was going to larger state labs, et cetera. I think we don't have the information that we needed and that we still need, so I think it's great to acknowledge that BJS has done this survey to the same group that they had previously approached, but that there was additional information that the commission could still use to address, as Matt was saying, so many questions about where it was being done and the quality of which it was being done.

On the issue of state and local, I would also agree with somebody over here who was speaking about it, that I think we have good representation on the commission and the subcommittees. I think we have lots of input with the adjudication of all the comments and we certainly reached out to that group. Clearly, there are aspects of what we recommend that might need adjustment, as Barbara was saying, to the state and local group. I think what we've tried to do is give to set standards that then the state and local governments have the ability to go to people saying this is what we should be doing, this is what we need to be able to do and we've really pushed the issue of this requires funding. [inaudible] raise the standards

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and meet a lot of different requirements without providing state and local labs' money to hire the people, do the training and all the other things that we've said.

I feel that we have represented state and local and we've tried to give them the leverage to use these standards to help improve things at their level and that we clearly have shown the need for additional funding. I think we've done a very good job of doing that. Thanks.

JEFF ADOCHI: Just a few things, Pam, first of all I think I would echo everybody's comments, thank you. Obviously with the number of [inaudible] coming up people put a lot of work into this and very thoughtful work. The other thing is the arguments to continue the commission; I know just personally, I've got just profound respect for the people that are on the table and affection. This has been an amazing experience. The only thing I wonder about if we're making some recommendation to continue the commission, I fear that we could be creating a false dilemma. Our choices are continue all this great work or sunset the commission but there are other courses of action. We could consider do you really need a commission and a Forensic Science Standards Board at the OSAC or do we need one group, this collapses with that.

Would you want to take all of these resources and say we're going to take a page out of the 2009 report and encourage DOJ to have an office of forensic science and fund it with this and staff it? Those are fair discussions and so it seems to me we want to consider the courses of actions. I think there's people around the table, people surrounding the table, that might have different views of how you do this work.

HONORABLE PAM KING: I think that's one of the reasons, Jeff, that we originally tried to really stay away from what should the makeup or what should the ... Is there a particular organizational component? That was something that we didn't address in this particular document for that reason because it may be that there's other forums that could be an improvement. There could be things that are, you've listed up a couple of examples or ideas. We're sure there's lots and lots of examples or ideas structurally by lots of people. We were trying to really keep it focused on here's what didn't get done from a subject matter standpoint and not from a structural standpoint. That may be the con for making a recommendation, not a recommendation, a suggestion, a belief that this group or organization continue.

I certainly would support this group should continue and this work still needs to be done statement, but I think we need to be really, really careful that we aren't pulling the discussion away from the subject matter and the things that haven't been yet done, which I think we do have some say in, and ideas for other structural mechanisms, which I don't think we have any control over. I'm pretty sure Nelson's going to have a heart attack about that.

NELSON SANTOS: No, I just wanted to followup on when we discussed the intent of the summary, and it seems to be shifting a little bit, and seems to be advocating for a position to continue or not continue the commission. That's concerning in that most business decisions that we've made are really thumbs up, thumbs down on relatively minor issues, procedural issues, and this is a pretty big issue. Depending on how the vote turns out, there could be quite a few dissenting opinions about which way we go, one way or the other, which was what I wanted to stay away with when we did the summary document. I think if the

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summary document simply states here are the things that are left unsaid and stays silent on what is the best mechanism, I think it goes to Jeff's point. That is there might be some around this table who have a different view.

This is a pretty important document and we want to rush it I'm hearing for the administration to take action. I think that's exactly why we shouldn't do it because I don't think we have looked at this issue well enough as a group to say here's exactly what we all believe, especially when it comes to a business document. This business document I think carries more weight than most business documents that we voted on before. We haven't actually voted on a business document except our bylaws and things of that nature. I thought it was going to be very fact driven and not taking a position one way or the other. That's all.

HONORABLE PAM KING: I think we were up to ... Well, Peter, we haven't heard from you at all and Gerry, you have your ... Is yours backup or not?

GERALD LaPORTE: You can skip me. I'm trying to look up something before I go.

HONORABLE PAM KING: All right, then let's go Peter, Julia and Jules. Jules, you're hogging the time so ...

SPEAKER 4: Pam, do you want to go through the rest of the document and other changes you made or do you want to wait?

HONORABLE PAM KING: I think let's just ... I think there really does need to be some better drafting than I've already been able to do so I think the discussion is probably more important.

PETER NEUFELD: This is in response to Nelson's comments. I think no matter where you go with what the suggestion should be for what form it takes, or even if you don't want to weigh in as to what form it takes, other forces are at play in the next several weeks. I'm not sure, Gerry, about this so if I'm mistaken obviously you'll correct me. The way I think it was left is that, I mean the continuing resolution funds this stuff through April 28th and that it's going to be due in the next eight weeks that there'll be meeting between the House and the Senate Appropriation Committees to resolve their differences. I think it's only the House report by the way that takes away the money both from I believe the commission and the OSAC. There's nothing in there for the OSAC either but the Senate recommendation continues funding for both so they're going to be hashing this out in the next eight weeks, and they would like to hear input. Frankly, it's not even that we would necessarily recommend the continuation. I'm not suggesting that, Nelson. What I'm saying is we need to provide the data on what needs to be done so that others in the Senate and the House can look at that data and that can be one factor that they consider as they try and hash out their differences during the next eight weeks. That's why you'd want to vote on this sooner rather than later.

NELSON SANTOS: I would agree with you, without the recommendation one way or the other, to provide the data on what needs to be done. I think including a path forward, whether a continue, not continue, different form and stuff like that, is where it gets a little tricky, that's all.

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JULIA LEIGHTON: Time may make this impossible, and I almost wonder if, to give Pam and the people that are working with her some guidance, we need to sort of take a straw vote on the issue of whether we would accept language that says, "We believe the commission should go forward," so we know whether we're writing, as Judge Raycroft described, our obituary but asking the next generation to do things, or if we are writing with the belief that, for some period of time, this body should continue. My personal opinion, despite hearing those things and fearing that it may complicate us getting this done, is that we should still continue with the notion of the belief that it should continue, if nothing else, to address the very issues that have been raised here of evaluating this structure, evaluating its impact, and ... Part of that is evaluating are the recommendations we've made actually being followed through? Are they being followed through the way we intended for them to happen? Are we seeing results? Should we exist in this form or should we dissolve?

I think that we're asking questions right now that actually we are also in a pretty good position to answer and to comment on. With respect to the state and local, I don't know if you're looking for anecdotal ... I mean, this is the topic of conversation in defense training after defense training. What's being done here gets put out on listservs. It's getting talked about. What does this mean? How would we implement? How would we litigate behind it? Can I give you numbers? No. That would take some work to do, but the other thing is we haven't ... Our recommendations haven't been out there very long. You know, the sudden short-term look at this ... We can't even get DOJ to think about to give us a response for six months. Even then, with respect, some of the responses are a little hedged and so this is a process that takes more time than that.

I think the people that have talked about that it started the conversation is a really important one. Even if it feels like a square going into a round hole, the conversation, it seems to me, is, "Well, what changes would we make if we did it here?" Since we don't actually dictate what state and locals have to do, it's not what we're there for, it forces the conversation of, "How do I round this square peg but at least put something in place?" Perhaps, I don't ... Nelson, how we proceed on this is we have to have some sense. If we're going to say that we believe this, then let's figure out if that's what we're working on.

NELSON SANTOS: I think your suggestion's a good one.

JULIA LEIGHTON: If we're doing an obituary, that can work for anything.

NELSON SANTOS: We can take a straw vote on whether the report should have an opinion on which direction we head. That's pretty straightforward. John, being as efficient as he is, has already got a little clicker thing up there.

SPEAKER 5: Is that the right question we want to ask?

NELSON SANTOS: The question is whether you should include a path forward in identifying whether it's the commission, whether it's something else, or leave it. I think that's the question. Or leave it open, as to ... The work needs to be done, how is it going to get done?

SPEAKER 6: How about ... I vote ...

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JULIA LEIGHTON: I would frame it more specifically. I don't think ... With respect, I don't think we can possibly agree or begin to suggest what the alternative is. We don't have time, though I agree that this group could, if it was given more time, talk about how it should be ended and either rolled into an o-sack or changed in some other way. I think the question here is whether or not we think the commission should continue to address this and other issues for some period of time.

JULES EPSTEIN: Suggestion ... I actually think you can accomplish both. We can have a tag to this that talks about how special the commission is, and just e-mail the suggested language on that. The single sentence, because this is hopefully going to help you, John, in narrowing this, is do we have an explicit, because I'd rather say it that way, an explicit urging that we continue? I think we should end this very strong with exactly how different ... I don't like the word unique. I don't think it has much meaning. How different or special this commission is in its makeup and in the constituencies that turn to it. Then, the only answer on this vote should be one sentence. Do we add a sentence that says, "We should continue?" In my ... I'm actually going to vote that we should leave that sentence out because it's actually said in the description.

The only other comment I wanted to make real quickly. Phil, I hear you. I'd like to have more time. Anything that we do to delay having some statement is going to deprive the powers that be, the decision makers, of some pretty important information. Pam, I e-mailed you proposed language that leaves that out. I think our vote should just be quite narrow. Do we include or exclude a sentence that says, "This commission in this form should continue?" Then we know.

JULIA LEIGHTON: Okay, so we can take a vote. I have tins up by Matt and by Wesley. Do you have things that you want to say before we take a vote or are they comments that can wait.

NELSON SANTOS: We need to be cognizant of time, so I think we take the vote and then we break and we can have discussions.

JULIA LEIGHTON: Perfect.

NELSON SANTOS: We've got to have those folks set up, I think, the first speaker's he ... Remote?

SPEAKER 7: Yeah, 1:30.

NELSON SANTOS: Yeah, 1:30. He's remote, so I'm sorry.

SPEAKER 8: [inaudible] in addition to what's being written so we can understand what we're [inaudible]

SPEAKER 9: Pam, we can't hear you.

HONORABLE PAM KING: My understanding of the question that would be up for vote is, "Does the National Commission on Forensic Sciences summary report include a sentence that the commission continue in its current form?" Yes would be it does. I don't know that there is a motion yet, so does someone want to make a motion. Julia made a motion and ...

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PHIL PULASKI: I'll second it.

HONORABLE PAM KING: Phil seconded it, so we can vote.

NELSON SANTOS: All right, so the question is clear to everyone, hopefully. Everyone can vote. This is ex officios as well.

HONORABLE PAM KING: Business document.

NELSON SANTOS: We should get one more. [Saneta] will not be able to provide a vote, so there should be thirty-eight. Okay. 42% yes, 39% no, 18% abstained, so ...

HONORABLE PAM KING: I'm going to go with "no."

NELSON SANTOS: All right. We don't get 51%, so it does not include a sentence.

HONORABLE PAM KING: All right. Thank you.

NELSON SANTOS: Okay, let's take a twenty minute break. Please, please be back at 1:30. Well, before 1:30, because we have a remote speaker who is going to log in at 1:30.

One other additional announcement, the men's room is closed up by the elevators, so please use the men's room through that back door.

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Part III

NELSON SANTOS: All right, commissioners. Let's take our seats so we can start the afternoon session. All right, we're going to get started with the next session. Please take your seats. This is our first session on scientific foundations. What we're going to do, all the speakers' bios are in the handouts that were given to you. We're just going to introduce the speakers. They're going to speak once.

Doctor Allison will speak first, then he'll take questions. Then we'll hear from the next two speakers. With any further ado, the first speaker is Doctor David Allison, who is with the University of Alabama at Birmingham. As you can see, he's joining us remotely. Doctor Allison?

DAVID ALLISON: Thank you very much. Can you hear me all right?

NELSON SANTOS: Yes.

DAVID ALLISON: Excellent. Well, it's really an honor to be sort of here with you here today. I was truly pleased by the invitation to speak with you. Wish I could have been there in person, but I have to say the climate is a little bit better here in Texas today.

I'm going to speak about breaches in research reproducibility, contributing factors, examples, and possible prophylaxis. My understanding is you'd like me to speak for 30 minutes. If that's correct, I will go ahead

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and do that. I may cut out a few slides in the middle to stay within the time, but all of my slides are available upon request. You can see my email address on the first slide. If anybody just emails me, I'll be glad to send them the slides.

This is an outline of what I'll discuss. I'll talk a little bit ways in which science can go wrong, factors that lead to problems in science, some examples of those kinds of problems that occur, potential solutions, and some macro-level issues.

Well, this is just a general taxonomy of how science can go wrong. I've put it into four categories. One is fabrication and falsification. That is just plain making stuff up. We think that happens rarely. We hope it happens very rarely. I don't know if anybody knows for sure exactly how often it happens, but what's important to realize is that this is not new. There's actually fairly compelling evidence that Brother Gregor Mendel fudged some of his data. His numbers in the punnett squares for pea plant genes, genotypes, and phenotypes, are just too close to the theoretical predictions to have occurred by chance. This was shown by Sir Ronald Fisher roughly 100 years ago.

So I think we need to recognize that these are not new, and start counting in the field how often these things occur so we can start to see whether we're progress or not.

A second category of where things go wrong we might call distortion and obfuscation. This is a photograph of Einstein talking to Lord Eddington. This is after Eddington had come up with the empirical evidence that supported Einstein's theoretical predictions about the bending of light towards the sun, but he was only able to really get that support after throwing out one of the data points that didn't look so good. Now, we may think that that was a good thing to do, and it may have been a good thing to do, but he was essentially throwing out data that didn't conform well to the theory, something that we're concerned about today. Was that distortion and obfuscation? Again, we can raise questions about it, but certainly these are not new approaches.

Then there's what's called gross error. If you had asked me a couple of years ago, I would have said, "I think fabrication and falsification are very rare, distortion and obfuscation are very common," and that was more or less the limit of my thinking. Then, through some accidental events, my colleagues and I start stumbling upon lots of very severe mistakes in the literature, mistakes that were severe enough to result in papers often being retracted. I'll tell you about some of those mistakes we uncovered. That got me starting to think that gross errors were at least as much of a problem as distortion and obfuscation.

This is a picture of Rene Blondiot. Blondiot is someone you may not have heard of because he was the discoverer of N-rays. You may not have heard of N-rays, and that's because N-rays don't exist. But, at the last century, they thought N-rays existed and Blondiot had discovered them. These were rays that were detected by a calcium sulfite thread that glowed slightly in the dark when the rays refracted through a 60-degree angle prism of aluminium. At that time, the physicists from John Hopkins University, Robert Wood, went over to Nancy. N-rays are named N for Nancy, the town in France where they were discovered. Robert Wood went over to Nancy and asked for a demonstration by Professor Blondiot. At one point Blondiot turned on the apparatus, said, "Look, you see the sulfite thread is glowing. Demonstration of the N-rays."

Robert Wood was kind of a trickster. He distracted him for a moment, reached into the machine, palmed the prism, put it out, put it in his pocket, and then asked to be shown the technique, the trick, the device again. He was shown the device again, and Blondiot said, "You see? There it is. It works again." Robert

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Wood at that point revealed that he was, in fact, holding the prism, and so it should not have been working at all. Clearly Blondiot had not put in proper controls. There's no evidence that he was intentionally being misleading, but he had made a gross error. This is something we're seeing very commonly.

Then finally, there are issues with substandard methods. A very famous story that illustrates the idea of just using substandard methods, and how it can lead us astray in serious ways, had to do with thymus glands. To make a long story short, years ago, roughly 100 years ago, people did autopsies to find out normative value on body parts, anatomy, such as the thymus glands of children. They got the norms for the average size of a thymus gland. Then some children from wealthy families started dying of Sudden Infant Death Syndrome. People were looking for the cause and they measured the thymus gland of these children who had died of Sudden Infant Death Syndrome. They found that they were bigger than average. They thought that these were enlarged thymus glands that were leading to Sudden Infant Death Syndrome. So then, children with these enlarged thymus glands were irradiated to try to reduce to size of the thymus gland, which is near to thyroid; which led to thyroid cancer in many individuals.

It turned out later people realized that cadavers on which the initial estimates of thymus size were based, people don't become cadavers at random. It tends to be preferentially poor people who become cadavers. Poor children were generally malnourished children. Poor malnourished children tended to have smaller than normal thymus glands. There was actually nothing wrong with the thymus glands of these children who died of Sudden Infant Death Syndrome, they just appeared large because they were compared to bad norms by bad sampling procedures. This would have been known to anybody even 100 years ago would have realized you're better off with some sort of representative or random sampling that looking just at the cadavers of poor people, but this wasn't thought through well, so it shows the errors of substandard methods. These are some of the major ways in which science can go wrong.

What are some of the factors that lead to these problems in science? Well, this is not an exhaustive list, but my friends, colleagues and I have tried to put together this list. We've come up with four big categories.

The first is motivational. Within motivational, we've put in two subcategories. The first one that we've highlighted in yellow is to indicate that to our knowledge, this is not something that is widely discussed, if discussed at all in the scientific literature and the educational literature, but we think it's an important one. It has to do with insufficient scientific motivation. I'm going to define scientific motivation as the desire to pursue and communicate truth discovered through scientific methods. The passion and motivation to pursue that, if insufficient, then may be insufficient to overcome the competing extra-scientific motivation that we all have. You'll see in the second major bullet is that there are competing extra-scientific motivations.

People often focus on things like financial conflict of interest. That's important, but there are many other important extra-scientific motivations. All of us who get out of bed in the morning every day get out of bed for a reason. We want something. We have motivations. Those motivations can lead us astray. Is there, then, the guiding force to pull us back? That is our scientific motivation to overcome that. That's why we put that first bullet in. So, motivational is one set of factors.

Ignorance is a second set of factors. People sometimes do things incorrectly because they just don't know.

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A third set of factors is limited resources. People sometimes make mistakes because they don't have the resources to work thoroughly and carefully.

A fourth is cognitive biases. These are fundamental human biases we all have. Probably the most well-known is confirmation bias, that is the natural human tendency to seek out information that confirms our beliefs, rather to go out of our way to seek out information that might refute our beliefs. That's just one of many cognitive biases.

To elaborate a little bit, in terms of extra-scientific motivations, these can be personal, like having previously made a public statement on something that you say, "I believe X is true," and then you don't want to go back on your statement. It can be financial, conflict of interest. There's actually another angle on conflict of interest which is the flip side of the concern about it, which is the fear of ad hominem attacks. We've seen this in many areas where people who have a conflict of interest are demonized. Whether they take money from tobacco or the sugar industry, or whether they take money from organizations that might question climate, whatever it is; whether their opinions are right or wrong, the point is that they're demonized. In demonizing an individual, then what we may do is shut down that voice and that leads to a bias.

There can be interesting career advancement, personal aggrandizement, and also unreasonable belief in validation by peer review. That is, we don't think peer review is really all that effective a way -- I don't know if it was ever intended or expected to be -- all that effective a way of making sure that what's published is valid. It's really that what's published is reasonable. In fact, if we believe that what's published is valid, or validated by the mere act of peer reviewed, we may be misled and not question things enough. There are also, on the other side, institutional aspects of conflict of interest. We see those over here. One can be the reward structure in which scientists are rewarded for the quality -- Excuse me. They're rewarded often for the quantity of publications, and for having exciting findings, and being the first to discover things, as opposed to being rewarded for rigorous conduct. We think if we can alter the reward systems, that might be better.

There are also institutional circumstances that have become even more prominent in recent decades than they were many years ago, which is that the beauty of our funding systems in the United States is that they allow a lot of research to be done. The downside of our funding systems is that they have created an academic environment in which many major research-intensive universities have built their structures on a system in which investigators, faculty, need to be funded not just to do the next project, but in fact they have their careers advance; or in some cases, even to continue their employment. That leads to people trying to acquire grants for the sake of acquiring grants, not just because they want to do an interesting project. That may lead to, again, cutting of corners and lower research quality.

Terms of ignorance, this can be either due to a lack of effective training or ineffective training, or it can also be due to what we call areas of interdisciplinarity. As research teams have gotten larger and larger over recent years, and as research projects become more and more complex, it becomes difficult to even know what to ask. That is, if I, as someone who's trained originally as a psychologist, and by evolution has become a statistician, if I'm working, for example, with a physicist, I may not even understand enough physics to know what to ask, to ask if something was checked. If I'm working with an art historian, the art historian may not know enough about statistics to ask me some key questions. We call these 'errors of interdisciplinarity.'

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Limited resources, limited time, limited money, limited opportunities can all interfere with rigorous research. By opportunity, we often mean things like limited platforms to do what we want to do and we know is the right thing, but are difficult now. An example would be: If I wanted to register a particular kind of study, before I execute that study, most of us think that's a good thing, and a pathway to increased rigidity producibility transparency. If it's a clinical trial, now I can do that. 15 or 20 years ago, I might not have been able to do that because those platforms didn't exist. If I want to register certain other kinds of studies, those platforms may not yet exist. Platforms for data sharing, for data registry, et cetera, et cetera, are needed.

Then cognitive biases. I don't expect you to be able to read this slide. I can't read this slide. It gives a list of some of the many cognitive biases that have been identified in the literature. Then you can refer to the references. These are just to say people are humans, and people are going to be biased by mere fact of being human so we need to think about ways of dealing with those biases.

Now, let me give you some examples of some of the things that have gone wrong in the literature, many of which we've detected, some of which we've just seen in the literature. This is sort of a working taxonomy. I won't go into details of all of these. These are some of the things we think about. I work in the field of nutrition and obesity extensively, so almost all of these are things that come up in the field of nutrition or obesity. If I worked in a different field, like particle physics, I'm sure I would have a different list. This gives you some idea of things that would come up in human and biological research. In the forensic setting, this will involve things like claims of effects of dietary supplements, claims of effects of drugs, claims of effects of treatment, and so on.

As you see on the right, we use the word 'errors' with implication as to intentionality or lack thereof. That is, some of the things I'm going to point out may have been intentional, some may not. We don't know in most, if not all, cases. I also point out we're not trying to be pejorative in this. We know we've made some of these mistakes too. We think, as a field, if we recognize these mistakes, we can start to put proposals in and programs in to try to minimize them.

Let's get into some examples. Errors of Design, one of the places we see this is cluster randomized trials. Cluster randomized trials are randomized trials in which people are assigned to two or more conditions, and then followed to look at an outcome. It could be, for example, children in school assigned to a nutrition intervention or a control group, and then we see what happens. But, instead of assigning people as individuals, we assign them in groups. We might assign entire schools to a nutrition intervention or control. When you do that, it is important that you have a minimum of two clusters of individuals -- cluster, for example, being a school -- assigned to each condition. Otherwise, you don't have a valid design. This is from a paper we published on this, and we pointed out two other papers, that have invalid designs in which, essentially, they could conclude nothing because they've just wasted a lot of research money and a lot of publication pages because they've got a design that has no inferential value. This harkens back to the problem of not having an adequate understanding of the statistics involved.

Gratuitous replication is something you see as another design issue. Here I emphasize the word 'over-reliance,' not reliance, but over-reliance, on observational data. Observational studies are great. They have their role in science, but over-reliance can be too much. This is from a meta-analysis Andrew Brown and one of my colleagues and I published together. What you see in the black lines here, this is the odds ratio for being obese as a function of skipping breakfast. That is, if people skip breakfast every day, they are more likely to be obese than if they don't skip breakfast every day. That was found in the early 1990s.

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You might think at that point, "Well, it's an association study. It's correlation, not causation. A good thing to do would be to replicate it". Indeed, it was a good thing to do, and it was done. After a few more studies were done, and you pool them in a meta-analysis, you can see that the confidence intervals are starting to get tighter; but the point estimate, the odds ratio, hasn't changed that much. As you go forward in time, and we keep accumulating data, the confidence intervals get smaller, and smaller, and smaller. So, we're more and more confident. The odds ratio's about here. But, the absolute odds ratio is not change very much, so we're getting much more confident in knowing the result.

If we look at it as a function of a P-value, a significance level, we see that right here, even in the first try, it was already at 0.05. This actually, this red line is negative Log₁₀ of the P-value. Here, it keeps going up. At this point in the mid-1990s, it was at 0.001. At that point, you might have said, "You know what? We've got it. It's significant. There is an association. Stop. Do a randomized controlled trial, and figure out if this is causal". But, in fact, that's not what was done. What you see here is the studies kept going till we had a P-value when we stopped counting of about 10 to the minus four. So, we've got enough observational studies on this question to give us a P-value that rivals the inverse of the numbers of protons in the universe. You really have to ask at this point, "Are we wasting research funds?" I think the answer is, "Yes." What we're doing is we're facilitating belief by what is referred to as the Mere Exposure Effect, which is one of those cognitive biases, by just exposing people to the statement that 'skipping breakfast is associated with obesity' over, and over, and over, instead of doing the randomized trials.

This is a common belief that breakfast-skipping predisposes to obesity, and eating a good breakfast every day is important for weight loss and weight-gain prevention; but is it true? If you go to the actual systematic review that we published, or presented an abstract of recently of randomized controlled trials, there have now been at least six of them. They fairly convincingly show that no, the answer was not. It is not the case that eating breakfast every day as opposed to skipping it is necessarily helpful for weight loss or weight-gain prevention so, important that we not overly rely on inadequate or weak study designs after their point of usefulness.

I'm going to skip this one in the interest of time, but again, you can see it all here. This is, again, a design flaw where people have been led to conclusions that have been pointed out in these papers, that are erroneous by not having proper statistically-managed designs.

There are errors in measurement. This is one that you probably see maps like this over and over again from the CDC showing the country getting fatter. The fatter states are darker. You guys are up here somewhere today. I'm down here today, and I live over here. In those darker states, we have more higher levels of obesity. The media loves these. They love to talk about these state rankings of obesity. Now, I don't actually know if state rankings of obesity is really a very important question. But, if it is, we might as well do it right. If we're going to do it, we should do it right.

Well, you have to ask, "Where do these data come from?" It turns out, these data come from the CDC calling up approximately 100,000 people every year, and asking them, among other things, what is your height and weight? You might not be shocked to learn not everybody's perfectly truthfully when asked, "What is your height and weight?" It turns out that men tend to over-report their height. Very thin men over-report their weight. Very heavy men under-report their weight. Women, on average, under report their weight.

If you look at these rankings then -- I circled California here just because the last time I gave a talk using

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this slide I was in California. These are rankings from the CDC self-report data, and these are rankings from my friend George Howard's data from a study called Regards, which is cited here, in which he has data from the same states in representative samples on measured height and weight. What you can see is very different sort of rankings. For example, let's see, Minnesota goes way up in rankings, which indicates that Minnesotans tend to under-report their weight or over-report their height more-so than do people in other states, on average. They're a little more dishonest about height and weight, on average. You guys are over here in Maryland. That goes down, which is good news for you. It suggests people in Maryland are a little more honest about their height and weight than the average people in the nation. Again, I don't know if it really matters where Maryland, Minnesota or Alabama are on these rankings; but if we're going to do it, we should do it right. We need to take our science seriously, and take our measurements seriously as well.

Again, I'm going to skip some of these in the interest of time. These are just more examples of where people have settled for markedly inadequate measurements, and therefore drawn erroneous conclusions.

There are errors in analysis. A common one we see in randomized controlled trials is instead of people comparing the treatment group to the control group, for example, in a weight loss study, they do a test of whether the treatment group lost weight; and they say, "Aha. That was statistically significant." Then a test of whether the control group lost weight. If it was not statistically significant, they say, "You see? Significant over here, not significant over here." Any statistician who's in the room with you will tell you that's a completely erroneous approach. The correct approach is to compare the two groups for this statistical test, yet this happens a lot.

This happened recently with a study of flax seed. You can see the original study was here. It's been retracted. It's been retracted because Rositsa Dimova from the FDA, and I -- She wasn't with the FDA at the time. We found this thing. We actually were able to find that the investigators had posted the raw data for their trial on the website publicly, which was great and I commend them for it. Using their raw data, we were able to re-analyze the study correctly, and show that, in fact, their conclusion that flax seed was effective was patently incorrect. We wrote a commentary on that. The investigators agreed, apologized, and the study was retracted.

I think it points out two things. One is the need for more statistical training. The second is the value of raw data. We didn't have to cast dispersions on their character. We didn't have to question whether they had conflicts of interest, or didn't have conflict of interest, and speculate about why they made this mistake, or whether they made a mistake. We just went right to their data, analysed it, and said, "Sorry, your conclusion is incorrect," and we were able to get this fixed.

This is another study just pointing out, again, a statistical error that occurred. This again, is with cluster randomized trials, where there seems to be a great deal of confusion resulting in a conclusion being overturned, and a paper having to be retracted.

This is another one in which conclusions were overturned because investigators didn't know how to conduct a meta-analysis properly, calculate effect sizes. We picked up the error. We were able to help them correct it, and that resulted in the conclusions of the study being changed.

We also see many errors of reporting and interpretation. Here's where you get into, whether it's intentional or not, distortions and obfuscations. This one is more of a math error. This paper came out, and we saw it.

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It showed that if a policy were implemented that required that kids meals had no more than a certain number of calories in them. These authors looked at the average kid, and how many calories were in a kid's meal, and how many kid's meals the average kid ate, and estimated that such a policy would lead to approximately two pounds per year less being gained by the average kid. That struck me as a little ambitious, but maybe not wildly ambitious. But then I saw this line, "Calculations in the model include children who are estimated to eat fast-food four or more times per day. Though rare, such children could theoretical expect to avert weight gain of 27 pounds per year if this policy were implemented."

Well, then you start to think about it described here at 27 pounds per year. Do kids gain 27 pounds per year? Is this plausible? This just struck me as so unplausible. I contacted Kevin Hall, who is a colleague and friend at the NIDDK, who has probably the world's preeminent model for mathematically modeling effects of energy changes on body weight in children. I asked him to run this through this model. Here's the quotation you can see from him, basically the authors of the original paper, of this paper, had used an incorrect mathematical model. By doing that, their estimates were off by easily an order of magnitude. They were off by much more if you project out further in time. Again, the original article was retracted. This shows, again, the need for sort of rigor and training, particularly around mathematical and statistical issues.

We see issues of language, of people doing correlational research, but using causal language to describe it, when we all know the [inaudible] correlation does not equal causation.

I'm going to skip these, but these are some particularly you might find comical, statements where if you look at what was actually done. Here's the study that was actually done. Here's the statements, and you realize the extrapolation is extraordinary. Here's another. Again, I'll let you read those yourself.

We realize that from this study, the perpetuation of spin that happens in the news media is not merely the result of the media going wild. It often is coming out of investigators and out of university-based press releases, so we have to say sometimes, "We have met the enemy, and it is us." We in academia, we scientists, have to take responsibility for letting the buck stop with us, and not starting the spin.

I'm going to skip these idiopathic errors. There are errors we don't know what exactly they came from. If you read through, I think you'll find some of them entertaining, some of them shocking, but they give some other examples.

Now, let me try to wrap up with some solutions. I think one is that we should not underestimate the importance of scientific motivation. There's a great deal of discussion about extra-scientific motivations. How do we deal with conflict of interest? Again, we have to deal with it. I'm not trying to say otherwise, but I think what we need to deal with at least as much; and I'm not sure how, and it's rarely discussed in the literature, is this culture of truthfulness.

I think that different people think differently about the profession of science. When I talk to some people in public health, for example, where we see a great deal of obfuscation, often their burning passion is beneficence. They want to help people. They want to get messages out that they see as good things that will help people change their behaviors, for example. That's a good motivation, but that's very different than a scientific motivation. Scientist wants to get the truth out. I think that we see some bending when people have motivations other than science.

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When people ask me often, "Why did you become a scientist," or, "Why did you choose to become a scientist?" I have to say, "You know, I didn't really choose to become a scientist. It's just who I am. It's part of me. Part of that is a very strong commitment and value to a culture of truthfulness. I see science not as a job, but as a vocation, as a calling, as a profession." I think if we can inculcate that view into others, we may see an improvement in the reporting of science.

I think we need to deal with competing motivations as well. Disclosure is essential. It is important that we disclose things. If you look on my various websites, you can see my disclosures. I'll be glad to send any more to you if you need. Disclosure is an aid to trust, maybe, at best, but it is not an aid to trustworthiness. That is, if I tell you that I accepted from this group or that group, it doesn't tell you really whether my data are good or not.

The methods of science themselves are the methods for promoting trustworthiness. I think what we need to do is buttress those methods with meta-methods. Things like studied registration, raw data sharing, reporting guidelines, and enforcement of their use. This is where government agencies have already started to be helpful, like FDA and NIH, who are requiring certain things, but we have a long way to go. It's going to be an evolving process that we all have to grow into.

We need to alter the incentive structures within universities and other scientific organizations to reward the quality of research conception. Let's reward the people who have the best ideas. Let's reward the people who did the best studies, regardless of the outcome of those studies. Whereas now we tend to reward the people who got the best findings. That is a formula for incentivizing obfuscation, bias, bending of truth, and so on, instead of incentivizing rigorous conduct.

Remedies for ignorance, obviously increase training, increase quality of training, more workshops, more statisticians needed. There's my bias. I'm a statistician, so you know that. Regular scoring of the literature so that we can see whether we're improving or not. These are all the things I think we can do to help with lack of knowledge.

Remedies for limited resources, I think probably we need to do a little less research. We need to forgo some studies that are unimportant and inadequate. We don't need the hundredth study associating breakfast consumption or skipping with obesity. The first 99 were enough. Let's save our research funds so we can do the bigger, more important studies more rigorously.

We need to triage studies for degree of rigor. Maybe not all studies have to be rigorous. That's another question. Maybe rather than trying to spend the funds to make all studies rigorous, we need to just flag studies for this one was rigorously checked, this one was not, or we didn't think it was worth it. There may be ways to use crowdsourcing to enhance our resources and of course, my bias again, you knew I was going to say we need more research funding.

Finally, there's some macro-level issues with trying to fix this. That is, to what extent do we need evidence that all the proposed solutions that I've offered here, or others offer, are effective? We don't really know they're effective, but we hope they are. Do we need science for that itself, or is it enough to say, "These seem reasonable, let's go ahead and do them"? As in other realms of policy, that's what we think. We think it's reasonable to proceed on face validity, and just be honest about the fact that we don't know that they'll work.

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At that point, I'd simply like to say thank you. If you ever want to come visit us in Alabama, we'll take you on a nice hike, and we can talk some more on the trail. Thank you again. I'll be glad to take any questions.

NELSON SANTOS: Thank you. We've got time for a couple of short questions. Julia?

JULIA LEIGHTON: Can I just ask that you put your email address up again so I can make a request for your slides?

DAVID ALLISON: Sure. It's on the first slide. Let me see if I can get there quickly.

JULIA LEIGHTON: Thanks.

DAVID ALLISON: Okay. So, you'll get them? All right. I'll leave it to you to get that.

NELSON SANTOS: Bonner?

BONNER DENTON: Excellent presentation, and I look forward to receiving your slides. I thought it's a type of educational presentation that all scientists need to see and understand. Thank you.

NELSON SANTOS: Marilyn?

DAVID ALLISON: Thank you so much.

MARILYN HUESTIS: I'd also like to say how good I think the presentation was. I think the emphasis on the positive results, only positive results being able to be published, and advancing one's career. There's huge push in academia on getting positive findings, and as many publications as you can get. I agree with you that we need much more registration and peer review of even study designs. At NIH, I think it's great that now data sharing is actually one of the primary areas that they've advanced, as well as all the clinical trial registrations. Thank you.

DAVID ALLISON: Excellent. In response though, let me say that knowing that I'm talking to the Department Of Justice and some people in government, excuse me, I think this is where we really ought to be moving toward being very firm with making it a legal and ethical mandate to publish research, at least certain kinds of research, once it's conducted.

Very, very quickly, I'll give you an example which is I did a little mouse study about two years ago. I got a really cool and interesting result. It was a preliminary study. I published it, submitted a big NIH grant. They said, "You need more preliminary data." I did another little mouse study along the way to confirm it, and guess what? I couldn't confirm my original finding.

I would love nothing more than to just stuff that second study in a box somewhere and forget about it, but that would be wrong. I'm going to go ahead and publish it because that's part of my ethos. I give these talks. How could I not do that? But, there's nothing to require that I do it.

I think it should be a legal and ethical mandate that if I hold mouse lives in my hand; and that's been registered with my university that I've done that because I had to get approval from the animal care

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committee to do it, that I should have a legal and ethical mandate to publish that paper, even if it's just a report on my website. The same thing goes for using human subjects. The same thing goes for using taxpayer dollars in research.

NELSON SANTOS: Okay, thank you. Wait, one more, Arturo real quick.

ARTURO CASADEVALL: That was a terrific presentation. I'm a scientist too. I totally agree with everything on all your slides. The question that I have for you is, you know, a lot of great discovery comes from error and serendipity. To some degree, there is a tension here because if you, in fact, plan everything, and you register everything, and you do everything, a lot of the anecdotes or things that often get discovered, could go away. It's not to push back in any way, because I totally support what you say. I just think that we need to recognize that there's the nuances sometimes in imperfection, resulting in science.

DAVID ALLISON: You're absolutely correct. I think we need to distinguish between unplanned studies and unplanned findings. Classic unplanned finding that everybody loves to talk about is the discovery of Viagra, which was not used initially as something for erectile dysfunction. It was used for something else. People came in, and said, "Guess what? I'm having this unusual side effect." Then pharmaceuticals said, "Oh my gosh, we've got a blockbuster drug on our hands." That's perfectly legitimate, but then it should just be disclosed, "This was a serendipitous finding, and it needs to be confirmed." That doesn't in any way go against pre-registration.

Sometimes there are studies we just want to play. This is particularly the area of very basic research where you just want to sort of fiddle around with things, see what happens. Again, I think that's fine, but to be disclosed as, "This is a different kind of research that always needs confirmation."

NELSON SANTOS: Okay. Thank you, Doctor Allison. We appreciate that talk, especially the way you ended it there on the Viagra talk. That was very well done. Thank you, sir.

DAVID ALLISON: Once again, I wish I could be there with you. Thank you for inviting me, and enjoy the rest of your meeting.

NELSON SANTOS: We appreciate it. All right. Let's move on to our next speaker, who is Doctor Michael Peat, who's the editor of the Journal of Forensic Sciences.

MICHAEL PEAT: Yeah, good afternoon. I'm not going to talk about Viagra. I am going to talk about Cialis, you know, the other one. I'm going to talk a little bit about the Journal of Forensic Sciences. Give you some background information and some insight into how we accept papers for submission, accept papers for publication, et cetera.

First, some background. I need some slides.

Recording: Thanks for using WebEx. Visit our website at www.webex.com.

MICHAEL PEAT: Some background information. We actually were first published in 1956, so the journal is 60 years old. Obviously, it's changed a lot in 60 years. It's only had about five or six editors in that time. The editor prior to me is actually sitting in the back of the room, Bob Ganslin. He was the guy

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before I, so you can blame Bob for everything that's happened.

This year, we have 671 manuscripts that have been submitted. We've grown over the past 10 years, significantly. We have an electronic review system which enabled that growth. I've used, in 2016, about 300 editorial board members and guest reviewers, both academic and non-academic based. Obviously, the academics, they're based in university institutions, et cetera, throughout the world. The non-academic-based reviewers obviously are practitioners. They're in the crime lab systems or the coroners systems, medical examiner systems, et cetera.

Our reject rate has gone up. It was 42% in 2012. It's 52% in 2015. We are rejecting more papers than we are accepting at this particular point. We have access not just to the membership of AAFS, which is about 7000 people, but we also have access to about 55 institutions worldwide through a relationship with Wiley, who actually published the Journal of Forensic Science.

Our current categories, and some comments on these. The papers are full-length research reports. That's how they're described in information for authors. Those papers are generally from academic institutions, although some certainly come from the crime lab systems, et cetera. Technical notes are more common in the crime labs than coroner's labs. Case reports, which are simply a case report, it's no detailed study there, are primarily submitted by pathologists. That is the favored category for the pathologists.

I've added some italics to this slide because we are about to change come -- well, actually have changed from first of January, '17. We are now going to accept critical reviews for publication. That's a critical summary of the literature. It's not just a compilation of the literature, and just printing out paper after paper. It's actually going to be a critical review. It's probably going to be the job of the editor, in this case myself, to invite those papers, and select their reviewers for those papers. That will begin sometime in 2017. That way, we should be able to get more data for foundational research. If we can put together a lot of papers around a particular topic, that should provide some foundational data for the forensic science community.

Now, we withdraw submissions also for a variety of reasons. We do not publish any regional population studies. For example, dental aging is a key procedure used in the refugee crisis in Europe to age the children that are part of that. They've got a lot of data on populations from various parts of the world that they use for those procedures. We do not publish those.

We do not publish internal lab validation data. If I'm a lab, and I validate a new piece of equipment for a particular procedure, or I develop a new procedure on a piece of equipment, unless that procedure is widespread, and has potential applications widely, we do not publish those internal validations. That's something that we decided many years ago that we would not continue to publish.

Manuscripts that I deem suitable for JFS, they're generally manuscripts that are truly basic research manuscripts. They'd probably been rejected by at least two or three basic research journalists before they've been submitted to JOFS and certainly I reject those. Then, obviously ones that I kind of understand the language, which happens frequently as you'll notice. We have a very broad geographical representation. Then we have some manuscripts that we've withdrawn at the request of the authors.

I'm sorry for the slide, the smallness of this slide. It just shows you the number of papers, technical notes, case reports, et cetera submitted over the years. They continue to grow. We continue to get papers and

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technical notes submitted. Disproportionately case reports, but disproportionately the number of them that are rejected also is higher than in the papers and technical notes.

Then maybe a little bit surprising to this audience, but the number of submissions we get are predominantly from outside the US. We're about a 1/3 US, 2/3 outside the US. That has been that way since I took over. I believe it was that way back when, too. It's been a consistent finding.

On the next slide, again, I apologize for the size of the data, but you can see that India, Italy, China, other countries submit a significant number of papers to the journal. Now, obviously some of those papers, particularly from India and Italy, are predominantly case reports. They're not basic research. Some of them from China are research papers in digital and multimedia sciences. We're getting a lot of papers from China that are more research papers than they are case reports. Fortunately, they found some translation services that work for them, because that does make it easier for us. Yes, these data on this slide are consistent year-in, year-out.

Now, impact factor, with a blip in 2008, I believe, we went to 1.5. That was because there was an analytic chemistry article published on forensic science, so that caused more citations that year for JFS. That was a blip in that particular year. It's grown. It's increasing slowly.

A couple of words about impact factor and submissions to the journal. The journal is not the first choice for the majority of academic researchers. Marilyn referred to that earlier in terms of grant money. An academic researcher, as all of you know, their ability to get promotion and tenure is based on what they publish and where they publish it. The more widespread recognized journals that they get published in, the greater their chances of getting promotion. JFS is not the first choice.

We would like to think we would be if it was a forensic science application, but that's not the case. I can tell that, because when I get a paper in, they have not changed the format. I don't have the format in a JFS format. I know it's been published or submitted elsewhere and been rejected. I've got to the point where I can recognize the journal it went to simply based on the format I see in front of me. It is something that we know is happening, and we're just encouraging people to submit to us.

We do have an increase in the last two or three years in what I would call chemistry, analytical chemistry, chemo metrics papers. There's more and more of those coming across, which obviously, they have a lot of statistics in them. They're basic research papers, and we're beginning to see more of those as we go through 2015 and 2016.

The impact factor is increasing. We are never, obviously, going to be equivalent to Jamma or any of those major circulatory journals, but we do hope to get this somewhere close to two in the next five to six years. That would be a significant achievement.

Now, we've got some pending changes in how it will work. I think these are also important for facilitating publication of data. We've had a office of two. There's been a editor and editorial assistant for a number of years. We are now moving to a full-time managing editor. In fact, that person is in place as of October of last year. Then, associate editors in the following specialties, and I've listed them on this slide. I'm not going to go through them, suffice to say that we get a lot of papers from anthropology. Forensic science you may have talked about in here, but a lot of people work in forensic anthropology, and we get a lot of papers from anthropology. We get few papers from odontology, et cetera, and behavioral science,

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psychiatry. Then trace evidence, in that category I would put fingerprints, shoe prints, gunshot residues, gun, ballistics evidence, all those things that people are talking about a lot today. Those will go into the trace evidence. Then we're changing our review process to shorten timelines, to double-blind reviews, and sharing of reviewers' comments.

The speaker before me talked about errors and retractions. We haven't had any retractions for errors. We've had retractions for duplicate publication. That is, they published the same article twice in the JFS and elsewhere, but we haven't had any errors. We do have a fairly sophisticated peer-review process. A number of you in this room actually have served as peer reviewers for JFS. We're not error-free, as the gentleman before said. We're not error-free, but we've had no retractions for errors.

Then, we do now have a mission statement, which we didn't have in the past. Our mission is to advance forensic research, education, and practice by publishing peer-reviewed manuscripts of the highest quality. These publications will strengthen the scientific foundation of forensic science in legal and regulatory communities around the world.

With that, I will thank you for your attention.

NELSON SANTOS: Thank you, Doctor Pete. We'll hold questions for after the next speaker. Then we'll have a question and answer session. Our next speaker is Doctor Chris Palenik who is with Michael Trace.

CHRIS PALENIK: Thank you. Good afternoon, everyone. It's really an honor to be able to speak in front of this distinguished board. My talk is going to be a little bit different from the last two. I'm not going to be speaking about journal articles so much, or at all actually. I want to talk a little bit about something that I think might be overlooked, or something that I believe is overlooked in the midst of an era of standardization.

I'm not here to criticize standardization. I understand the purpose of it and I think it's very important. I want to put that out there at the beginning. But, I think that there's some things that are overlooked, and I hope that this talk raises some of those points.

Before I start into this though, for those of you that don't know me, my background is published in the papers that you have. I just wanted to comment a little bit about my background and my history.

I literally grew up in this field. From my earliest memories, I was surrounded by forensic scientists. I remember hearing Robin Kelly when I was at the dining room table at our house talking about identifying Ricin in the little bead that killed Georgi Markov, the Bulgarian dissident. I remember talking with Barrie Godette when I was seven or eight years old about some of his hair studies, and learning about this. It was this history, even scientists from the former Soviet Union, or it was the Soviet Union, coming to our house, and eating hamburgers for the first time. It was this history of these stories that fascinated me, and grew the practical solution of questions with science is what fascinated me, and has been sort of the inspiration for my whole career. Growing up with a laboratory in our basement helped as well.

Since that time though, I've studied chemistry at the University of Chicago. Then I went on to officially study geology for my PhD, but my research spanned into material science, chemistry, nuclear engineering where I studied the isotopic systematics, and micro-structure and nano-structure of a naturally-occurring nuclear reactor so my background is really in materials analysis. To that end, 25 years ago, my father

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started our laboratory. It's a private laboratory outside of Chicago. To give you an example of what we do, this is a case example.

This is a tissue that was in a child abuse case that led to a murder, or ended up being a murder of a child. There's a little stain where that yellow is. Another lab had looked at this before us. What was left was that little stain. You can barely see where the yellow is. When we looked at by light microscopy, we found these little particles. A microscopist would recognize these as glitter particles. They're very small glitter particles, and that puts it into a -- That further characterizes the glitter particles. Looking at it by high resolution electron microscopy ... Maybe not high resolution, but electron microscopy, we start to see an area of the stain on the tissue fibers, other flakes. These have a composition of mica's.

If you take one of these single flakes though and you cut an ion-filled cross section of them, you can see that not only are they mica compositions, but they actually have a thin layer, a few hundred nano-meters of Bismuth. I'm not showing the chlorine map, but these are actually coded mica's that have a layer of Bismuth oxychloride. They're manufactured, they're engineered. With the nano structure we start to get some interesting information that further classifies this mica and it's Bismuth oxychloride. Bismuth oxychloride is a pigment. It's used in coded mica's to create effect pigments. Again, another indicator of an end-use of this product.

Finally, we saw these free spears. We started to see them in the light microscopy preparation, they looked like oil droplets, but by electron microscopy we saw that they're solids. Again, you can see the scale. These are Sub10 micron particles. Also, in the background you can see tiny particles that are sub-micron. These are titanium dioxide.

When we combine all of this together it gives us a fairly specific ... You can eliminate a lot of things and it's consistent with really only one product, that I can think of, which is make up. This had a very significant implication in this particular case. This is an example of the type of analysis that we do.

To give you a little more idea of where our laboratory sits, our area of expertise is trace evidence, materials characterization, identification of unknown materials. Our clients really span a variety of disciplines both criminal, prosecution and defense. We do about 50/50 work in both areas. We do some civil litigation and industrial forensics as well. Besides analysis we do case reviews. We also have active projects with the National Institute of Justice and other agencies actually doing research. Forensic science research. We're an ISO accredited laboratory. We are involved in the forensic community in various areas on committees, boards, giving talks.

One of the things that led to this invitation to speak here to all of you was a question that was raised at the end of a session that I spoke at at Interpol a few months ago where someone said to me, "Well, you're applying a lab director ...". This was the Interpol lab directors meeting. "You're applying forensic science questions not only of comparison, but also identification, sourcing, route attribution, but my staff doesn't use the microscope, which was the basis of your talk. We don't know how to identify unknown materials or do this type of synthesis. How would you suggest we educate a new generation of forensic scientists to take this more fundamental approach to the case?"

That got me thinking and I think that the question goes beyond education. When we're in the midst of this unprecedented era of efforts into quality and standardization and statistics. The question I think that's more relevant, is a little bit more philosophical in nature, and that's is the discipline of forensic science

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missing something of greater significance?

To illustrate that point to you and what I think is missing from all of this is that if we take a look at the history and you read case reviews from early studies in forensic science, they were largely case-driven studies, case-driven analyses that a scientist, a generalist, took evidence, analyzed it with his team or by himself, pulled it together, and formed a conclusion that contributed very directly to a case. Now, in an era of experts and specialties, our analyses are very much task-driven. Evidence is broken up, often times before it even gets to the laboratory, into individual discreet samples that get whisked off to discreet disciplines. If a case is complex you end up with a series of reports that have very little investigative information, potentially comparative information, but it's all task-driven. There's really not a whole lot of look at the bigger picture of the case.

This has impacts on evidence collection. For example, in our world today and most forensic laboratories, if the evidence isn't submitted with a comparison sample, it's sent right back. If it's returned it probably won't be collected more in the future. Analysis. Evidence will be missed or ignored because it's not part of a protocol. We see this quite often where we'll look at something after another laboratory's looked at it and they haven't analyzed. They've missed a piece of evidence because it doesn't fit in with something that they have listed in their protocol so they don't identify it. Some laboratories, for example, I was talking to someone in a federal laboratory who said, "We're geologists, but we're not permitted to identify starch. We see there's starch in the sample, but the biologists aren't microscopists, they can't identify starch. So nobody can treat starch". Starch is one of the easiest things to identify under a microscope. You learn it in your first day of class at a microscopy school.

Then, testimony goes. When you start to take these approaches that are driven by protocols and driven by procedures, you end up with scenarios where people tend to rely on the protocols as opposed to thinking and you end up with people testifying to things such as, "I didn't test that control sample because it wasn't in my protocol." We've run across this in cases as well.

Finally, when you start to look at reports it becomes very difficult to synthesize a lot of forensic reports because it will say, "Item 9 was consistent with Item 5 in color, appearance, and chemical composition." With no reference to what items 9 and 5 are. So, if you have more than one item it becomes difficult.

In fairness, most cases today are driven by sort of mono-evidentiary cases where you have one type of evidence. DNA, a tox sample, a drug sample. So, this task-driven approach works pretty well for most things. The problem is that when you have a case that's more complex and you have multiple types of evidence there's no way to treat it because all the procedures, all the policies have been driven towards these individual tasks and you end up with a problem where there's no way to treat complex samples. There's no way to treat samples where you don't have a particular protocol for a particular type of evidence and some things are missed.

I'm going to go back in history now and talk about a case where this works. The way things used to be. This is the last great train robbery of the United States. It's a neat story if you want to read about it. These brothers, the DeAutremont brothers, decided to hold-up a train in Oregon. They stopped the train, they ended up killing a few people, they blew up the mail car where half a million dollars of gold was. They used too much explosives and then they drenched their feet in creosote and ran off. The police found a pair of overalls and they arrested a local mechanic saying "There's stains on these overalls".

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There's stains on the overalls so they arrested someone. They sent the evidence then to Edward Oscar Heinrich at Berkeley. He looked at it and in a short amount of time said, "Release the man you arrested. You have the wrong man. The person you're looking for is a lumberjack. He's left handed. He's about 5'8" and about 165 pounds and he's a man of fastidious habits." How did he say this and is it valid science? I would argue, yes, because he's using logic to form conclusions.

These are modern pictures, but to illustrate the point. The stains, he identified not as oil stains from a mechanic, but as sap. He found wear and pine needles in one of the pockets that suggested the angle at which he was cutting the wood, suggested a left handedness. He found hair that gave an idea of the color of the mans hair and he found nail clippings that were carefully cut and neatly put into a pocket. That is where he came up with the fastidious habits idea. Of course, these are investigational, but they might help in an investigation. You certainly couldn't testify to fastidious habits in court, but it's something you could use in an investigative sense.

Some of these things though, you could testify to in court, I think. At the end of the day he also found rolled up a registered mail receipt and he said, "Not only that, but I'll tell you the mans name that you're looking for", and they tracked him down. They went on the run and several years later they actually arrested the men.

Today we've come a long way from that. This is a typical example from a state laboratory report. "The paint from Item 12 was consistent with paint from items 18 and 19 in color, type, layer structure, and elemental composition. This means that the unknown paint and standards could share a common source." If that's the most we can say and it's class evidence, we can't put statistics on it, it's not surprising that trace evidence gets used less and less and less.

If we go to the DeAutremont case today we see that this case would hardly work in most labs. First, the case wouldn't even be accepted at most labs, because there are no comparison samples. The case would only be ... Most of the materials in the case couldn't be analyzed because most crime labs that have a trace section analyze about five materials, hair, fiber, paint, glass, and tape. That's about it. The evidence that was brought in would be split up among sections and reported in several reports. Finally, the information would be submitted ... That would be provided would be sent out in a pre-formatted report with conclusion statements.

I'm not saying the conclusion statements aren't useful in a lot of cases that we do regularly, but I think that we need a mechanism to permit for these types of cases where there are complex types of evidence, where we can actually apply science to see how far we can go and what types of investigative or other information that we might be able to provide.

The impact of current approaches. We see, in the trace field. a decrease in the quantity of traces being left in the scenes. That's probably a CSI effect. A decrease in traces even being collected. A decrease in the relative value of evidence because the statements we're able to make are weaker and weaker and weaker in a lot of comparative cases. The need for trace, is apparently, decreased due to DNA.

That's true, DNA has taken over a lot of traces' traditional role. That's fine. DNA does a better job in a lot of cases, but there are instances where trace evidence is still useful. I would say that even though I'm talking about trace evidence specifically here, I would say that it's a proxy really, for any type of discipline in the forensic sciences, or sub discipline. Any type of atypical sample, complex sample, or

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novel sample, or novel analysis that shows up in any discipline, I think trace is a good proxy because it captures the difficulties that the discipline faces that's faced by these types of analyses that don't necessarily fit as well under protocols. Do we still need trace? Well, you heard about the DeAutremont brothers and that's a story that's 75, or almost 100 years old now, but these types of applications can still provide value today.

This is a case that we worked on in our lab. This was actually while I was still in graduate school. My father worked on this case. Two t-shirts that were covered in two separate rapes. Part of a serial rapist. Dust was recovered. We were originally asked to investigate a stain at on one of the shirts to see if we could tell anything about that. That didn't lead anywhere, but dust was recovered. We vacuumed both shirts. A picture of the dust. We found, consistently on both shirts, four useful pieces of information. Calcite grains. This is between cross-polarized light. They're angular and they had a fairly tight particle size distribution. Spray paint spheres, which turned out to be an acrylic, a white indoor, interior paint. Gypsum particles and oak pollen. This is taking a long story and making it very short, but note this is all done with the light microscope. There's no high-tech equipment.

At the end of the day, oak pollen suggests when the dust was picked up or could've been picked up. Calcite and gypsum suggest drywall. The particle size range of the calcite makes it different from what you would see in geological calcite. A naturally occurring calcite. This is a very tight particle size distribution and the angular nature suggests it's a sanding procedure. Then the white spray paint suggests probably more of a commercial site than an industrial site.

Again, some of this information becomes investigative in nature more than factual, but there is factual information there as well. At the end of the day, the investigators were given ... It was suggested they look for someone who's an interior commercial drywall worker. A few weeks later they put this out to the press and an old lady looking out her window late at night called the police about a suspicious vehicle. When the police pulled this car over ... Wasn't actually this car, but one that looked like this. They talked to the driver and said, "Do you know anything about these rapes?" The driver confessed on the spot. He later recanted, but they had DNA.

Do we need trace? If we don't collect evidence we can't analyze it. If we can't analyze it people won't collect it, but at the end of the day if those things don't happen information is lost. Trace is difficult. It's its own beast. It's not as straightforward to deal with with the protocol, standardization, quality management, and statistics. As those of you have dealt with the OSAC materials group have started to probably realize. While the benefits and needs for the above quality systems are well established, we have to look also about what are the implications, what happens, what are the downsides to protocols and standardization?

Trace has larger numbers of materials and methods. Already we have more protocols than most sections have and we're only touching on a few of the materials. Trace also requires the flexibility to be able to expand its protocols when we encounter something that's a little bit different. Finally, besides realizing that white was probably not the best color here. Sorry. When we reduce the scope and we reduce the instrumental approaches and we reduce the questions because of the requirements, protocols, and standardizations, we end up reducing the value of the evidence.

The same thing with quality systems. They're designed, really, to do the same thing, the same way, over and over again, but what we encounter in trace evidence is that while making a screw is done the same way millions of times, every paint sample is a little bit different. There might be something that we've

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never encountered before. Current protocols are written in such a way as to capture as much as that variation as possible, but at the end of the day, you can never capture everything. So, when you need to make a change or adapt a method there's an inertia for examiners to not want to do that, not want to buck the system and try to do more analysis. It's difficult because there's paperwork involved, directors don't necessarily want to approve that. New approaches and these new observations are easier to ignore sometimes than to try to go with them. A lot of time it's not considered worth while when you're dealing with a single sample and something you're probably not going to see again.

Significance. This is a little bit more difficult. DNA results in these huge probabilities that are as certain almost as science can get. You have almost definitive answers, but in trace evidence we have a hard time even getting numbers, much less high numbers. It goes to the point that if you give a jury a number and say, "This is your 99.99% or 99% or 95 or 65%," what does the jury do with that and what does that number mean to the jury? Is there a threshold that you can say something happened or didn't happen?

Here's a case that I want to use as an example of that. You have a black shirt, multiple black acrylic fibers were found. It's a cotton shirt. Black acrylic fibers were found on the shirt. They were compared to fibers on a sweatshirt found at the scene. They were consistent with each other. With statistics, we don't know the number of sweatshirts made. We can't make assumptions about the anticipated local distribution of the shirt. We don't know if other items use the same fibers or fibers that were dyed the same color. Like I just said, if we could assign a statistical value, what does that number mean to a jury? 'Cause it's not going to be 1 in tens of millions or higher.

As opposed to the approach that a trace evidence lab uses today, which doesn't involve statistics, we would tell a jury both the questioned and known fibers exhibit a round cross section. It has the same diameter. The fibers are one inch staple with a dtex of 2.2, both the questioned and known samples. The birefringence is 3 in the thousandths with a refractive index. Epsilon and omega are parallel and perpendicular listed there. They both fluoresce bright orange under UV excitation ... or, it says blue light excitation. The fibers are polycrylic and nitrile with acrylate copolymer. The IR spectra are similar in both, but they also contain an unexplained band. When we extract that band, when we extract the fibers, extract the color out of it, that band disappears which suggests that the band isn't something extractable. Possibly the dyes. When we extract the dyes and we analyze, we conduct thin layer chromatography, we see that not only are these fibers consistent with each other in all these other characteristics, but they also have the same three dyes in relatively similar concentrations.

That starts to paint a fairly specific picture in the jurors mind, I believe. Even though we don't have any numbers that we can assign to it. I think that that's still science. I think you're still educating the jury. I think you're using your expert opinion in a responsible way to educate the jury. That's my opinion.

The take home, as I wrap this up, is that amidst all the quality management, statistics, and error rates, it's important that we find ways to explicitly encourage the traditional strengths of forensic science that might be overlooked when we're attempting to standardize these larger, more luminous types of samples so that we encourage new types of evidence, new types of analytical approaches to be introduced into the crime laboratory, because there's this inertia against it and the free application of scientific thought. Certainly people have testified beyond what they should in cases. We see it in the review cases we work on. It happens on both sides, but they are forensic scientists, they are experts, and they should be permitted to contribute some opinion. A responsible opinion.

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How do we support this? This is my last slide. I'll wrap up here. I've listed out some various items that I think that each of the stakeholders might be able to provide. Practitioners need to provide thoughtful analysis. If they want to act like technicians, they should be treated as technicians. They have the ability to conduct scientific analysis.

A lab director needs to think about in Australia their new laboratories have these big collaborative work spaces for complex cases where they get together and they talk about the evidence before it's distributed. Transparency of discovery materials. In North Carolina, with every report, is automatically issued a full electronic discovery packet with everything. It's really quite impressive all the information they provide.

Education. Traditionally, a lot of laboratories say they don't want to hire people from forensic science programs because they're not as fundamentally sound. It's not so hard for a chemist or a geologist or biologist to go into forensic science. You don't see many students trained in forensic science going the other way around. The challenge that I would make to educators is your students should be able to go into another discipline. If only to do interdisciplinary work. They should be well versed enough and fundamentally sound enough to be able to do that.

We talk about the legal community and the adversarial system. A lot of the testimony we read, scientists spend a lot of time working up their procedures, working up their results, working up their analysis, and working up their conclusions. A lot of that is done collaboratively. Then they get out into testimony and they're forced to speak out of their report, to put things into different words, to use words that weren't used in their original report. So a lot of times it's very easy to misconstrue or impart bias when attempting to explain something to a jury. I think it's incumbent upon the counsel, on both sides, to make sure that they are prepared to ask appropriate questions to put the answers into context as well.

Finally, policy makers. We heard about punitive responses coming down and I've seen this on the materials OSAC committee, where it does sound like decades of work is being dismissed very quickly. Give credit to the experts in the field. Include them explicitly in some of this decision making process.

Finally, not only should you criticize, but please provide constructive criticism and criticism solutions that could actually be implemented. As opposed to what should be done. That's our companies Christmas card this year. A little Frosty the Snowman crime scene. I thank you all.

NELSON SANTOS: We've got fifteen minutes or so for questions. Fred?

FRED BIEBER: Chris, I enjoyed your talk. Though, one thing I might say troubles me about the reports that you talked about is that you didn't offer us a denominator in any of your examples. What's your database of particles that are similar or different and how often do you find such particles on random objects that might be found on the coat rack of Nordstrom rack? It makes me think of someone walking on the beach and having sand in their flip flops, so what? How common is sand in the shoes of people walking on the beach? It's very common. Without those two data points I'm not sure as a juror what I would do with the information you presented on those -- on the beautiful work that you presented on the analysis of those particles. Thank you.

CHRIS PALENIK: I thank you for that question. I think it's an excellent question. I can answer it in a few different ways. First of all, with regards to how common are the particles. We have-- actually, earlier this year and in this symposium. I gave an address on databases and trace evidence and our laboratory has

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over 35,000 curated specimens of different dusts and different materials. Including dust samples that were taken from all different environments. Hundreds of dust samples from different environments that we've looked at. We've looked at dust on clothing. I can say, qualitatively -- because I don't know how to put it into quantitative use. I can explain to you, how is the dust different from sand?

If you go to a beach and look at a carbonated beach, you can have a different particle size distribution, you're going to have different if you go to a beach, like in the Caribbean, that's made up of carbonated sands, you're going to find biogenic materials and the grains morphologically are very distinguishable from what we're seeing in this example. I mentioned particle size. Also, in beach sands you would expect to find other components. Not necessarily gypsum, gypsum is a mineral that's formed in deserts, typically, but this was nicely crystallized gypsum. Something you wouldn't find in a desert environment. The gypsum is different. The calcite is different, morphologically. Both are consistent with being manmade.

Furthermore, if you did vacuum the clothing at Nordstrom or a store, you would find a different population of fibers and materials. You wouldn't expect it to be loaded with that population of materials.

FRED BIEBER: You wouldn't expect it or do you know that from actually doing it or is this?

CHRIS PALENIK: [inaudible]

FRED BIEBER: Okay. So on cross you could respond to those questions? That's my question as a first year law student in moot court.

CHRIS PALENIK: I think it's a good question and I would say we have looked at dust on enough types of clothing to be confident that if you found that much dust on your clothing -- this would be something that you could actually do a study on. The amount of dust that we recovered from that, you might actually expect the clothing to feel gritty and dirty, if you recovered that much dust, and you wouldn't want to buy a new piece of clothing.

Now, an oriental rug is a different situation because to make oriental rugs, very expensive oriental rugs, not appear new they actually take them and put them out on dusty roads and beat them and pound them and you would expect to find a different population of particles. Still different from the drywall dust, though, that we're finding here. That composition is very characteristic, and I don't know how to be numbers, I can't put numbers on it, but it's characteristic of drywall. I don't know of any other compound or any other dust that has that composition.

NELSON SANTOS: Phil?

PHIL PULASKI: That was a great talk. I just want to make a clear distinction that I think you were making, but sometimes it gets crossed over. One is the intelligence or lead value and then the other is testimony. So, they don't have to go hand in hand. You can have intelligence and lead value that is tremendous, but if it was coming from my laboratory, from one of my analysts I'd say, "You're not going to testify about that". I call it an experiment. In other words, you're going to do an experiment, we don't have a database to reference off of, it's going to produce lead value, but I'm not going to have you testify about it because there's a lack of underlying scientific validity, because you don't know the answers to the denominator question. You have this experiential thing. In a little laboratory, like NYPD, which is kind of a big little laboratory, they don't do that much and I'm sure in most laboratories they don't do the same

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amount of work as you so the experiential reference points that you use in your experiential database is not there.

Just to address what you said is lacking, I think I've mentioned this in a commission once before, called paint chip case where one of my detectives wanted to know the color of the paint chip and the analyst was full of consternation to give that information out over the phone. Then it got down to "Take a photo of it. Email me the photo", "I don't know if I can do that", and we had kind of an intervention of management in order to rectify this problem, because it was that much concern that passing on this information, the color of the paint chip was going to create some sort of problem.

I think your talk was awesome in terms of real practical defect. Thank you.

CHRIS PALENIK: Thank you for the comment. One comment I would like to make though is there is a distinction between investigative information that you can provide, which you can go a little bit further with and information that you would testify to. However, the information that's provided in terms of the identifications of these materials, that is based on factual -- that is factual information because we're identifying as mica the same way a geologist would identify a materiel as mica. So, while the drawing together of all the results starts to get into an investigative or a more speculative -- or at least putting constraints on what something could've been, it's based on scientifically derived information.

PHIL PULASKI: I agree but it gets to the so what question. I'll let Julia and Jules kind of pound you on that issue. You are in there as an expert. You're testifying as an expert. Your conclusions, although you know in your mind are limited to X, in the eyes of a jury it could be a 100X. That's the danger. Right Jules? Right Julia?

NELSON SANTOS: Let's do Jeff and Gerry.

JEFF SALYRDS: Hey Chris, I want to act like I thought that was a really provocative presentation. As a lab director, I agree with 85% of what you said wholeheartedly. I'm really pushing my guys for investigative value in our trace section. I love the example on the drywall.

The 15%, and it's a very important 15% to me, is three slide back where you said here's all the things we can testify to. What I think you should consider, what all of us as practitioners should consider, is when you start giving these analytical findings, it suggests that they matter. It suggests to the jury that that's rare.

So, if John and I are both dead and Randy does our autopsies, he can make a long list on anatomical findings. He could use Latin words and talk about the similarities, but really it would just prove that we're both human beings, but it would look very elaborate and he would have either with the CV and I would hear all this stuff as a juror, maybe Phil Thompson could shake his head on how a jury interprets that, and would go, "Wow, that must be one in a million," but really, it's not a significant finding at all. So, I think we've really got to be careful. Especially that kind of testimony.

The drywall testimony and investigative value, that was remarkable and we should be pursuing that. But that's the kind of testimony I'm trying to stop in my lab.

CHRIS PALENIK: One question I would ask then in the case of the fibers, if you have ... We don't have

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numbers, but if you have two fibers and we can say their both acrylic, that's a point of comparison. If we say they're both acrylic and they're both the same diameter, that's two points of comparison. They're a little bit more closely related. You're eliminating more fibers from the general population of the world. If they start to have the same optical properties, the same dyes, you can't place numbers on them. I agree, but you are shrinking the population of fibers that they could be from.

JEFF SALYRDS: Chris, I disagree. I think you can place numbers on it. I think you've actually stated a falsifiable hypothesis. We might not be able to do a perfect experiment, but we could begin. We could go to Nordstrom and start collecting samples and talking about how rare the things we find are. Then we could get that peer reviewed and have other scientists go, 'Hey, that end's to small in that or you're making some headway.'

I think to Julia's point this morning, there's something that should make us all very uncomfortable of, "We don't really have numbers, but we're going to keep doing it in hopes that if we did get the numbers that they would bear out." That doesn't sound like science to me. I think the people like Jim Gates, who come to us from not forensics would go, "You don't get to do that in particle physics", Bonner, "You don't get to do that in analytical chemistry", you've got to bring it first and say this is a valid technique. You don't get to do that in medical techniques, you don't get to just, "Here's a diagnostic test. We hope that it works, but we don't have the raw curve, but we're hoping that when we do that it will work." You don't get to do that. But, somehow, forensics, we've convinced ourselves we can.

Now, what I don't want to get lost in here as I said, I want to go back to the 85% that I agree with. I think there's phenomenal investigative value that we've lost and I want to see that returned. I think we could offer much quicker turnaround times if we just -- like you said, it shouldn't take a management intervention to "What color's the paint", but I struggle with the same things in my lab. You guys are a wealth of knowledge when used properly. I don't think that we don't have numbers like we could. We could have numbers. We should pursue numbers.

CHRIS PALENIK: I think the number question is more complex than you make out in terms of going to Nordstrom and starting a new population study, because people have tried to do it, but that's, I think, a discussion for maybe outside of this because it can go on for a long time.

The point that I want to make is that besides comparison, which is what our discipline's locked into, I think that there is other information that we can provide off of trace evidence. That's one the of the points that I want to make. There are other questions that can be answered by identifying materials, by characterizing materials. That's something that not captured in our approaches, it's not captured in the uniform conclusion writing. I forget the acronym for that. It's not captured in the [PEAK S] report, which deals with comparison, really. The NSF report that deals with comparisons. I think we should really think about that as a discipline.

JEFF SALYRDS: If I just try to sneak in the last word 'cause this comes up in forensic science, I would just suggest to my forensic science brethren, if it's too complex to actually do the research project then it's probably too complex for us to be practicing. I think we just need to consider that.

NELSON SANTOS: Gerry. Excuse me. Gerry.

GERALD LaPORTE: I want to thank all the panelists, specifically Chris. I think your presentation was a

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good one. It demonstrates a lot of the discussions that we have, but I think what may not be sort of taken into perspective is that in a real case there's a whole bunch of information that's being provided to the jurors and your piece of information will be helpful and potentially corroborative with other evidence. I think a lot of people, that have never been involved in a case, in this room don't understand that if you're going to court -- I would hope that there's not a lawyer in this country that would be putting on a case just simply based on some fibers. I would hope that there's all kinds of other information that's going to help, potentially provide the jurors with some information.

Sometimes there's this criticism that it's not science. Science is information. That's what science is. It's information. How we gather it, the conclusions that we come to about that particular item and that information. Certainly we can debate all day long about the science behind that, but it could hopefully be corroborative information that could be used for a juror. I think that your response in terms of "I can't give you the number", is perfectly honest. If you go and testify to a jury and say, "Folks, I can say this, but I'm sorry I can't give you a denominator," then it is what it is. That's the information. I would hope that the jury has to take that into consideration when they're looking at all of the other evidence.

NELSON SANTOS: Julia then Arturo then we'll move on. Arturo. Deferred. Arturo.

ARTURO CASADEVALL: I was thinking as I was listening to your presentation, which I agree was excellent. It occurred to me that, I was troubled by one part. The part in which you show the stain and then you show the titanium particles and you said something, "In my experience it can only be make up. That can only be found in make up", or in other areas where things are said and people say, "Well, I don't know of any other component". What really bothers me is this is an argument that has been known since antiquity to be a logical fallacy. Which is absence of evidence is not evidence for absence. It just seems to me that at the heart of it, that is something that is very important. For example, to admonish the jury when someone says, "Well, I don't know of any evidence to there these fibers are found here or they're found on something," that is an Aristotelian logical fallacy.

CHRIS PALENIK: I appreciate your point and I understand the point. I think though, in the case of some of these types of materials we can put constraints. I'm not an aesthetician, but I think we can put constraints because we know the population, roughly, of materials and products that contain drywall. Or if we go to the make up, the make up. If we go to the make up question, we know the compositions of a lot of different products that are out there and we can rule out a lot of products. As scientists, we probably could create a database of all the different ingredients. The difficulty is in the details, But we could rule out, and that's what we're doing as experts in this particular case, is we're ruling out, we're using our experience.

It's a little bit different from the hair argument, I think, because there is more bases. We know what the world, what the universe is of things that contain calcite or titanium dioxide or mica and you can put constraints on where mica particles that are under 50 microns would be found. It's not many things. Where these silica micro spheres ... What industry's they're sold to and we know that one of the major industry's that they're used in is cosmetics.

We have some basis, even though it's not in numbers, for that information. So, I wouldn't say that it's make up to the exclusion of everything else, but I would be comfortable saying that we -- that based on -- I would want to think about the wording more carefully, of course. It does come down to that, you're right. But I do think that there's value in it and maybe to Gerry's point, when you present these facts and

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you present this information, it places constraints. I think we are placing constraints on the origins of something and I think that is a legitimate thing to do. You can argue about the nomenclature forever.

Speaker 1: [inaudible]

CHRIS PALENIK: If you could and that's the trick.

NELSON SANTOS: Julia and then we'll break.

JULIA LEIGHTON: Then I'm going to cede my time to Jim Gates.

JIM GATES;Thank you Julia. Thank you. I was wondering since my flag went up before anyone's.
[crosstalk]

I figured it was that cognitive bias at work.

First of all, I want to thank Dr. Palenik. That was a wonderful presentation. Very informative for someone who is far outside of your science. As Jeff mentioned, we have some people around this table who are scientists, but we are just so far removed from this that it's almost like it's the difference between night and day. So, thank you for the presentation. I really appreciated it.

A couple of things struck me during the presentation. I don't think any major report, that I'm aware of, has tried to restrict the direction of forensic investigation in terms of evidence. In fact, Phil said this very well early on, is that I don't know of anyone who's argued that as investigators are out in the field and they're collecting evidence, we're saying, "Restrict the evidence that they can use in order to find a lead". I don't think that's the business of this commission. I don't know of any report that has said that. Later we're going to hear from [PEAK S] and the co chair's probably going to tell us something about it, but I don't think anyone has ever said that, to my knowledge.

We have said repeatedly -- Gerry, a moment ago said, "Science is information," to me, that's not quite right. Science is information where you can quantify what you don't know. That's the important distinction with science. You can say, "How much in error could I possibly be?" It's not just a statement of information. That's why the denominator becomes so important in the discussion over here.

Those of us who are outside of forensic science, but who are scientists, we have a problem when you say things that are, as Arturo said, Aristotelian logic that we know doesn't comport with what Galileo did when he became the Father of Science.

I would love to hear someone of your stature and accomplishment get on a witness stand and run through that long list of things about how the fibers are similar, but then I want you and your colleagues to say, "But this does not clench the deal," because from a point of view from science, unless you can tell me how much in error you are, then you've had this wonderful detailed presentation, but it's not science for folks like me. It just isn't. We outsiders, of course, are going to come back again and again, every time you invite us, or when you don't because we're going to be looking over your shoulders as a community. We're going to always bring it back to this very essential point about the definition of science.

I think that that conversation's extraordinarily important, because when I meet someone like you, it's clear

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that you're at the top of your game. You're clearly out there in pursuit of justice on the basis of scientific evidence and I want that. I want that so dearly for my country that I can't express it. So thank you for what you do, but on the other hand when you are in the court room, talking to folks not like the folks that are sitting around this table, the mechanics, the farm workers, I want you to be very clear to them about what it is that you're telling them and don't come up with this wishy-washy, "It's similar. It's a match," you can do that but then you can't say that it's science. That's all I would say.

CHRIS PALENIK: Thank you. I respect your comments immensely. You spoke on several topics and I would love to talk to you maybe afterwards more.

First of all, I would like to address a few of them now, though if we could. You talk about not restricting the collection of evidence, not restricting the direction of investigation and I hope that in my talk -- I'm not saying that it is explicitly restricted. I'm not saying it's explicitly restricted. When our laboratory went to be ISO accredited, I remember one of our concerns was, "Are we going to be able to do what we do?" They said, "No. Your quality system needs to address what you do." That's what we ended up doing, but what I see as a result of having a quality system in place and I see this in a lot of the work that we review of labs that have quality systems in places.

The Firestone tire plant, they were ISO accredited, but they did the same thing wrong over and over and over again. A lot of people rely on quality systems and procedures for thought. They replace their own thought. And that's what I'm getting at is when you remove thought, you don't explicitly encourage people to be proactive as scientists, to make investigative jumps, to apply the scientific method to their own work. You're effectively limiting, even if you're not explicitly limiting what's done. I believe that that is one of the reasons that trace evidence is decreasing in use, is because people are applying protocols blindly, effectively, and they're missing out on information that could be gained.

JIM GATES: May I respond to that point? Because it seems to be then, what we as incumbent on a body like this, is make some very clear statements about the difference of the uses of forensic science in investigation versus probative use of forensic science in the court room.

CHRIS PALENIK: Maybe a more appropriate distinction to make is a difference between a forensic scientist and a forensic technician. A technician being someone who applies a protocol that's scientifically based and a scientist, who applies the scientific method to address a specific question.

JIM GATES: You might be happy to know, perhaps, that on previous occasions, as many people around this table can tell you, I have explicitly brought up this difference on several occasions.

CHRIS PALENIK: Fair enough. Do we have to stop?

NELSON SANTOS: Thanks Chris and Dr. Peat. We'll break. We've got another session on scientific foundations starting at 3: 20. I ask everyone to be back please at 3: 20 promptly.

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NCFS DAY #2, TUESDAY, JANUARY 10, 2017

Part IV

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ERIC LANDER: That one turns on. Super, because I won't shout the whole time. So, thank you very much. I'm delighted to come in response to your invitation to talk a little bit about the PCAST report. I'm just going to give an overview of it, and we'll have time for questions. I think we're going to do all three presentations, and then there will be Q&A afterwards, and I'm delighted to address them. But I co-chair PCAST. Just in case anyone is interested, PCAST is the sole science and technology advisory group to the White House.

There are many scientific advisory groups scattered through the federal government, but PCAST, in particular, works on those issues that involve policy and science, that crosscut science, technology, innovation, that may crosscut different departments, different fields. And we will work on things that are important to the economy, the defense. And so it's a very broad mandate.

And I've put up here, just for background, the range of things that PCAST does. We have produced, and I think we're done at this point, we approved our last three reports last Friday, so it will be a total of 39 reports, 37 open and two classified, across a wide range of topics in health, in energy and environment, the health of the U.S. Research Enterprise in general; several reports on advanced manufacturing that led to the creation of advanced manufacturing institutes we have in the country now, a report that just came out on ensuring the continued leadership of American semiconductors; a number of reports on information technology, including spectrum sharing that has had a very big impact, I'm proud of the work PCAST did there. A number of reports in education that are known amongst the PCAST folks as the Gates Report, because -- Gates Reports because your colleague, Jim Gates, and our colleague has really driven those reports. The report on forensic science about which I'll talk; multiple reports on nanotechnology, on agriculture, and there's a bunch of other ones on the website, but just to give a sense.

And so it is a group that consists of currently about 19 members, it's averaged about 20 members over the course of its life, 15 of whom have served for all eight years of the current administration. And they cover a wide range of topics here, expertise is all over the place. That's way too small to read, but you can look up the biographies on the website there. From academia and industry, and many, many, many different kinds of fields of study.

So, every report that PCAST undertakes is undertaken at the request of the President. So we'll have a conversation with the President. The President will say "I would like you to do a report on X." So, in this case, the President, as you know, in the creation of this very commission, is committed to your mission, which is ensuring the reliability of forensic science. And as another step in the same mission that created this commission, he asked PCAST to take a look at what else could be done to help support this mission. We came up with a plan of what we thought should be done. We sent it to the President. He said, "Yes, I like that work plan," and we proceeded to do that.

So my job today is to simply tell you about the nature of that report and then, when we get to the Q&A, we'll have a chance to -- you can pepper me with any questions you want. But briefly, we spent a year working on the report. We began -- well, we began talking with the President about it in early 2015. We actually launched our activities in September of 2015. We unanimously approved this report in September of 2016. Publically released it -- we usually take several weeks to do clean-up and proof-reading and all that. We publically released it about three weeks later. And then an addendum to the report was approved last Friday, which should be released today. I don't think it's up on the website yet, but it will probably be

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up by the end of the day or so, addressing remaining questions that had come up. So you'll have that addendum as well.

From the point of view of process, we tried to be, and we were in the case of this report compared to the other 38 reports we've done, maximally inclusive. This was the widest search for information and input that we had ever conducted. We spoke to 85 experts, the largest category amongst them are forensic scientists, including eight from the FBI laboratory. And I should declare right at the beginning that I have enormous respect for the FBI laboratory. I have had the pleasure of working with people at the FBI laboratory going back to about 1990 when I had a chance to work with the director of the FBI laboratory on the early days of DNA fingerprinting. And I've collaborated with scientists there, and just have huge respect for the FBI laboratory. And so we were enormously grateful that a number of scientists, eight different scientists at the FBI laboratory were able to comment on specific details of our analysis of methods and things, and they were just great. Sent us all sorts of information about particular papers, "No, we disagree with that or that," and we made many, many, many improvements in response to these great scientists at the FBI laboratory.

Statisticians, we had a panel that included a number of judges who were enormously helpful. We really wanted to refer to them for the important legal context here. We also, for the first and only time in PCAST's work, put out a call for public comment or request for information, and received more than 70 detailed public comments. We're enormously grateful for those. And then we asked many agencies and individuals to suggest papers that we should review, and we ended up with a list of 2,100 papers which we reviewed. It was super. It was very, very helpful to get that list there, and it was not an easy thing to do, and I'm enormously grateful to our staff in this regard, one of whom is in the room, Tania Simoncelli, as well as Diana Pankevich and Kristen Zarrelli, who helped us in chewing up what papers we should look at more deeply. And then I and others on PCAST looked deeply at those papers. So, anyway, that was the process.

The report, you've all seen. It's about 173 pages, with 399 footnotes. It has a nine-page appendix that will come out today. And I'm sad to say we'll fall short of being the longest PCAST report by about six pages. There was another report that beats it. Oh, well. And it contains a variety of recommendations to a variety of agencies.

So let me just go to the main message of the report. The main message is, like, ludicrously simple. It is 173 pages. It does have 399 footnotes. It's a ludicrously simple message. First, and relevant to the discussion that you were just having, the report considers only forensic feature comparison methods. Lots of other things are interesting, but we didn't have time to look at them, so we've only looked at forensic feature comparison methods. And number two, it only concerns expert testimony in court. We make no statements whatsoever, the report pertains in no way whatsoever to what might be done in the course of investigation. I think investigation is a place where all sorts of inspiration may be helpful. We focused entirely on expert testimony in court.

Why? Because the federal law imposes a threshold requirement. It is the one place where hunches won't do. The law says one absolute thing, which is the basis of all of your work and our work. Expert testimony may only be admitted in court if it is based on methods that are reliable. More specifically 702C, "Expert testimony must be based on reliable principles and method," and 702D, that it "must be reliably applied." And Daubert makes very clear foundationally that in matters related to scientific evidence, evidentiary reliability rests on scientific validity.

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So the reason why PCAST wrote a report is because that's a challenging thing. You have to know, what does it mean for a method to be reliable. So I want to just draw that strict distinction between all the wonderful conversations before about inspiration in investigations. I don't want to limit anybody from being inspired to find things that might get to the perpetrator in the course of investigation. But when you want to come to court, the law requires you need a reliable method.

So then the question is what's a reliable method? Well, if it's a feature comparison method, what you're saying is these features are so distinctive that it's reasonably likely that the evidence came from this source. It might be a class source. It might be an individual source. But that's a feature comparison method. I'm going to look at a set of features, I'm going to say I see them, I compare them to a potential source, they match within some degree, and they're distinctive enough. That's a really interesting scientific conclusion. And we took on the question, what does it mean for that method, this matches close enough to that to draw a conclusion, to be reliable.

The entire PCAST report could be summarized as saying a forensic feature comparison method cannot be established as reliable unless you've empirically tested if it's reliable. That's it. You can't know otherwise. You have no business claiming a method is reliable if you haven't empirically tested if it's reliable. And then I guess a bunch of the rest of the report, chapter five, is devoted to the question of is that the case for many forensic feature comparison methods. Some yes. DNA simple mixtures, for example, DNA single source. The absolutely beautiful work that the FBI has undertaken with regard to latent fingerprints, yes. We can argue about what exactly the method is, but the -- what the accuracy is, but the FBI went out and measured it in their hands and they came up with an accuracy, a reliability.

You can't say a method is reliable unless you know its reliability, that is a number, something. It doesn't have to be perfect. Science is never perfect. There's always bounds on it. But the basic thing is if you know nothing about the reliability of a method, the method is not reliable. That's it. And it turned out that for a bunch of methods, we don't, because nobody's ever looked. We do -- we say that in greater length, with more footnotes, but that's basically what the report says is for a bunch of things, nobody's looked. Okay.

Now, I want to clear up a concern people might have. We have enormous respect for the professional practices within forensic science. They are very important to the practice of the field. They are valuable. They're important. Professional organizations, very important. Certification, very important. Accreditation, very important. Training programs, best practice manuals, extensive experience by examiners, papers in peer-reviewed journals, all those things I take my hat off to. They are very important to keeping a high quality field.

But it's very important to say none of them ever, no matter how much of it you do, can establish that a method is reliable unless you've empirically tested the method. The only relevant thing would be a peer-reviewed paper that tested the reliability. That would be very good. But peer-reviewed papers that describe other things count for nothing when we ask whether the method is reliable. Now, don't get me wrong, we do not fail to respect the importance of all of those things. They are very important, but they can never prove reliability because they don't test the only thing that matters. Does the method produce a result like it claims it produced? That's the heart of science.

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We looked at seven areas. You know of them because you've, I'm sure, reviewed the report. I'm glad to address any of those. Basically, in two cases, it's clear that they're empirical tests that establish reliability and validity. In three cases, it's clear there's nothing there, just no tests. We couldn't find a thing that even would pass the laugh test. Bite marks, I can't imagine that anybody seriously, in this room, thinks that bite marks could pass the test of being a reliable method because there's no evidence to support it, and you can't support it without evidence. And the couple times people have tried, they're pathetically bad. I'd love to see great bite mark evidence, but you'd have to do an empirical test. And we all know that's not been done, so we know it fails the test of being a reliable method.

So we went through that, and we shouldn't be shy about it. Feel free to use an investigation. They have no business in federal court, obviously. In one case, we really did find a challenge, which was firearms. The issue is not that firearms people are not very smart and very careful and very thoughtful, and I have a lot of respect for the firearms community. They did a bunch of studies.

The big issue we ran into with firearms is many of those studies were designed in such a way, for example, these closed set tests, that they really did not come close to mimicking what really happens. And I mean, when you know that the answer is present in your possible known sources, you act very differently than when it's possible the answer isn't present there. And not surprisingly, those sort of tests produce error rates that are a hundred times lower than when you don't. And I realize that may not have been obvious to folks at the time, but now the evidence is super-duper clear, and you couldn't rely on the kind of "shooting fish in a barrel" kind of thing.

This is in no way to denigrate the forensic firearms examiners, because, in fact, there's been a study, a proper black box study, that has gone off and measured an error rate. And I believe you could do another one on the issue for us, and I'll admit this is the one that's exactly on the bubble is there's one such study. From a scientific point of view, reproducibility matters, but that's a great one we could argue about. But I wouldn't argue very long because it's not hard to do that study, as demonstrated by the fact that somebody did it. So it's a great example.

And then, on complex DNA mixtures, I won't go into lots of detail other than to simply say this is an area that is ripe with potential. There are some things that are clearly solid, but it's clearly the case that if I said that's got a one-part-in-a-million contribution from you, you'd be pretty dubious about that and you'd want to know. And so the question there is not is DNA a good thing. I'm a big believer in DNA. It's what range -- within what range has reliability been demonstrated? We believe, reading the literature as best we can, it's been demonstrated within a certain range. And people can work to demonstrate it in larger and larger ranges. But again, it all comes down to this ridiculously simple notion of it's about empiricism. You actually have to do it empirically.

So what's needed? You know, a bunch of things. Threshold question of admissibility, should stuff come into court, you got to establish its reliability where it hasn't been established. You got to do it if you want to bring it into court. If you don't want to bring it into court, don't bother, that's fine. Now, some people, I think, have gotten the idea that PCAST somehow is not enthusiastic about the other things. By having focused on the reliability question as the threshold to admissibility, we may have given the impression we don't think it's also very important to do these fantastic white box studies. FBI has done white box studies. My colleague here, Dr. Champod, has looked at these things, namely what goes wrong, how do people make mistakes, how are conclusions drawn. Open up the black box and look inside. It's critical to improvement. We're wildly enthusiastic about that.

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Moreover, we're sitting around talking about technologies that, frankly, ought to be converted in the next four or five years to objective methods. Companies can do facial recognition on the street really well. The technologies are becoming so good for matching, it would not at all be crazy to take -- yes, I know, latent fingerprints can be complicated, smeared, all sorts of things, but when I see what's happened with image recognition over the past three or four years, I believe this is an easy problem compared to many of the problems that are being solved.

And we can argue will we ever get rid of the forensic examiner; I'm not trying to ever get rid of the forensic examiner, but I have no doubt that a great deal of work could go to turn these things into objective methods. Firearms is actually somewhat easier because the patterns on bullets are much easier to digitize as a 3D image there and do matching on. And we're giving much too little attention to turning this into really objective science.

Why do I care? Because I think it will improve law enforcement. I think it will improve justice. I think it will decrease costs, increase accuracy. And we can argue all we want about should we do a black box method on this study, on the subjective method and all that. If we can turn it into an objective method, let's just do it. And then, finally, there's always the incremental improvements. Don't get me wrong, things can always get better, but what we were talking about is not could we get better, it's have we met the threshold test for this ability.

So those were the key things that we've talked about. We made a set of recommendations in the report. You've read them. And I won't go over those because you've got them all and we can always talk about them. And finally, the last point with regard to the appendix was the appendix was stimulated by the fact that the Department of Justice suggested in a statement following the PCAST report that "The report does not mention numerous published research studies which seem to meet PCAST criteria for appropriately designed studies providing support for foundational validity. That is, in short, we missed some important papers.

We take that very seriously, and so we reached out to the forensic community again, and to the Department of Justice, and said please tell us. We got back a bunch of responses of things we might look at additionally. And John Butler, God bless him, suggested we also look at the INTERPOL list of forensic papers. We actually reviewed the 8,000 papers you pointed us to. Happily, they are sorted by category, so we didn't have to read all 8,000 of them, but we did do that. And we could find no examples of empirical studies that had been missed. We were wondering if the DOJ would write back to us about that. We didn't hear back from the DOJ. So I got in contact with Deputy Attorney General's Office and asked are there any other papers that you would like us to take a look at, and we were told -- this was about a few weeks ago -- that, no, in fact, upon reflection, there were no additional papers that DOJ thought PCAST should look at.

So, in any case, we've written up an eight-page appendix to the report that addresses the question of was there anything else missing. It readdresses this question of empiricism is necessary. There is no substitute for empiricism. And it makes clear our enthusiasm also for the white box in the other studies. I don't know exactly when that will go up, but it should be up sometime today. That's it on my end. And I think you guys have to wait for questions until we're done with the rest of the panel. Thank you.

JOHN BUTLER: Thank you very much. Okay, Christophe.

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CHRISTOPHE CHAMPOD: Well, good afternoon. First, I need to borrow the -- the mouse. And I think it's quite difficult for me to come after you. You are really good at looking at this report. And I will present something which is, I believe, a bit atypical compared to the discussions that you had. And I thought a lot about what I wanted to say. In fact, it's probably a presentation that took me the longest to do in the past few years. I don't know why, because of the messages I'd like to convey are very simple.

Now, I already know that my responses to these three questions may not -- may not be the type of responses that you expect from me, from a forensic scientist, from a scientist to start with, or from an expert. But I'd like to take you through this little -- these three chapters. So the first question is do we let experts decide on an identification. The second question is do we allow experts to formulate informed judgment. And the last one is how will experts report in the future.

Now, Eric has been very thorough and candid, and he has been blunting some of his arguments. And I would do the same, just to give a counterpart. And I will, of course -- I will use examples which are mine and I will push the button a little bit too far for you to react as well. So, the first question, and I'd like to start with a view of what could be the next generation of forensic scientists, the type of scientist that we have tested through black box studies. In fact, I'm using here -- data coming from very respective journal, plus one, which, by the way, has an impact factor of about three. So I'm pretty sure it will meet the requirement included in PCAST.

And I take -- and each of these sessions were conducted on 200 trials per session. It's coming up. And the paper moves on to say something about what would be a retained expert, how many tests that person should pass before being retained as an expert. And they decided to have, as a decision [indiscernible], that the expert should give no false alarms over 200 tries. There in step five, it's roughly the last two weeks before being entered in the judicial case program. And I quote directly from the paper. Now, I quote directly from the paper to an exception, the word "expert."

So, the first argument I'd like to make is if we think about the future -- and I'm wondering if my button is working.

ERIC LANDER: It's very finicky.

CHRISTOPHE CHAMPOD: I need to press hard like you.

ERIC LANDER: [Inaudible].

CHRISTOPHE CHAMPOD: First -- my first argument is I'd like for experts to be able to know what is going on in their mind once they make decisions. And it's down to decision-making. And my colleagues published two papers which, in my view, are the foundational papers to have an understanding about how a forensic scientist will decide on an identification. And it implies some prior probability. It implies weight of evidence, and I call it likelihood ratio. It implied posterior probability on the identify. But above all, there is some decision "fressels" that comes into play, and they are guided by cost-benefit analysis, by the scientist.

Now, the first thing to ask ourselves, and if I could just go back one slide -- it will not allow me -- but the first thing we have to say is to ask ourselves is, well, do we allow a scientist to do that? Do we allow that

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person to take all these steps and make the decision? Now, I make a small parable for why. And I'd like to quote from my -- one of my mentors, Pierre Margot. And Pierre Margot, in his response to a paper related to the NAS report, highlighted one thing, which I think we would agree, that in the pattern recognition disciplines, there is little, if any, training in science. And the second part is that there is very little in forensic science education, which could promote experts who truly understand what is at stake when people make these decisions.

Now, how does it relate to -- aw, authority. Now, I'm a pupil of Pierre Margot. And there is an expression in French which says that "Les chiens ne font pas des chats." And there is a link with what I want to convey today. The experts we discussed before are dogs. Now, and these dogs have been trained, and they have been trained to these tasks. And don't ask them how on earth they do it, they will not respond to it. They are adverse to any white box studies. And that we -- we are training super-recognizers, super dogs, to do this task. Now, the question I'm asking is do we want forensic science to be that? And of course I'm provocative on purpose, but I think there is more to forensic science than to be accurately measured super dogs.

So if we start to think about the process, you may agree with me or not, but I will claim that prior probability are not in our business as forensic scientists. So, by consequence, posterior probability go out of the window, and the decisions at the same time. So what we are left with is a measure of the likelihood ratio. And that is the measure of the contribution of forensic science. And that has been expressed in the guideline. And we discussed today about uniform language. And yes, I will stick by this uniform language.

The ENFSI, the European Network of Forensic Science Institutes, issued a guideline on evaluative reporting to be distinguished, of course, from investigating investigative reporting. That when it comes to evaluative reporting, the guidance provided in these document, in my view, apply, and they apply also to pattern recognition disciplines. So, and I need to play a little bit with you, but I'd like forensic scientists to stop barking and adopt the forensic science language.

Now, the next topic is do we allow experts to formulate informed judgments, and that's where I'm taking some risks. I think it all comes down to a matter of transparency. And the guideline I referred to before is giving some guidance about what do we mean by transparency. And it means an expert who is in the position to declare what is the basis of his opinion and how these data defined, in a very large manner in the documents, have impacted his judgment. And we are expecting this to be transparently provided to the decision-maker.

Now, transparency is hard. So I decided to take one of my cases to illustrate the issues. Take this case, there is a mark, it's a palm mark, and this is the analysis carried out on that mark before being compared to any known impression put forward to me. The mark is of extremely good quality. There is ample information, a lot of features. There is more than 50 minutiae that has been identified on that mark. And here's comes the comparison with the individual, and I make it blown up of this.

There is, in correspondence, more than 50 minutiae without meaningful discrepancies between the mark and the print. And that comes with tricky question, what does it mean? And the case is interesting because it came with two additional questions -- other questions, but I think two questions that were put forward by the defense. That case predates PCAST, but you will see the analogy. These two questions were put forward by the lawyer. Now, that's where transparency comes into play.

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I'm a firm believer that an expert should be candid. Now, in French, candid has a very different meaning. In French, it means -- well, it's a bit of an idiot who is telling too much. But I will be candid on this. If you thoroughly look into the forensic literature, there is not a single study about palm print identification, none I'm aware of. There is no black box study about palm. We have no idea about the error rates under control conditions. And everything is down to an analogy between fingertips and palm. Okay.

Now, should we stop palm print immediately from being presented in your courtroom? Do we allow me to express something about this comparison? And I took the liberty to do so. This is the next track of my statement, well, it has been translated in English, but that's exactly what it said in French. And I, indeed, invoked some knowledge about fingertips. I invoked the study and the FBI study you had mentioned that at some point I indicated there is an analogy which is made between fingertips and palms. But the analogy has limits.

We know that the distribution of minutiae on palms is a bit different from the distribution of minutiae on fingers, that the match probabilities we would expect for simple features, such as ridge endings, will be higher than the one we expect on palms. But given the number of minutiae that was recovered in the case, and the amount of information, I will not claim to an identification because, by principle, I think it's outside my duty and I think it is misleading the court, but I was prepared to give my likelihood ratio and my strength of evidence in this case. This is applying informed judgment. If you judge me by the reliability test that was mentioned before, there is no way I could be recognized as an expert in the U.S., I understand. That's how I reported that case.

Now, we have a system which is in tension between, on the one hand, disciplines which are based on essentially on experience in the hands of a few. On the other hand, the desire to have relevant systematic studies which establish reliability. And, of course, we don't want to have blind trust and have to trust the experts simply because it's declared as being one. But on the other hand, I think there is limitation when we ask the pendulum to swing all the way to the left on this slide.

Now, let's have a look about the future and how we'll expert report in the future. And that's my last quote about dogs. I think we can have dogs learning new tricks, even if they are old. This is a mark. It's a finger mark. It's from a fingertip. It's very limited in terms of quantity. This is not the palm print case I presented. In fact, there is information here that has been analyzed and put forward on the basis of the image alone by more than one expert, and they worked through a consensus to stabilize the information they want to provide to base their comparison upon.

Now, in the comparison stage, they, indeed, noticed some correspondence with the print of an individual on the right, and that has been documented. The -- all the minutiae identified in analysis have been observed in correspondence on the print without significant discrepancies between the two. Now, then the mark and the print has been subjected to an assessment by a model, which will derive the weight of evidence associated with this comparison. And the likelihood ratio that the model provided is of a few thousand in favor of a prosecution case, which is that the mark has been left by that person, that print, who left the print. As opposed to the view that the mark has been left by a different individual, which is an unknown individual.

The system is informing the expert about the window of usage and whether it was safe to be used and whether there is distortion that needs to be accounted for. And the experts have also considered that in

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this case, the minutiae, those are the little triangles, they are -- it's very difficult to say whether they are ridge ending or bifurcation because of a dotted pattern. So, in fact, we don't know which type of minutiae we are talking about, and that has to play a role in the assessment of the weight to be assigned to these findings.

So what these experts have done in this case, they have assigned a likelihood ratio on the order of a thousand to this comparison. And it is not the number that the model gave straight away. It has been adapted, conditioned on the complexity of the case, and conditioned on the fact that the mark was not as legible as it could. And we were operating within the lower limit that the model will allow, hence the reduction in the weight of evidence. The experts authorize themselves to provide you with an order of magnitude which reflect in their opinion the fair assessment of the weight to be assigned to these findings.

Now, who are they? Well, they are the students which I'm training. And because the first -- my first thought I had reading the PCAST report was, well, if it all comes down to testing dogs in controlled conditions, what about the forensic science program? We just test them forever and give them certificates about error rates they committed during the training, or we want them to be critical thinkers? I want forensic scientists to be critical thinkers.

So it leads me to a few answers. I believe that it is not the scientist's job to decide. So the PCAST identification, non-identification, the PCAST black box concept has its limits because, in my view, these decisions should be taken by the court and not deferred to the expert. Do we allow experts to formulate informed judgment? Yes, but we must go beyond ipse dixit. It must go beyond an opinion because there is nothing you can challenge on an opinion than offering another opinion, and it does not make it better to have a second one, even a third one. And I have seen cases where you had six, seven, eight opinions, and still don't -- I don't think we have good forensic science at play.

How will experts report in the future? They will report I think with more forensic education and with more transparency. And if there is one message I'd like to convey, it's that transparency should be paramount. It should be paramount on the way they report. It should be paramount in the way they write the report. It should be paramount in the way they respond to your questions, and I will try to do at later stage. It should be paramount in the document's software source code they are ready to disclose to anybody asking for it. Thank you very much.

JOHN BUTLER: Thank you, Christophe. Give this to Allen. Allen, please.

ALAN LESHNER: Hi. So I'm going to try to do my best and keep the blunt going because it would ruin my image if I didn't. But it's late in the day, I'm the only thing between you and getting out of here. So, first of all, I should say I'm a fundamental neuroscientist by background. I have no specific expertise in forensic science, but I have spent the last 36 years here in Washington. I know, thank you for your sympathy. Giving out money in federal agencies and then running a large scientific society. My comments have to do with a subset of the discussions that you've been having, but I'm going to sort of ask you to take a stand on how to move this forward. So, here it goes.

So this is a truism, the quality of forensic testing is under constant scrutiny. And I'm not taking a position on the quality of forensic testing. I think we've heard. But I would repeat Eric's comment that in order to be credible and to stand up in courts, tests must have been shown scientifically to be reliable and they should have been shown to be valid. There also is a truism that all tests can and should be improved. They

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need to be improved in order, A, to make sure that they're doing what they're supposed to be doing, and, secondly, in order to increase confidence. And the only way that you can actually do that is to apply the full power of science to it through rigorous research. I would then argue that ultimately, after that, you have to apply standards.

Now, this issue of how to strengthen the scientific underpinnings has been studied nearly to death. There was the 2009 report that people have made reference to. There was the 2010 report talking about "Strengthening the National Institute of Justice" that spent a lot of time talking about the subject. There is the PCAST report that we've been talking about. And I had the opportunity to chair a report at the National Academies of Sciences, Engineering, and Medicine that was called "Improving the Scientific Role of the National Institute of Justice in the Support of Forensic Science Research."

So I would argue we don't need any more guidance. We've had plenty of guidance. We know what to do. And so I put down a little list of what needs to be done. And I would hope that, as a part of your responsibilities, you would take a position on these; right? We need a national commitment to apply the power of science to forensic science. Secondly -- I'll come back to each of these -- we need leadership. We need coordination across the government. We need a long-term stable strategy. We need adequate and stable funding. It's a shame for the neighbors how little money is devoted to research in forensic science. And you need to make sure that there's appropriate staffing.

So this was my moment of blunt frustration since our report came out in 2015 and you know how effective we've been. I'm sorry. I chair a lot of academy committees. I've had this experience before. Just do it. I don't think we need to debate it anymore, but we do need to have a body like this commission come out and say do it.

Okay, so what are we talking about? First step, go to all of these reports and do more to implement them. A part of our study looked at NIJ's response to the 2009 and 2010 studies. And there has been substantial progress, and I wouldn't want to imply that there hasn't been. But, of course, more can be done. A very big problem is that nobody is in charge. There are a lot of agencies involved in the process. They do what they do well, but there's no coherence to it and there's no strategy. So this is just some of the agencies, and there's a whole bunch of them. I apologize for the change in the template, but I'm actually very tired. I make all my own slides, so I have to use the ones that I'm given sometimes.

Okay. So we recommend that in our report that the leadership responsibility, that doesn't mean the sole responsibility, that means somebody to lead the effort, should go to the National Institute of Justice. And our argument is up there and you can read as well as I. It's the largest external research funder, supports research conducted by academics and its state and local labs. And it has, in fact, made substantial progress, although, as our report points out, it's not fully there yet.

But it can't do it unless there's this commitment, and that starts with the DOJ leadership, needs a bigger budget. Its budget is actually ridiculous. It needs to have full control of its own research agenda with stable priorities. Its priorities now get changed year by year. And if I were a researcher thinking about applying, I would sort of say, "Gee, next year you might hate my kind of stuff, so maybe I'll go do something else." The research agenda is too heavily shaped by practitioners and does not well enough reflect the opinions of the researchers. And some of the detail practices and policies need to be brought closer in line with the way other science agencies operate, and that's -- yeah. I'm not going to do those in detail.

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Anyway. So what are we actually advocating? First thing we need is a government-wide strategic plan that articulates the major problems and a path to addressing them, assigning roles to the various agencies. And if there's a single recommendation that I would repeat, it is there needs to be a plan. There has to be some coherence to this research agenda. And then there's subsets of this that need to get done, integrating the perspective of research scientists and having ways to measure the impact. And again, I won't take the time to go too long on that.

The solicitations that come out, as I implied, have priorities that shift from year to year, and the research can't actually figure out what continuity there will be. As I said, the budget is too small. And the programmatic staffing hasn't changed over the years, both in size and I would argue in the breadth of substantive expertise. There's my famous plan. I'm obsessed with this plan, and I am because I do believe that it's absolutely critical to any. We also recommended the development of a research advisory board. So that's something that every science agency in Washington has one or 20 of. But these are boards of respected scientists. Eric probably sits on 12 of them.

ERIC LANDER: No. No. No, just PCAST.

ALAN LESHNER: Just -- oh, right, because you have to behave when you're on PCAST. Some of us have been on way too many. And the idea is not only do they help to shape the research agenda and how the agency operates, whichever it is, but it also is the case that they can help monitor progress in getting it done. There needs to be a broader array of researchers involved. Each of the topics we've talked about today is extremely diverse. And there ought to be scientists involved in the research from a much broader swath of the scientific community, but they're not going to come if there isn't any money and if there isn't any leadership and if there isn't any continuity over time.

A lot of what NIJ does in technology transfer or knowledge transfer out to the field is good, but, again, I would argue that there needs to be a broader set of efforts for it. And that's just a taste. I would refer you to our report and the other reports that have been done. But what needs to be done is there needs to be somebody taking the responsibility and saying we want to do this better. And the only way we can do it better is to get coherent about it, to get focused, and to make a genuine national commitment to making something that is so central to the wonderful functioning of our criminal justice system, that if we don't have confidence in the reliability and the validity of the tests that we are applying, we're never going to do it right but we're never going to get the confidence that we all want to see. Thank you.

JOHN BUTLER: Thank you, Allen. So we have from now until about quarter to five to have a Q&A session with our three speakers. And we'll start with Jules.

JULES EPSTEIN: Thank you all. These questions are to Dr. Lander, although if Professor Champod wants to chime in, get it. I read the PCAST report. I'm not a scientist, but I have two follow-up questions from it. The part that talks about the foundational validity of latent prints, if I understand it, says there's enough there to show from black box studies that people can perform reliably. What it doesn't address, or if it does I missed it, so that's really question one, is what are the proper conclusions they are allowed to draw? In other words, I get it that it seems to say there's enough to say that, when given samples, people are really good at saying these two come from the same in a closed universe and these two don't. But that seemed different from any question of validity as to who else might have that, how many people in the world. So my first question is was I reading that right?

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The flipside is taking a field like ballistics, firearms, where that said, okay, we're not there yet on the foundational support. I'm assuming, and this is where I'm, again, asking for enlightenment, that that still would permit some firearms comparison testimony. For example, this is a fire cartridge case at the scene. It's a 45-caliber. And the fire cartridge cases in the defendant's house are 45-caliber. And there are five lands and grooves, and there's this and that. So is there some demarcation on the latter discipline where you'd say, well, this much is okay, it's really after this line that we're concerned about? And thank you for all the work PCAST did.

ERIC LANDER: No, thank you. Let me do the last one first, because I think it will be most helpful. When we speak about a forensic feature comparison method, we're not speaking about a discipline. So, firearms is a discipline. A forensic feature comparison method is a way of doing a certain kind of comparison to reach a certain kind of conclusion. You might say can we tell whether these bullets were fired from the same class of gun; that's a method. And then you would test how well do you do in figuring out whether it was fired from the same class of gun. That wasn't actually what we did. We looked at the method and were very clear about can you associate it with a particular gun within a class. That's different. You can do a test for that.

So it might be the case that you can tell this bullet, I know what kind of bullet it is. That's good. It might be you can say I know what type of gun it was fired from. We didn't go look up papers on that. It turns out there aren't quite as many papers as you'd like, but it should be easier. You can tell which way the rifling was done by the way -- there are many things you can do to do class characteristics. We chose our method and we said associating with a specific gun within a class. For that, you can do a test. And I think there's confusion. There's not casting aspersions on a discipline, a field. There's "Is my method reliable."

So if we go back to your question about the proper conclusion about fingerprints, you might say, well, you know, in DNA, we're blessed with the distribution of alleles across a population, and we can make a database of the alleles. And we have the fact that, give or take, with very little bit of dependency, they distributed dependently and we can draw many conclusions about the frequency of each pattern. We don't have a theory for the frequency of every fingerprint pattern, and therefore what we have to do is say, when I give you, Fingerprint Examiner, a bunch of fingerprints, latent prints taken from a particular place, and a bunch of possible knowns, as the FBI did running them against a large database to get the best match by the database, and then asked them whether, when they examined it, it was the right one. They looked at very large numbers by virtue of that process.

The goal was to make a statement that is roughly it's pretty likely it comes from that person who we've identified in the database. The right statement to make is when people try to test that method to see if it was reliable, they found that the data said they might be making mistakes at a rate of one in three-hundred and change, but not more than that. I'd be totally comfortable with somebody going to court and saying there's very good evidence from a study done that says people can get this right under circumstances that reasonably resemble -- let's not fuss too much -- what goes on. And they do make mistakes. It's not like one in a billion and not one in a million. They do make mistakes, but when they measured it was on the order of one in 300. Jury factor that into your thinking. That's a reasonable conclusion to make.

So, A, a method is not a discipline. And B, the statement is, approximately, when we try to do that thing, we get it right pretty often, and occasionally we get it wrong. That's all PCAST really says, and it's just all of what science says. That's simply science. Can I ask a question of you about ipse dixit?

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CHRISTOPHE CHAMPOD: Mm-hm.

ERIC LANDER: Because you really said that this palm print, you think it's a one-in-a-billion chance of matching, but that there's not a shred of scientific study of this question. So my elbow is kind of dry and a little crackly, and if I fell down and left an elbow print, how would you feel about the minutiae on my elbow, my ear, my nose? Given that there's no evidence whatsoever to support it, how is it not ipse dixit?

CHRISTOPHE CHAMPOD: Yes, okay. Well, I -- well, first thing I'd like to say is that the discipline is forensic science, to start with. I mean, we should be careful about what is at stake here is forensic science as a discipline. And there is a discipline called forensic science. Now, whether you're -- I think the pendulum, if you ask me to comment on ear prints, and I did in a few cases, and I'm hated in some countries because of my position on this, I took the option that, indeed, the research was not adequately thorough to allow identification conclusion. And I said this in numerous forums and in numerous cases on behalf of the defense, and would still do.

Now, whether or not we can -- I mean, if it's a question of how the analogy between fingertips and palm prints, how trustworthy I am when I'm inviting you to do so. So if your medical examiner -- not medical examiner. Sorry, you're too young for this. If your GP is looking at your elbow and he's an expert in elbow, and you say, "Well, by the way, I have a knee problem," would you find this a stretch of science for that person to make a judgment about your knee, an informed judgment based on his knowledge about the elbow? And I think I would accept my general practitioner to do that. I would trust his scientific background to allow him to make parallel from one case to the other because he can make a decent argument that will apply.

Now, is it still a matter of belief? Well, it's a matter of trust and transparency. And you may find people saying that there is no way you can make informed judgment from elbow to knees. And if they're proved to be true, I am happy to revise my position. But from everything I know about fingertips and the knowledge about how friction-rich skins are developed, I think there is a good argument to say that [indiscernible] and we can transfer some knowledge about tips to the palm.

ERIC LANDER: So, let me -- this is a great colloquy here. So, just as medical advice, I'm not a physician, but just generally, the knee is very different than the elbow. There's this patella here. There are a lot of the cruciate ligaments.

CHRISTOPHE CHAMPOD: And you absolutely make -- you absolutely make my point.

ERIC LANDER: There are these bursa that are really painful sometimes. And the elbow is nothing like that.

CHRISTOPHE CHAMPOD: Yes.

ERIC LANDER: So I would not reason from the elbow to the knee, just as a general matter.

CHRISTOPHE CHAMPOD: You absolutely make my point.

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ERIC LANDER: But your argument is is there a decent argument here. So it might be that in some legal systems, being able to make an analogy is enough. But given how sophisticated you are and given that you're the leading thinker in forensics in Europe, what's wrong with actually just measuring a bunch of palm prints?

CHRISTOPHE CHAMPOD: I mean, of course, we should -- I would never refrain from acquisition of structure data, absolutely not.

ERIC LANDER: Then I don't want to hear you in court giving me your guess when you could give me data.

CHRISTOPHE CHAMPOD: I'm -- if you don't want to hear me, that's your choice. But what -- that's --.

ERIC LANDER: I love to hear you. I love to hear you.

CHRISTOPHE CHAMPOD: This is a court decision, and I will obey to any judge barring me from talking about palm print in court. But the matter -- the situation today is that today probably ten fingerprint examiners identified someone based on palm print. So what do you do about it?

ERIC LANDER: You use it in investigation.

CHRISTOPHE CHAMPOD: No. Today, ten examiners at least, in the U.S., testified to a palm print identification.

ERIC LANDER: Oh, well, then --.

CHRISTOPHE CHAMPOD: So, I mean, do you want an alpha dog in court saying he can identify it on palm without knowing because he's making an analogy, or do you want a more humble forensic scientist explaining the distance between fingertips and palm, and providing you with an informed judgment in the form of a likelihood ratio.

ERIC LANDER: Alas, I want neither --.

CHRISTOPHE CHAMPOD: Your choice.

ERIC LANDER: No, I want neither, because the law compels that the expert may not be there unless it's based on a reliable method. It's not my choice. It's Congress's decision.

JOHN BUTLER: I have Bill and then Suzanne.

WILLIAM THOMPSON: This is just a great panel. I'm enjoying this a lot. I want to pursue the issue Jules raised of sort of the demarcation of when -- at what point do we have a method that requires validation and when are we simply having an opinion based on expertise that we don't require validation for? And I think there's a lot of confusion about this that surrounds the PCAST report. We heard from Jonathan Wroblewski of the DOJ this morning that, in his opinion, the PCAST report would mean no testimony could be given about footwear comparisons whatsoever because there had been no black box studies. So what I thought I would do was -- let's imagine for a minute that I'm a footwear analyst and let

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me give you a series of conclusions that I think I might want to give in court as an expert. And Eric, maybe you could tell me which of those conclusions you think are the result of a method that would require validation.

ERIC LANDER: All right, so you want "standing on one foot" answers to these footwear questions. All right. Let's see.

WILLIAM THOMPSON: All right. So I'm looking at a mark at the scene, and I'd like to say that it is a shoe print. Do I have to validate that? I'd like to say it has the same pattern as the shoe found in the defendant's apartment. Do I have to validate the --

ERIC LANDER: Pattern, meaning [inaudible].

WILLIAM THOMPSON: Yeah, it has the same -- the pattern of the shoe is the same, the sole pattern. Do I have to -- I'd like to say I've measured it and found it to be exactly the same size. Do I have to validate that I can measure correctly? I'd like to say that the degree of wear, it appears from the print that this is a worn shoe and that the defendant's shoe is also worn. Do I have to validate that I can make that determination? I'd like to say on these shoe prints I see some accidental characteristics. I see some cuts and so on that appear to be in the same location in the print as in the defendant's shoe. And I'd like to express the opinion that the likelihood of seeing so many similarities if these shoes are from a different source is really rather low. In fact, I -- in following the Champod method, I would like to actually state a likelihood ratio that it's, you know 893 times more likely, in my opinion, that I would see these things --.

ERIC LANDER: Right, in footwear, it's sort of been said to be billions of times, according to the Bodziak book.

WILLIAM THOMPSON: Well, I got my number the same way he got his.

ERIC LANDER: Yeah.

WILLIAM THOMPSON: So -- so the question is which of those statements that I might like to make in court as an expert should I be allowed to make, and which ones would need validation through empirical research?

ERIC LANDER: Okay. So, for starters, the PCAST report, just to be very specific, looked at identifying, that is to say associating, a footwear impression with a particular source. It did not look at class characteristics. We looked at what was the ability to say it came not from a Nike size 12 running shoe of this given make, but whether it came from your Nike size 12 running shoe of this make. That was the method we looked at for which we looked for data.

WILLIAM THOMPSON: Do you think to give a statement about class characteristics, to state --

ERIC LANDER: So, we said with regard to identifying characteristics, we said there is no evidence whatsoever that anybody had done anything approaching a meaningful test. And we've since gone, and as part of the supplement to the report, talked to the president of the IAI and to PEPA [ph] and to the leading worker in this field, and they both agree there's never been a study, there needs to be a study, and one is

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being done in West Virginia today. It's great. West Virginia University is undertaking the right kind of study. I'm thrilled to hear they're going to do it.

With regard to class characteristics, we didn't look, but one could ask is there evidence that people can identify which shoe it is. But now let's not agonize to death over is it a shoe, is it a worn shoe, is it this large, because, remember, why did we care about any of this? We cared about any of this because in these forensic pattern comparison methods people are saying the characteristics are sufficiently distinctive that it would be very unexpected to see that. It's because people are coming in wearing the mantle of expertise, claiming that they can make statements, whether they give an actual number or they just imply, "hint hint, wink wink," "It's really rare." Such statements are the ones we care about. That's what we mean by pattern comparison method.

So if you ask me is a forensic footwear examiner entitled to make statements associated with a footprint -- a shoe print with a particular source shoe, the answer is no, of course not, because nobody has ever bothered to test whether they are any good at it. What they do is they've written papers that say, "Oh, dings and marks on shoes, they're probably kind of random and we can probably kind of multiply the probabilities." That's not science. So, no, of course they couldn't give that.

With regard to class characteristics, we didn't look. Maybe there's a set of papers. I'm not aware if there are actually, but we didn't actually look because we take seriously a method needs to be validated, and we chose that method. With regard to "is it a shoe print," go for it. I'm not very worried that that's a statement of the sort that is going to cause anybody to think we are saying this is a distinctive set of features. It's a shoe. No risk there. Even it's a worn shoe, not a particularly big risk there. Let's be real. We are here because people have misstated, for a long time now, claims that they can do things with high probative value when there's no evidence. So we don't have to say exactly where do we have to draw the line to know that there's a bunch of things on this side of the line we have to attend to.

WILLIAM THOMPSON: But I'm not sure I'm hearing a principled distinction.

ERIC LANDER: Yeah, it is.

WILLIAM THOMPSON: A category of things that require validation, in your view, and the category of things that --.

ERIC LANDER: Anything that holds it out as a scientific method, offering evidence beyond the ordinary can of a juror is the basic point. If it's within the ordinary can of a juror -- "It's a red hair" -- go for it. You're not going to snow a juror.

WILLIAM THOMPSON: Okay.

ERIC LANDER: If you're saying, "Oh, my God, this DNA pattern is one in a gazillion," I can snow you on that. The clear line is if it is something within the ordinary ability of a juror, ordinary experience of a juror, then the truth is we don't need to qualify the guy as an expert. The cop can say it's a red hair. The lawyer can say "Isn't that red hair." But when we're talking about things where a lay jury is unable to interpret that statement and must, in fact, say, "Well, science says," then science damn well better know.

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WILLIAM THOMPSON: What if the expert wants to say "In my experience, it's rare to see two different shoes that have exactly the same cuts in the sole"?

ERIC LANDER: Well, you know, A -- A, unfortunately for that poor expert, Congress doesn't allow it. The federal rules of evidence say that hunches don't do it. Your doctor, your general practitioner, they can have hunches. They can treat you based on hunches. There's not a guarantee that everything your doctor tells you to do is supported by detailed studies because Congress didn't pass that law. But, of course, the doctor's working on your behalf with your consent on your side. When the State is bringing a piece of evidence against a person, the Congress has said "reliable methods." That's it. You got to have -- it's there. So is it reliable to say, "In my opinion, I've looked at lots of shoes and cases." By the way, you didn't know if those prints matched those shoes, because that's just experience. No, the answer is, no, it fails the test, at least in the United States. Europe might be different.

JOHN BUTLER: All right. Suzanne, then Gerry.

SUZANNE BELL: Thank you. This is -- again, thank you for your hard work on the PCAST. I really appreciate it. My question is a little bit more general. It's directed primarily to you, Dr. Lander, but I think both other panelists can comment on this. Because you mentioned that you read so many thousands of papers or reviewed them, one of the things that we've been very concerned about is the quality of the forensic literature. And I understand that you have a problem being blunt, but what's your evaluation of the state of the forensic literature and is it coming up to the standards that we would expect of a discipline such as molecular biology, chemistry? I mean, what are your thoughts on that?

ERIC LANDER: So let me start by saying there are some first-rate people working in forensic science. And I want to associate myself with Dr. Champod's plea that our goal is not trained dogs. Our goal is real careful scientists looking at processes, measuring things, understanding processes. I totally buy it. I take my hat off to the collection of FBI studies on latent fingerprints, the one published in the National Academy of Science, gorgeous piece of work. The white box studies are even more beautiful because they examine such questions as, well, when there's a certain threshold number of minutiae that you have to reach to get somewhere, boy, there's an interesting spike just past the right of that. These are real good scientists doing really good work.

What I take away from these excellent papers in forensic science, Dr. Champod's, others of these papers, is it's totally possible. It says there's no excuse for crap. There's just no excuse for crap. Now, when we go back in the literature earlier, and when we look in other fields, there's a fair amount of crap in the literature. I cite -- you know, PCAST cites some of the hair papers where the results section of the paper consists of a single sentence. "My assistant gave me seven sets of ten hairs and asked if I could match them, and I got them all right," that's one of the papers cited by the Department of Justice in supporting the validity of hair analysis. I recited you the entirety of the data in that paper. That ain't science, and we know it. And I don't blame the DOJ, they probably didn't even read the paper. But had they read the paper, they'd be embarrassed to quote that paper.

Or another hair paper where people took a whole bunch of hairs and they characterized them by a bunch of characteristics. They found which ones had similar characteristics and then they did microscopic hair examination to see if they should match. And they almost never made a false association. But the study was designed where every single hair came from a different person and the examiner knew it. So, going into the study, if you know that the right answer is it's not matching, it's not a study.

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What we are seeing, and I want to make it really clear, we are on a wonderful threshold. Forensic science stands at a crossroads led by people like you, by people at the FBI, that either it's going to turn into a serious science that says we can and will measure methods, we do make mistakes, we will report our mistakes, and we'll give up some of the past. We do not in any way disparage forensic science or forensic scientists. We want great forensic science. The only way you get great forensic science is the good scientists say this other stuff, if it ever was acceptable, is no longer acceptable.

Why is this a problem? The only reason forensic science is in the state it's in is not because there aren't good people or people don't know what to do, it's because everybody's gotten themselves in this little trap, admitting the problem about methods that are in ongoing use runs the risk of opening past cases or existing cases. If it wasn't for that, everybody in this room would be saying -- if we were only prospective, if we could pass a bill that says you have a four-year grace period, and after the four-year grace period this stuff has to be reliable, people like Dr. Champod and others would do the studies. But we must deny, right now, that there's a problem because it could reopen past cases. No other science labors under that, and we should call it as it is. It's not that people don't know. It's not that they're not smart enough to do it. PCAST, because we can be blunt, is simply saying that's the only thing that stops this from being a reliable science.

JOHN BUTLER: Gerry and then Julia.

GERALD LAPORTE: What an excellent panel. I wish we had more time for discussion. Christophe, I agree with 99 percent what you're saying, Allen, 99 percent of what you're saying. I don't want to say 100 percent, because I'm a scientist. But really good. And so my question is directed at Dr. Lander, not that I don't agree with 99 percent of what you said. So one of the things I think that -- and I'll just try and speak on behalf of the forensic community -- I think one of the things that -- where there's an issue is almost like PCAST makes it sound like people are just pulling this crap out of their rear ends, like that there's no basis for it whatsoever.

When I trained as a forensic drug chemist in a lab, I probably analyzed hundreds of ground truth known samples before I was even qualified to do testing. The same thing happens with shoe print examiners, happens with latent print examiners. In fact, I know that latent print examiners probably do, on the -- probably somewhere -- and I'm just making a really good educated guess -- somewhere on the order of thousands of comparisons over a two- to three-year period during their training on ground truth data so that they do know -- they have a very, very good idea whether or not they're making errors.

And I can tell you in most accredited laboratories, if you are making errors during your training, you're not going to become a latent print examiner. You're done. Especially -- I mean, certainly up in the beginning you're going to make some errors, but if that doesn't improve, you're going to lose your job and you're going to get probably put somewhere else.

Also, we have proficiency testing. There seems to be a lot of criticism about proficiency testing. And I think sometimes PCAST was a little unfair when you discount studies, you come up with an excuse. "Oh, it wasn't -- you know, the journal didn't get a 3.0," "It wasn't published in a --."

ERIC LANDER: We didn't say anything about impact factors.

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GERALD LAPORTE: Well, there are certain things where you give more credence to studies because they were published in a high-impact journal.

ERIC LANDER: No, I'd ask you to point that out. We did none of that.

GERALD LAPORTE: Well, you had just said, just before this, something about, you know, certain quality of certain studies.

ERIC LANDER: That's the quality of the paper. Nowhere do we say anything about impact factors. The thing about science is these external issue -- you could have a crappy paper in the proceedings of the National Academy of Sciences. So we simply don't do that.

GERALD LAPORTE: So my point being -- and I don't want to -- I don't want to sort of get into a debate, but, I mean, these are things that were not taken into consideration at all, and it does -- if I ask you, on your way home, what's the probability of you seeing a Lamborghini or a Toyota Camry, your answer is going to be a Toyota Camry; right? If I ask a four-year-old that question, they're going to have no idea because they have no experience. They don't know whether a Lamborghini is more common than a Toyota Camry, not to mention they're not going to be able to probably figure out that a Lamborghini is not probably going to be seen in December and -- or in January in Washington D.C. because everybody puts their Lamborghinis away, whoever has them.

The point being though is that experience -- and I don't want to sort of oversell experience, but experience does have some factor. So if I -- and just one more point that I want to make, it sounds, sometimes, like when you're pulling out impression and pattern evidence comparisons or you're not understanding that there are actually measurements, okay, it's a semantical measurement. So if I compare a shoe print from a scene and I have an actual shoe, and I have a -- there's a rock in one place, I got a nick in another, and I got a wear pattern in another place, you know, we are actually measuring the constellation of those.

ERIC LANDER: We know that. So let me address your question.

GERALD LAPORTE: Just one last thing. So we don't actually say, well, the nick is four millimeters from the tip and the rock is, you know, five millimeters from the base over on this side. What we do is we actually do a comparison and we overlay them, and we say, oh, look, they actually occur in the exact same place.

ERIC LANDER: So we're well aware of that. We had the benefit of a lot of forensic scientists who have walked us through these methods. There's no doubt, there's measurement, there's comparison. The bite mark guys, they actually measure things, they put in distortion factors. All those are great things. They don't tell you that you're getting the right answer, but they're good things to have.

And the fact that you've said all these examiners have done lots of practice problems and they get them right back in the lab convinces you that they're probably doing a good job. The only question is the fact that you, examiner, happen to be convinced, or you, examiner's supervisor, happens to be convinced does not constitute reliability until you share it and publish it. You must take one more step. And you're telling me you're very confident that most of these methods will be reliable, they can be shown to be reliable, and all I'm going to say is, "Good, show them."

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Let me be very clear. When we are totally blunt about the problems, there's no disrespect to forensic science and forensic scientists. We're not saying people are pulling things out of their butts. We're not saying that people don't care. We're not saying they're evil in any way. We're saying that in order to bring a method to court, you have an affirmative obligation, which the four-year-old and I do not have in guessing about Lamborghini's, and that obligation is not to believe that we're reliable but to show that we are reliable.

The NIJ is in just the position to show we are reliable. I will be thrilled if every one of the methods that we discuss can be shown to be reliable within some degree of reliability. And if it's wrong five percent of the time, fine, just be able to say so. That's why I was disturbed when the Department of Justice says its examiners can't discuss error rates because the heart of science is "How reliable?"

So I want to apologize to any forensic scientists who, in any way, were insulted or put out by the fact that we say these things. We say them because we need your attention. We say them because all these other great things you're doing, your wonderful training, accreditations, all of which I respect, the reason we say they count for nothing is because, from a scientific point of view, as important as they are and as hard-working as you are about it, and as much as we want you to do it, they count for nothing with regard to actual demonstration of reliability. You, of all people, are in a position to ensure that we take the PCAST report and show that all of our concerns are unfounded. Good luck with the bite marks part.

GERALD LAPORTE: And for the record, I don't disagree with what you're saying. I mean, I think -- I love the idea of black box studies, white box studies, finding out more --.

ERIC LANDER: I actually prefer the stuff he's doing, if we can do it.

GERALD LAPORTE: So I -- I totally agree with that. I think just my comment would be let's be careful not to necessarily just throw everything out when maybe we don't have that empirical evidence, but we have a lot of anecdotal.

ERIC LANDER: No, no, no. We must throw things out if they fail to meet the standard. The thing that you hear often from people who are trying to have it both ways is, "Well, let's not throw it out because they still know stuff." Have that in investigations. The law requires a threshold. It's not that you know some stuff, it's have you met the threshold. Answer, if you have not done an empirical study, you just haven't met the threshold, no ifs, ands, buts. No amount of experience will actually tell us that your belief is correct. Anyway.

JOHN BUTLER: Let me just ask Jonathan what do we have for public comment? And do we have time to take a couple more?

JONATHAN MCGRATH: Yes, so I think we've got two public comments. So we can probably have a few more minutes.

JOHN BUTLER: Right now I have Julia, Fred, and then Bonner. I don't know if we'll have time to get to all of them, so.

JULIA LEIGHTON: This question hasn't come up and I don't -- I raise it because it's out there in the public sphere. And I would characterize it so that it's understood the context in which I'm saying it is if

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you have a hard time defeating the message, you defeat the messenger. And one of the criticisms that came out very quickly of the PCAST report ran along these lines, that the working group was made up of scientists that were predisposed, biased against forensics, and that the report fails because the report had no forensic scientists or, more importantly I think, the forensic practitioners involved in the drafting of the report. I don't see those as going to the message, but I think that we're going to hear this in our day-to-day practices a lot, that the fault -- that you can fault the entire report by faulting the messengers.

ERIC LANDER: Oh, okay. Well, those are -- that's great questions. So the bias against forensic science I'm not sure I get. I've admitted my bias in favor of forensic science, having worked closely with the FBI, having -- you know, with Bruce Budowle, with John Hicks, with those at the FBI, and having put a lot of effort into the early days of DNA to get that on a sound footing. So I'm clearly biased in favor of forensic science. Jim Gates, I believe, is biased in favor of forensic science because he's here. Notwithstanding the fact that both of us are biased in favor of forensic science, I think it's okay that we're working on the PCAST report. I'm on the board of the Innocence Project, which collaborates with the FBI on forensic science, and they've done great work together.

So, you know, I think the question is are the people on the PCAST report who are knowledgeable about forensic science biased against it? No, certainly not. There are only two out of -- of course, a 19-person group, only two are familiar with forensic science as a discipline, and neither of us are practicing forensic scientists, as it should be. That is the case for the other 38 reports that we do, that the goal was not to get practitioners writing the report. That's not what the President's asked for. What the goal was was to hear from lots of practitioners.

So, in making a public RFI and getting input from 70, and having 85 people we spoke to in a variety of different settings, the largest category being forensic scientists, in having sent drafts of the sections in chapter five to the FBI laboratory that were kindly distributed by the head -- by the FBI laboratory to experts in the field, who wrote back with lots of comments, almost all of which we took. The question is not did we get -- did we outsource our writing to forensic scientists, but did we listen. I'd say, in this report, we sought the input of the forensic community far more than any of the other reports we've done precisely because we know how much information and value there is there.

So I don't know -- in any case, you know, even if you thought one or two people were biased against -- like I say, Jim and I are biased in favor, otherwise we wouldn't spend our time on it -- you got to remember the rest of the PCAST has no biases, they haven't been in the field, and they've done what the President has asked them to do with regard to many fields. Cybersecurity, we're not all experts in cybersecurity, one or two people are knowledgeable, but we talk to the whole IC and to many people at universities and go down the whole list. So, no, I think that's kind of if you don't like the message, complain that, oh, my -- and, of course, what's the message? The message is science requires empirical evidence. I told you, that's the message.

The President's Council of Advisory on Science and Technology is mighty qualified to say that science requires empirical evidence. That is not a statement that pertains to any particular field. And in the case of footwear examination to identify a particular shoe, I don't need much to know that if there's never been a single study to measure its reliability, it ain't science. So this is not a tough call in that sense. Your other question had to -- those were your questions. Thank you very much for those good questions. I hope I was blunt enough.

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JOHN BUTLER: Do we have time, Jonathan, for one more? Bonner and Fred.

ERIC LANDER: I'm sorry if we run out of time.

M BONNER DENTON: It seems to me that there's a little bit of difference between something like a shoe print, because the men and women of the jury have some idea if you say it's a man's shoe -- appears to be a man's shoe and it's a 9D, or if it appears to be a man's shoe and it's a 16FFF, the men and women of the jury have some idea of the statistics of how often those occur. You can't say -- you can say that there's a rock print here in the shoe, and the shoe found on the defendant has a rock print, and show a picture of it. You can say that there's a crack in the sole on the defendant's shoe and there was in the print, show a picture of it. But to say that it is unequivocally the defendant's shoe, you can't do that because there could be another shoe with those exact characteristics.

It becomes a bigger problem when you start testifying that the fiber found on the victim and on the defendant was a 20-micron fiber. The jury doesn't have no clue how common 20-micron fibers are. So now you have to give some statistics on 20-micron fibers that are valid, that you can back up with real-world evidence before you use that information to present to the jury. Otherwise, you're baffling them with -- excuse my language -- BS, and that's not a good thing to do. You -- if the jury can't understand the data, you shouldn't be producing it without valid statistics behind how rare it is.

JOHN BUTLER: Okay, we'll turn it over to Jonathan -- or Fred, do you want to --.

FREDERICK BIEBER: I'll be quick. I just want a reaction to all three because it was really a great presentation. I think you hit on three points. Can the method or methods get it right, and I think Eric made it clear there's work to be done, and I don't think we'd disagree with that. But a bigger question that was raised by Chris' comments is can all examiners or can all labs get it right, and this begs the question that I see in reviewing data from a lot of different labs around the world. When I ask examiners how they know these two samples match, they'll say, "Experience." And I'm reminded of Oscar Wilde's quote, "Some people make the same mistake over and over again and call it experience." So I think we really have to be careful in this experiential grab-bag.

Finally, I'd like to say that the third and perhaps most important end to all this is the interpretation in reporting. And I can't tell you how often I'm seeing cognitive bias or confirmation bias creep into reports that I see. I'm working on one with the Supreme Court of Canada now where almost every type of error that's implied in PCAST or other critiques of forensic evidence, whether it's DNA-based or others, has crept into this single case that's led to a wrongful conviction of someone for homicide.

And it begs the question now that Allen pointed out. I'm not sure that this committee, even though I think it's tremendous and I hope it continues, I hope Congress will allow it to continue, I don't think it's enough to move this snowball where it needs to go. I really think that NIST has the opportunity to do more of the inter-laboratory comparison studies, like you've done with the mixture studies to different labs. And NIJ has the resources to monitor grants. So I think some kind of government program, like Allen mentioned, needs to happen because this committee, even our recommendations when they're taken to heart by the Attorney General, takes six months to a year to get in place. And it's too slow.

So I think for us to move this important hinge point the way -- Eric's analogy was better than mine -- to move it the way it needs to go, we need more bricks on one end of this teeter-totter. And I think this

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committee could help it happen, but I don't -- it's my sense, just from this beautiful conversation, that it's not going to be enough. And I hope that John and Nelson and the gang can talk to the new PCAST chair, whoever that will be, and the new heads of NIST to try to move this forward. Thank you.

ERIC LANDER: Can I just respond to your thing?

FREDERICK BIEBER: Yeah.

ERIC LANDER: PCAST can only do so much. Outside groups can only do so much. This is the forensic community stepping forward. At this point, it is the expert people in forensics who want high quality to step up and be unafraid to say, "We're not going to tolerate anything less. We see it." This point of being at a crossroads is evident because there are the necessary people in the field to move it. We must support them.

JOHN BUTLER: Let's thank this wonderful [inaudible]. We'll turn it over to Jonathan for public comment. I think we have the two public comments, then we'll finish.

JONATHAN MCGRATH: All right, I think we're down to one public comment of those who have registered right now. We have three minutes per comment. And so I think Billy Leiserson, you signed up.

BILLY LEISERSON : Hello? Is that on? No? Hello? There we go. That's better. Yeah, my name is Billy Leiserson. I am a scientist by training, an educator. I spent two years as an AAAS science and technology policy fellow, one year of that at the National Institute of Justice. And I'd like to comment about your business piece, the reflecting back, looking forward, because part of what I worked on in those two years is strategic planning, evaluation, and communicating, helping organizations communicate the value that they bring. And the discussion about that piece, as well as the discussion that we just had, and the discussions earlier today, I think are relevant and should be publicized.

So what I would say my suggestion is that in approaching that you have an opportunity to explain what the value is that you bring and have brought to the community. So I would approach it as looking more at what would have been lost if we never existed, and what will be lost if we or someone else doesn't fill that role. And leave it to the policy deciders to figure out whether they want it to be the NCFS in the future or some other group, but at least explain very clearly that you would not have the stakeholder discussions, you would not have these kind of things going on, you wouldn't have the focus. And the other things that are not just simply the list of work products, that is kind of the way that I read it. And I also wouldn't dwell so long on what isn't done, just because it makes it seem like, you know, you're valued, and your kind of devaluing yourself. I would just say what would be lost if we didn't exist. Anyway, that's just my two cents. Thanks.

JONATHAN MCGRATH: Thank you for the comment, Billy. Are there any more public comments? All right. Seeing none. Dr. Gates, did you want to mention something?

JIM GATES: I do. My name was mentioned several times in the last half hour. I guess the first thing that I would say to the community, the forensic science community is something I've said before, don't you want us to be your allies? Don't you want us to be supportive of the work that you do? I think this is a very important question to ask. And the larger scientific community can, in fact, be your allies, but it has

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to be the case that those of us who are not in forensic science can trust -- and that's the real word that's playing out here -- can you trust what's going on.

It's not to say that people are pulling things out of their anatomy. We just want to -- we just want that confidence. And, in fact, to Gerry, at the last PCAST meeting I mentioned the movie "Sully" as we were walking out. And I talked about the fact that here's an example where experience saved lives. We have an extraordinary regard for experience. We're asking you folks to give us the evidence, that's all.

JONATHAN MCGRATH: John or Nelson, did you want to make any wrap-up comments today?

NELSON SANTOS: No wrap-up comments, but Phil was asking me to make sure that we tell you that the "collegiation" is occurring at Del Campo immediately after the session ends. He came up with that word; it has no scientific basis in grammar.

MALE SPEAKER: But you are testing it.

NELSON SANTOS: I am testing it to see how many people show up, yeah. So that's all I've got. John.

JONATHAN MCGRATH: All right. Well, thank you everybody. Thank you to our speakers. And we will start at 8:30 AM tomorrow morning. So, I officially adjourn this meeting. Thanks.

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Part V

JONATHAN McGRATH: Good morning and welcome to Day 2 of the National Commission on Forensic Science. I'd like to welcome those that are following along with the webcast. We're going to get started with the BJS briefing.

John, did you want to make any comments?

JOHN BUTLER: Just to start, Nelson will be a few minutes late getting here this morning.

I just wanted to begin the meeting and to say we've had a few people that have called in sick, so hopefully nobody else gets it that was around the table yesterday.

We'll begin today with the Bureau of Justice Statistics. They're going to fill us in on what's happened with the recent survey they did of a forensic science laboratories. So we'll get a chance to hear from Matt Durose and Anthony Whyde. We're grateful to have them here with us. Thank you.

MATT DUROSE: Thank you, John.

Good morning and thank you for the invitation to provide the Commission with a couple of presentations this morning. I'm going to be talking a little bit about a recurring national data collection called the

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Census of Publicly Funded Forensic Crime Laboratories, which is conducted by the Bureau of Justice Statistics.

I've been a statistician at BJS for about 16 years. BJS is the statistical branch of the U.S. Department of Justice. Following my presentation, my colleague, Anthony Whyde, will provide an overview of a couple upcoming data collections, one that's going to examine the forensic activity of law enforcement personnel and the second one, which will be a new census of medical examiner and coroner offices.

Just to give you a little bit of background on the project history, in 1998 BJS conducted its first survey of crime laboratories, focusing solely on those agencies that conduct DNA analysis. The National Survey of DNA in Crime Laboratories was repeated again in 2001. As the need for statistics on all types of forensic services grew, BJS expanded the survey of DNA laboratories to include all types of publically-funded crime laboratories.

The Census of Publicly Funded Crime Laboratories provides a snapshot of the workload and operations of crime labs nationwide and the resources devoted to completing the work. This data collection has been conducted four times. The data collection includes all agencies that are solely funded by Government or whose parent organization is a government agency and who employ one or more full-time scientists with a background or natural science or closely-related field, whose primary function is the analysis of physical evidence collected from criminal investigations and who are responsible for reporting on such evidence in courts of law. This census does not include privately-operated facilities or police identification units. So Mr. Whyde will be talking a little bit more about this upcoming survey that BJS will be doing that will be looking more broadly in terms of the forensic activities of law enforcement agencies.

The most recent census was recently completed, and two reports came out of that study. Both are available on the BJS website at: www.BJS.gov. I believe they were also provided to everyone before the meeting today. One of the reports focused on the quality assurance practices within crime laboratories, and the second one looked at the resources and services within crime labs.

In April of 2015, BJS initiated its fourth census of publicly funded crime labs. This data collection focused on the workload and operations of crime labs during 2014. The questionnaire was sent out to a total of 409 federal, state and local crime laboratories; 88%, or 360, of those agencies provided responses to BJS.

BJS developed statistical weights to adjust for labs that didn't provide responses to certain questions or did not respond to the census altogether. These weights were used to produce national estimates to make the data representative of all 409 crime laboratories.

This census also included a pilot test of digital evidence laboratories, which the information collected from that will be very helpful in designing the upcoming survey that will go out to law enforcement agencies on their forensic activities.

In the presentation today, I will talk about some of the key topics from this data collection. The first part of my presentation will discuss resources and services. This includes topics such as staffing; annual operating budgets; the number of requests that were received, completed and backlogged within crime labs; the procedures used to complete the work; and the outsourcing of forensic services.

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The second part of my presentation will talk about quality assurance practices. This includes laboratory accreditations, analyst certifications, written codes of ethics, written standards for performance expectations, and also proficiency testing.

What this table shows here, in 2014 publicly funded crime labs employed an estimated 14,300 full-time personnel, which was an increase from the estimated 11,000 full-time employees working in the 351 crime labs in 2002. Nearly half of the 14,300 crime labs employees are working in state-operated facilities.

In 2014, the typical crime laboratory in the United States employed 35 staff members. So just to provide a breakdown in terms of the types of employees that these crime laboratories included, in 2014 the majority of the employees were forensic analysts or examiners who were responsible for analyzing and reporting on the forensic evidence that was collected during criminal investigations. Managers accounted for an additional 13% of the overall number of full-time employees in crime labs. Clerical supported accounted for another 9% and technical support 7%. Overall, 6% of the full-time crime lab employees were crime scene technicians.

Now, another piece of information that's captured through the census of crime labs is the annual operating budget. The total combined operating budgets among all 409 crime laboratories in 2014 was \$1.7 billion. This was an increase from the estimated total budget of \$1 billion reported by the 351 crime laboratories in 2002.

In addition to asking crime laboratories about their annual operating budgets, information was also asked in terms of whether these crime laboratories charged fees for conducting the forensic services. What was found in 2014 was that about 4 out of 10 charged fees for completing services.

To examine the volume of requests that crime laboratories receive from police, prosecutors, the courts, correctional facilities, the census asked the crime laboratories to provide information on the number of requests that were received in 2014 for each type of forensic discipline that they completed that year. They were also asked to provide information on the number of requests that were completed.

The census also asks crime laboratories to provide information on the number of requests that had been received by the lab but had not yet been completed or that were pending. The census defines a pending request as backlog if it had not been completed for 30 days or longer.

In 2014, the nation's 409 publicly funded crime labs received an estimated 3.8 million requests for forensic services, which was a decline from the estimated 4 million requests received in 2009. It's important to keep in mind that these totals do not include requests that were sent to private laboratories for analysis. Controlled substance analysis, biological samples collected for convicted offenders and from arrestees for DNA database and toxicology accounted for about three out of four of all requests received by crime labs, both in 2009 and 2014. Other types of forensic analysis that were conducted by crime labs included trace evidence, latent prints, questioned documents and impressions.

At the end of 2014, these 409 crime laboratories had an estimated backlog of 570,100 requests for forensic services, which was a decline from the estimated 895,500 backlogged requests at year end 2009.

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This reduction in the backlog was mostly driven by the decline in the backlog for requests to process convicted offender and arrestee samples.

In 2009, there was an increase in this type of work, due to Federal legislation that required the collection of DNA from federal offenders. But after 2009, the FBI Crime Laboratory was able to significantly reduce that backlog. So the backlog that we observe in 2014 has declined because of the decline in that type of work. But in 2014, 37% of the overall backlog was from convicted offender analysis; and an additional 19% came from forensic biology casework.

To address this growing demand for forensic services, the Census of Publicly Funded Crime Labs asked these agencies whether they outsourced any type of forensic work. What we found in 2014 was that 38% reported outsourcing one or more types of forensic services to either a private facility or another public lab. This was an increase from the 28% of crime labs that reported outsourcing work in 2009. This table also shows that county and municipal labs are more likely to outsource forensic requests than federal and state agencies.

So now to shift the presentation to talk about quality assurance practices, the Census of Publicly Funded Crime Labs found that in 2014, 88% of crime labs had some type of accreditation from a professional accreditation body. This was an increase from the 70% of crime labs that reported having accreditation in 2002. Between 2002 and 2014, the overall accreditation rate increased among state, county, municipal and federal laboratories.

This table shows the types of professional accreditations that the labs reported having in 2014. As I mentioned previously, overall 88% of crime labs had some type of accreditation. ASCLAD Lab International was the most common type of accreditation in 2014; 9% of crime labs had ASCLAD legacy accreditation that year, and 1 in 10 crime labs reported accreditation through Forensic Quality Service International or FQSI.

In 2014, 72% of publicly funded crime labs employed at least one forensic examiner who was externally certified by a certification body, such as the American Board of Criminalistics or the International Association for Identification. This was an increase from the 60% of crime labs employing one or more analysts with an external certification in 2009. This data collection also found that an estimated 94% of crime labs had a written code of ethics in 2014. In addition, 70% of crime labs had written standards for performance expectations that year.

In both 2009 and 2014, the Census of Publicly Funded Crime Labs found that the vast majority of these agencies performed some type of proficiency test on its analysts and examiners. The proportion of crime labs that conducted certain types of tests remained consistent between 2009 and 2014. So in 2014, we found that 95% of labs used declare examinations, where the examiner knew the sample that he or she was analyzing was going to be tested. In both 2009 and 2014, about 1 out of 3 crime labs used random case reanalysis, where the examiner's work was randomly selected for reanalysis by another examiner; and about 1 out of 10 crime labs reported finding blind examinations in 2009 and 2014. This is where the examiner was not aware that he or she was being tested.

Now I want to shift the presentation over to my colleague, Anthony Whyde, to talk about a couple of new data collections on BJS from forensic science.

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ANTHONY WHYDE: Good morning, thank you for allowing me to speak today. It's really exciting for me; I appreciate it.

Some upcoming data collections that the Bureau of Justice Statistics will have coming out in the next couple of years include the 2017 LEMAS Forensic Science Supplement and a Census of Medical Examiner and Coroner Offices.

A little overview of my presentation – it's going to be a little bit easier because we don't have data yet, so it should also be a little quicker for you. I'll basically go over each of these upcoming surveys and talk about the purpose, key estimates, and provide either a specific or general schedule if possible.

First of all, the 2017 LEMAS Forensic Science Supplement – I first want to say that LEMAS stands for the Law Enforcement, Management and Administrative Statistics. This is a survey that's been conducted periodically since 1987. The Forensic Science Survey will be a supplement of this survey, which means we'll use the same sampling frame and most likely the same contact sources as a proxy for the law enforcement agency.

The purpose is to understand the scope of forensic activity carried out by law enforcement agencies. From my understanding, there's not a lot we know about this; so this could set a baseline to understand what types of tasks and which disciplines are being carried out at the law enforcement agency level. We'll also explore staffing and agency resources committed to forensic services within law enforcement agencies, and also to learn more about accreditation and certification standards for those engaged in providing forensic services.

The key estimates – I'm having trouble with my clicker, I apologize for that – should be similar to the census of publicly funded labs. We will be getting agency characteristics such as size, number of sworn officers. We also want to understand the scope of forensic activity undertaken within the agency. Most likely, it will be at a discipline level; but we'll also look at task level and, particularly maybe in more detail, at specific disciplines that subject matter experts theorize will be undertaken more at the law enforcement agency level.

Again, we're going to look at staffing, such as the number of overall staff and the use of sworn and non-sworn personnel, particularly in the forensic science activities. Standards -- at a general level, is the agency accredited; at an individual level, what type of training certifications and continuing education are either sought after or required for those positions within the law enforcement agencies? For processing submitted forensic evidence, we're going to identify which labs are used for analysis. We understand that some law enforcement agencies may collect evidence but have someone else analyze that evidence, so we want to track where those are being completed. For agencies that do not have any forensic units or conduct any forensic science activities, we will try to find out who's handling the collection and analysis of those forensic activities.

I have worked a mouse before, but I'm having a little trouble with this one.

So the schedule for the forensic science supplement is a little more well-defined because it's coming this year. Right now, our contract is with RTI; and they are developing the questionnaire. We do have a question list and topic list that's been going around for a couple of years, and so we have a good starting point. Once we have a working draft questionnaire, we will be looking at feasibility and cognitive

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interviewing. Feasibility – we'll send it to some of the contacts and ask are they able to answer the questions that we're asking or who would be the best person to contact within the agency; basically, can you do this as it's prepared and planned? Cognitive interviews get a little bit more into the details of the questions, whether we're using the right terminology if they can provide that kind of evidence and how difficult it would be.

As with most surveys, state and local enforcements are considered members of the public; so we have to get OMB clearance. This process can sometimes be lengthy; but BJS seems to have a really good handle on it, so we anticipate that that will go fairly smoothly and hopefully be completed by August 2017. The data collection will begin in early October of 2017 and last until April 2018. Then there's a processing phase to clean up the data; that will last a couple of months in April to June of 2018. Then we should have a data file to work with to analyze and create reports sometime within June 18 to November 2018. So that's in the plans and we have a fairly set schedule and we're looking forward to getting that work moving.

Also coming up from the Bureau of Justice Statistics is the Census of Medical Examiners and Coroner Offices. As you know, there are approximately 2,400 medical examiner coroner offices that are responsible for determining cause and manner of death at the state and local level. These offices investigate deaths that are sudden and unexpected, and also any that involve a suspicious or violent death.

In 2009, the National Academy of Sciences published *Strengthening Forensic Science in the US: A Path Forward*. This provided a lot of recommendations to improve the quality and practice of medical examiners' and coroners' offices. The survey should be able to provide some insight to either process improvement or further needs within some of those recommendations. The survey will also provide data for the national medical/legal death investigation activities, which can inform policy and decision-making at Federal, state, local, tribal and territorial levels.

Here's a picture of the path report. It's available on the BJS website. Again, this census will replicate those efforts and, from what I'm seeing, maybe add some additional information as well.

Some of the key estimates include collecting data similar to the 2004, so there will be some opportunity for trend analysis. This includes personnel, budgets, workload, and the number of human unidentified decedents handled by the medical examiner and coroner offices; number of examinations performed and autopsies conducted; the forensic capabilities of the offices such as DNA, toxicology, fingerprinting and imaging techniques; which functions are outsourced by the offices; the frequency of testing and case circumstances; and use of the National Missing and Unidentified Persons System.

Other estimates include rationale regarding why certain deaths were referred to the Medical Examiner or Coroner Offices but were not accepted or investigated or autopsied; the number of certified personnel within the offices; accreditation and whether the office is not accredited or will pursue accreditation and perhaps why they are not currently accredited; co-located with medical schools – if the Medical Examiners Offices or Coroner Offices are co-located with medical schools or other agencies and if those resources are shared regionally; and, finally, records and evidence retention policies.

We hope to publish the solicitation in the winter of 2017, which is where we're at now. It's currently not released; but once this is published and awarded, we'll be able to get a more well-defined schedule of tasks and be able to explore in a little bit more detail what's going to be done and when. For now, this is

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just a general schedule. Like I said, hopefully we can award the grant in the spring of this year. Once that's done, the contractor can develop information collection materials; and this includes any pretesting activities. I would say it probably would include OMB clearance and other types of tasks that need to be completed in order to go into data collection.

The data collection process should be in the summer or winter of 2017, so it will move pretty quickly once the grant is awarded. Then data processing in the winter or spring of 2018 and, finally, analysis and reporting should occur within the spring and fall of 2019.

That's all I have about those two upcoming information collections. Is there anything you'd like to add, or should we move to question and answers?

JOHN BUTLER: All right, we have an opportunity for questions of our speakers. Would anyone like to – Randy?

RANDY HANZLICK: Anthony, in the Medical Examiners and Coroners Survey, are you going to collect any information about unfilled positions, turnover, attrition in the forensic pathologist staff and other positions? That's kind of an important issue – how many jobs are typically vacant at any given time, how many people have come and gone in the last five years, what do they expect in terms of retirement? There have been about 1,600 board-certified forensic pathologists since 1950, and about half of those have been in business 30-plus years; so they're going to be like me pretty soon and not working. It would be nice to collect some information about that, if you could.

Then I wondered if for Matt, the same questions for the crime lab statistics – how many people trained and then leave for private sector jobs; how much turnover is there in that side of the business?

MATT DUROSE: We appreciate your comments. The Census of Publicly Funded Crime Labs is something we repeat every few years, so there are certain core questions that we like to stick to, to provide trends; but we also try to take the opportunity to try to add new questions that we think will be helpful for the field. So as we get more into the design phase for that project, we can kind of take all of these suggestions in terms of information that will be helpful in the field and try to incorporate them.

Like Anthony mentioned, when you add new questions, it's important to do good testing and make sure that we can get reliable and accurate information first; and we also have to balance things in terms of burden. But it's very helpful to hear from the field in terms of the types of information that would be useful for them to do their work.

Did you want add something?

ANTHONY WHYDE: No, I think that's perfect. I know there is also a public comment part when it is presented with OMB, and so those comments can also be shared. I'm not familiar with what's been exactly done on the Medical Examiner as far as the personnel section, but I do know some of the recommendations were to improve forensic pathologists and maybe even offer enticements to go into that field of work. So I know that is important.

I can get back to you and share the questionnaire if you'd like to see what's being asked specifically.

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RANDY HANZLICK: That would be nice; thank you for that.

JOHN BUTLER: Greg, I think you're next.

GREGORY MOTTA: Is that working? Good.

I have a question just about the methodology for Mr. Durose. What was the nature of the solicitation? Because one issue was some people considered their services activities to be a laboratory, some as forensic, some consider it not to be forensic. So what was your methodology? Did you just write and say, "Do you have what you call a crime lab," or how did you survey the departments to make sure that you were getting a response of services from police departments, for instance, that did the criminalysis but didn't deem it to be a laboratory?

Especially because I think that we were tasked with this before the amendment charter, did your survey – and I apologize if I missed this – but did your survey exclude digital evidence and multimedia? Did you query about taskforces? Because there's a big divide between investigative taskforces that do digital forensics and then ASCLAD-accredited digital forensics laboratories. So if you could just explain what those numbers represent in your solicitation process to know what you captured and didn't in the process.

MATT DUROSE: Sure, so going back to the beginning of the project history, I mentioned that there was a survey that just focused on DNA laboratories; and then in 2002, BJS worked with ASCLAD. I believe there was also a partnership with the National Forensic Science Technology Center to expand the data collection out to capture more types of forensic work besides DNA analysis. So when they developed a roster for that, they used a number of information resources include ASCLAD's membership list, information from the National Forensic Science Technology Center, other available information. There was also information that BJS had collected at the time, some limited information in terms of which police departments have forensic crime laboratories. So it was kind of a combination to identify the crime laboratories.

Now moving forward, the definition is somewhat limited because it's only looking at laboratories that employ examiners with background in natural sciences. So what we're trying to do now, especially with the survey that Anthony talked about, is tried to expand that because we know now that forensic service providers kind of go beyond what would be this traditional project definition of a crime laboratory.

Another thing we did – because you're right, when you're staying within that scope in terms of crime laboratories, it does limit the types of information you collect on digital evidence because a lot of the people that work on that do not have this type of background that I described, like a background in a natural science. So we did a small pilot test that was part of this Census of Publicly Funded Crime Labs, where we were able to identify the Federal and State agencies that solely process digital evidence. That would include the FBI's regional computer laboratory.

I think what we're trying to do now is trying to shift gears more towards kind of the modern forensic crime laboratory and realizing that that project definition is somewhat limited in terms of the work that's being done with fingerprinting and controlled substance analysis and digital evidence and other types of disciplines. So that's been kind of the process over the years; it was kind of being limited to examiners that had a background in a natural science. But a lot of these labs also conducted different types of forensic analyses, so it did go beyond the natural sciences to a certain extent.

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GREGORY MOTTA: If I could just follow up, John.

I guess the first part is, it was not that a solicitation was sent out to the 55,000 law enforcement agencies in the country; it was starting from a selected list. And the solicitation was self-selective in terms of whether or not you responded to a question about does your department provide the following services. Is that accurate?

MATT DUROSE: Well, if you had at least one or more scientists with a minimum of bachelor's degree in either chemistry or physics or biology or some closely-related natural science – so it's somewhat limited because the project definition coming off of the survey of the DNA laboratories and expanded it out to more crime laboratories. But it is certainly somewhat more limited in terms of what we would get from sending out a survey, like BJS is planning to do a sample of all police departments and asking about the work when they collect the evidence and then where does that evidence go to be analyzed.

GREGORY MOTTA: Okay, thank you.

JOHN BUTLER: All right – Phil, Jules and then Cecilia.

PHIL PULASKI: So if a police department has a crime scene unit and the people go out and they collect evidence – and it may be called something else, it may not be called a crime scene unit – but they're out collecting evidence. And the people who collect the evidence also do chemical processing of the evidence, which traditionally can be a laboratory but it happens out in the field and can be done in the field quite well. Does that get picked up on the survey?

MATT DUROSE: The Census of Publicly Funded Crime Labs would not include either the police identification units or these crime scene units that would be primarily responsible for the collection and processing of evidence collected directly from the crime scene.

PHIL PULASKI: So then the second piece of the question, which would be the same answer, but would be now you have crime scene units that pick up evidence. They don't necessarily chemically process it; it's a lift. But they'll do an examination and a lift, and they'll do a latent print comparison or enter the unknown latent into AFIS. Does any survey pick that up?

MATT DUROSE: Not the Census of Publicly Funded Crime Laboratories, but the new data collection that Anthony described would capture everything from the beginning of when the evidence is collected and track it kind of in terms of where it goes.

PHIL PULASKI: So in the questions, they'll be able to discern that difference because that does take a traditional "I collect evidence crime scene unit." If it's chemical development, then it changes it slightly; and if there's a latent print comparison, not necessarily chemical development, that is truly important. So that survey will pick it up – great.

MATT DUROSE: That's my understanding.

Is that right, Anthony?

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ANTHONY WHYDE: Yeah, I believe you're correct. The survey was developed using the publicly-funded sort of construct, where we're screening into disciplines and specific tasks. Right now, we're kind of working with Dr. McGrath and some other subject matter experts to determine what are the exact disciplines that need to go into more detail and what are the specific tasks that need to be well-defined or thought through, especially when you're considering a law enforcement agency. So hopefully we get that correct, and at a high level we're able to determine whether law enforcement agencies doing either or both.

PHIL PULASKI: Thanks.

JOHN BUTLER: Jules, Cecilia and then Bill.

JULES EPSTEIN: Good morning and thank you. My questions go to the BJS study of crime labs and financing, and it's got two parts. If I recall correctly, there was a slide that said something about financing had gone up from \$1 billion to \$1.7 billion over X years. Did I get that data point right?

MATT DUROSE: Yes, sir, that's correct. In 2002, the census included 351 crime laboratories; and their combined operating budgets was an estimated \$1 billion. Now, in 2014, the census included 409 crime laboratories; and their combined operating budget was about \$1.7 billion.

JULES EPSTEIN: And that's not inflation adjusted at all, so it sounds like we're spending almost less per lab. I haven't done quite the numbers; but certainly, considering inflation, it doesn't sound like it's kept up. Do you have a sense of that? In other words, were those numbers teased out more?

MATT DUROSE: Yes, I think we did try to take a look at the different ways to account for inflation; but the information I talked about in terms of the estimate in 2002 was kind of basically how it was reported that year.

JULES EPSTEIN: All right, so my second question goes to the thing about charging fees. Are fees separate from that budget number? In other words, we get X in the budget; but in addition, we charge fees – or are the fees rolled in? I have a follow-up. I want to make clear why I'm asking about this.

MATT DUROSE: Did you have a--?

JULES EPSTEIN: So the linked question to that is I assume that the people who pay the fees – at least I've seen this in some jurisdictions – they're assessed on the convicted defendants, who are all too often indigent, which means one of two things – either they get soaked it while they're in jail, like \$2 a week, and come out of jail with a financial burden; or it's an illusion that the labs are saying we charge these fees but we're not getting it. I'm trying to figure out how all that works and also what that does in terms of incentivizing testing; but my big concern is who's paying the fees, and are they actually getting them?

MATT DUROSE: Just to clarify, the total reported for budget would include the allocated budget as well as other sources, such as fees and grants and things from other special one-time projects.

JULES EPSTEIN: Do we know who the fees are assessed on and what collections exactly—

GERALD LaPORTE: Jules, I think I can answer that question for you.

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JULES EPSTEIN: Great.

GERALD LaPORTE: Because we deal with this all the time. So you might have a county laboratory that will charge the surrounding counties to do testing. So they won't charge within their county, but they'll charge for the surrounding counties. Generally speaking, most of the program income that we see does not generate a profit at all; they do it at cost.

JULES EPSTEIN: I'm not suggesting a profit. I just see that on defendants' transcripts or sentencing dockets – that fees are added. I'm trying to figure out if we know anything about that; and the answer I get – nothing critical -- the answer is no, so thank you.

MATT DUROSE: Like Gerry mentioned, just charging the submitting agency the fee.

JULES EPSTEIN: And then we don't know farther down the line.

MATT DUROSE: Right.

JULES EPSTEIN: Got it, thanks.

JOHN BUTLER: Cecilia and then Bill.

CECILIA CROUSE: Thank you for the survey; I really appreciate it. We always take it to our upper management in the crime laboratory. In Palm Beach County, we're actually sitting in a pretty good spot as far as support; and this always helps as well.

But I did have a question, and mine is mainly because I'm not quite sure how these are always put together or analyzed. But there were 409 eligible crime labs that received the questionnaire, and 360 provided responses. If you go to the first page of the Resources and Services, it talks about the \$3.8 million request for forensic services for 409 crime labs. So how does that work?

MATT DUROSE: Sure, what we did was we used some imputation procedures to generate these national estimates for the crime labs that did not respond. So the methodology section of the report gets into a little bit of the details; but basically, statistical weights were created to account for the labs that didn't respond. Those were based on using the data received from labs of similar size and jurisdiction. So the numbers that are presented here are estimates that would account for the missing data and a couple of different ways that the missing data are adjusted for these reports.

CECILIA CROUSE: Okay, I appreciate that.

My second question is, with regard to the \$3.8 million request that was down from 2009, was there any consideration given to the number of crime laboratories that have case submission policies and how that would affect that number?

MATT DUROSE: We didn't collect any information on that; I mean, there are a lot of possibilities in terms of why there might have been a decline. We also noticed an increase in the labs that were reporting

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that they were outsourcing requests for services. But the point you made, we wouldn't really have any specific information on the policies and how that might impact our workload.

CECILIA CROUSE: Okay, thank you.

JOHN BUTLER: Bill?

WILLIAM THOMPSON: There are lots of very intriguing findings in here. I'm wondering, is your dataset publicly available or available to academics who may want to break the data down in a different way?

MATT DUROSE: Yes, it is. Every dataset that we use for our reports is put up at the National Archives of Criminal Justice Data. So we'll have the dataset and code book; that will all be available to the public very shortly. So I can take your contact information; and once that information is posted – the dataset is still kind of being processed -- but once it's available, we can let you know how to access it yourself and do your own research with it.

WILLIAM THOMPSON: That would be great. Did you promise these labs confidentiality, or are they identified in the data?

MATT DUROSE: Well, if somebody is going to access the data at the National Archives of Criminal Justice Data, they have to agree to a certain set of conditions. One is that the data will only be used for research purposes and not to identify individual laboratories.

WILLIAM THOMPSON: Okay, but for example, some of the labs are doing this blinded testing. If I was interested in figuring out which labs are those and what are their characteristics, would I be able to do that?

MATT DUROSE: I'm not sure the questionnaire included in anything specifically on that; but within the questionnaire, which is also provided as part of the code book, you can kind of see what questions were asked and then let you know what's available to analyze.

WILLIAM THOMPSON: Okay, thank you.

JOHN BUTLER: Go ahead, Troy.

TROY LAWRENCE: I have a question about the upcoming survey that you're going to be doing. I come from the digital evidence world, so I'm very curious. Are you going to be measuring how many of them are doing it part-time? Because a lot of the forensic examiners carry caseloads and do the examinations at the same time. So I'd like to know how many of them are full-time examiners, and how many of them are just part-time examiners and part-time investigators.

Also, when you send these surveys out to the different police departments, I assume you're including the sheriff's offices as well because they do it. But I'm curious; are you sending it just to the Chief of Police, or can there be multiple contacts at each department? Because if it goes to my Chief, he'll forward it to the crime lab. We don't work in the crime lab, and so we won't ever get surveyed. So I want to make sure you

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get the actual digital evidence people that are doing the work and not the crime lab that would hog it and answer the questions for us.

ANTHONY WHYDE: The first part of the question – full-time or part-time – we will screen them into certain sections, and digital evidence will obviously be one of the more important sections. Then if they say they do any work in there that asks more detail about the personnel, I'll have to check about whether we ask like the number of hours. I know we do ask if they're certified and how many hours of training they receive and other details, but I forget right now if we ask them whether they're determined as full-time or part-time on a specific staff. So I'll have to follow up with you on that one.

When the survey does go out – and my main contact is in the room, so if I'm wrong please let me know – I believe the initial contact is always sent to the Chief or the main person; and then that is distributed internally with who can best answer the question as a proxy for the selected law enforcement agency.

TROY LAWRENCE: Can we get some kind of notice when this goes out so we can know to hit the Chief and say, "If you get this, let us know"?

ANTHONY WHYDE: Yes, I believe that's possible.

JOHN BUTLER: Okay, are there any further questions from anyone?

Thank you very much.

(Applause)

MATT DUROSE: Thank you.

ANTHONY WHYDE: Thank you.

JOHN BUTLER: Instead of taking a break right now, we're going to go right into the Research Panel, so we'd like to invite the speakers up. Unfortunately, Nick Petracois ill – caught the bug that some of the other Commissioners caught yesterday, I guess; and so we only will have the speakers listed -- Bob Gaensslen, Gerry LaPorte, Rebecca Ferrell and Jose Almirall.

(Pause)

So today we're going to be going into research issues, and we had a chance to hear scientific foundations yesterday, some of the issues that are involved and the research review of some of the things that will be going on to try to resolve some of those things, I believe, and kind of share what some of the challenges are in this area.

Our first speaker is Bob Gaensslen, who is retired from the University of Illinois at Chicago and formerly – as mentioned by Michael Peat yesterday – former Editor of *Journal of Forensic Sciences*.

BOB GAENSSLEN: Thank you, it's really a pleasure to be here; and I'm honored to be able to speak to a group like this.

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I think I'm here in two contexts sort of. I've had a lot of experience in three different programs, and so we're talking about academic infrastructure in that context, and then a little bit at the end about the *Journal of Forensic Sciences* back in the day that Michael didn't talk about yesterday.

You probably have some idea about what the academic picture of programs is in the United States by now. A lot of the programs are Bachelor's level, and they're mostly not in places that are heavily research-oriented or have a lot of research infrastructure. Many of the people who run those programs didn't come from heavily-researched infrastructure places either, so that's sort of an issue.

Also, there's another class of programs where you have Bachelor's and Master's programs together. New Haven is one of those, and there are many others. There are a handful of Ph.D. programs, not too many; some of them are in forensic science, and some others are in traditional disciplines with a forensic focus. Those are in places where there is an essentially good research infrastructure.

So the problem with us is most of the faculties are pretty small. There are a few exceptions; the few of the places that do a lot of the research are exceptions. It's pretty hard to put a faculty together that covers all the areas of even criminalistics, never mind anthropology and medicine and dentistry and all the other disciplines that get talked about. So I'm mostly talking about criminalistics; let's say that's drug chemistry, biology DNA, and trace for the most part, and pattern evidence – fingerprints, handwriting, firearms, footwear, that sort of thing. That's all criminalistics. I'm not talking about anthropology or any other things which require doctorates, and I'm not talking about European institutions either – just America.

I have been at John Jay; I started at John Jay. John Jay had just moved out of the Police Academy when I got there; this was in 1970, quite a long time ago, brand new college, part of the University of New York. We were in an office building on Park Avenue South – no labs, no anything infrastructure – just here you are; and it was the first year of open enrollment in the City of University of New York, which meant if you had a high school diploma, you could go to the University of New York. So we had about 8,000 brand new students to teach.

This kind of a place – teaching is a very big thing. Teaching loads are heavy; there's not a lot of time for research. But John Jay has come a long ways as you know; Nick isn't here, but you know John Jay has come a long way since that time. After that, I came here for a couple of years as a visiting fellow to the National Institute of Justice. I might have been the first non-social scientist visiting fellow; I'm not sure, but maybe. A visiting fellow is somebody who comes here to Washington to the Institute to do a project of some sort; there are all sorts of different projects that can be done. I was writing; that was my project, but there were other people here – political scientists and different people. And you stay here, you live here, and you essentially receive a stipend from the Institute to be here for a year or two or sometimes a little bit more.

That was a good experience, and so I got to know the Institute a little bit. Then I went up to New Haven, and I stayed up there for almost 20 years. New Haven is a teaching institution. It has bachelor's and master's programs. It's pretty good educationally – trained a lot of good people up there; but it's hard to do research in a place like that. There is almost no research infrastructure up there. I was my own Radiation Safety Officer to give you a silly example. You want to use P-32? Go talk to the NRC and get a license. So we face a lot of these kinds of problems.

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The last place I went was to Illinois to the Chicago campus. The forensic science program had moved from the east side, the undergraduate side of the Chicago campus, over to the medical school. So that was a big fortunate thing for me and for the program, I think. We ended up in pharmacy, which sounds absurd; but everybody thought, oh well, it's related to toxicology, let's put it there. So my predecessor chose Pharmacy, and it was David Stoney. Some of you know who David Stoney is, and that's where it ended up. So when I got to Illinois, that's where it was.

Anyway, all of this background leads me to think that the answer to some of this kind of lack of resources in the academic programs should make us think a lot about collaboration. And so over the years, we've tried to collaborate between ourselves. When I was in New Haven, I collaborated with Dave Stoney in Illinois, both for educational and research purposes. And Chicago turns out to be a very good place to do forensic science. McCrone Research Institute is there; Argonne is there; Internal Revenue Service National Chemistry Center is there. There are a lot of things there that can be tapped into, and those resources are available to help out students in instruction; but they're also available to help out with research projects. So I like the idea of collaboration, and we did quite a lot of it.

Another factor, which I think is positive, is there's a big Midwest forensic science research center at Ames Lab in Iowa. I think this was probably an earmark at some point, but it doesn't matter. They pulled together a lot of stuff, and they gave many grants out in the Midwest and pulled together scientists for conferences and conventions and research and things like that. That's a very useful thing to have around; and as far as I know, they're still there. So that's what I have to say about the academic infrastructure thing.

There are people in non-forensic science programs, who don't necessarily run a forensic science program, who have interest in forensic science; and they can be part of this whole thing too. It's a matter of hooking people up and having the right relationships. NIJ does this; they already do it. I mean you see this in grant applications; you see this in a lot of different respects, and it's all positive I think.

The other thing I want to say about – well, I want to say two things about NIJ. In general, I've had a lot of dealings with the Agency over the years, and I'm mostly positive on the Agency. Recently, they went to a three-year term for the review panels. Jose and I were on one of these. I really like this; this is kind of along the lines of NIH study sections. So there is sort of an institutional memory in the study section; they call it review panels. So sometimes people get turned down, and they get their comments back and they reapply; now the same people get to see this again. If it's a new panel, all that institutional memory disappears. So I really like this idea a lot, and I assume it's still going on. I'm sort of not there anymore.

The other thing is grad student support has been really helpful for the forensic people from NIJ. So anything more they can do to help the graduate students out and help graduate education, that would be all a good thing I think.

Just a couple of notes about the *Journal of Forensic Sciences*. I was editor in the '90s when DNA was burning up the world. So the questions people said I should talk about are validation. What do you do with validations? The usual reason editors give for not wanting to publish validations is that there's nothing original about a validation; it's not hypothesis-driven. And that's true; it's not. But I think the forensic journals, for the most part, have been very responsive to publishing validations – ourselves and *Forensic Science International*. I've reviewed for them for a long time, and I think they adopt basically the same stance on this.

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So we did publish validations. We have a category called "Technical Communication" or the "Technical Note," and that's where they went. I was fine with that. This was all peer-reviewed, and so this was driven by penal court decisions – the Frye Decision originally and the Frye-plus that came after it – and then Daubert, where the courts wanted to see things published. So this was fine, and so we published this kind of stuff. If it wasn't too trivial, we would publish it.

The other thing we did for a while was there was a lot of population data floating around. Everybody kept sending in population data; this was like the big deal. So for a while, we treated those as technical notes and we got almost overwhelmed; some issues we'd have 13 or 14 population studies. So I decided what we should do is put that in a separate category, which we did; and I didn't want to have to peer review every one of those things. So we just did a quick and dirty peer review on them to see if the data actually made sense, and we put them in a category called "For the Record." When we did this, I said editorially, "I hope this will lead to somebody starting a data bank for this. I'd love to see a data bank, along the lines of GenBank, where people can put data in and the system automatically checks it to see if it makes sense and people can access it and mess with it and all that because that's what people said they wanted. I don't know if this is an issue anymore, but it was then. I don't think the database ever came into being either.

Anyway, Michael stopped that eventually because you can get overwhelmed with that kind of stuff and use up all your pages publishing population data for Hunan, China that nobody cares about.

The genetics section of *Forensic Science International* – they split their genetics part out as a separate publication – they still have a population genetics piece. You can send it to them in Europe.

The last thing was what do we do with negative results. I think it's context-dependent. If you just say I tried "A" and "A" didn't work; I'm probably not going to publish that; but if you say, "A" didn't work, but I tried it against "B" and "C," and "B" works better than "C" and "A" doesn't work at all, that will get published probably if it's otherwise okay. So it depends on how it's presented. Reproducibility is a big thing in science; so if somebody just simply tries to reproduce something that someone else did and it doesn't work, that's going to be a tough one. But the way I would handle that when I was editor was just write me a letter; I'll publish your letter. It's out there; people can read it, and that's probably about the best we can do.

I don't know how other editors handle that. Everybody says it's a big deal – reproducibility; it's not done very much. I mean, not very many attempts are made to reproduce something unless it's really something very hot and important; but it does happen. I don't know how big journals and high-impact journals handle that.

Well, thank you, and I'll turn to – is it Gerry next?

JOHN BUTLER: Do we want to take one or two questions just for Bob really quick before we go on? We can do that; go ahead, Phil.

PHIL PULASKI: Thanks, Bob, great presentation. I have a question in terms of education. So Nick Petraco and I are buddies – I wish he was here -- and we work together; and I have an affiliation with John Jay – Dr. Pizzola, Dr. (inaudible). And I considered it to be a significant loss when the type of science they would do, that I'll call "**CRIMINALISTICS**," all caps, bold/underlined, began to be

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replaced by instrumentation. It seemed like instrumentation wasn't supplementing that, that it was replacing that. And the value of what Chris Palenik called it yesterday, which is extremely valuable to an investigator, and the idea of being able to take someone like Chris and his dad Skip, yourself, Dr. Pizzola, Dr. (inaudible), and bring my investigators to just sit with them to just logically go through a case and see associations that an investigator might not see -- that was very, very, very, very valuable and it seems to have been replaced by instrumentation.

So the value of having someone compare an unknown glass sample with a known glass sample is very probative, so long as the testimony doesn't exceed the scope of the examination. But is there any move afoot to try to kind of get back maybe a little bit more -- or maybe this is happening and I'm just not seeing it -- to the days of the general criminalist to be able to take a case and look at all the components and help, from an investigative lead standpoint, to pull that together?

BOB GAENSSLEN: I don't think I'm seeing it either, and it is a shame; it's a loss. I completely agree with you. I probably wouldn't have 20 years ago, oddly; but I do now. I think this stuff is pretty important. I think we can get information from trace, even if it's not totally definitive information -- just as he said yesterday.

PHIL PULASKI: That's still very probative. I believe it has testimonial value provided that whoever is doing the direct examination doesn't cause my examiner to go right to the edge and then sometimes walk over the edge.

BOB GAENSSLEN: Exactly.

PHIL PULASKI: But, yeah, it's got value as testimonial evidence; but its investigative value is just remarkable.

BOB GAENSSLEN: I've been in very large laboratory systems. I had the opportunity to work with the Chicago, Illinois State Police Lab for quite a long time. In a lab that size, where they're taking in close to 7,000 cases a month, things have to be pretty automated; and it's mostly drug cases by the way. It's probably 85% controlled substances. By the way, the labs are just simply overwhelmed with controlled substances cases if nobody's gotten that before -- I mean, just snowed. So that's bad for what we're talking about because there are no resources left over to do this sort of thing.

But in Connecticut, I worked with Henry Lee for a while; and he had this same philosophy as Pete, as DeForest. They used to have kind of morbidity and mortality meetings about cases -- you know, what are we going to do with this case? What's important in this case? Where should this stuff go? What should we look at?

They sort of -- I don't know, what would you say -- triage the evidence, like this is important and this isn't. So we don't have to work everything here; we have to work the stuff that will help the police solve the case. That's what is important, and that works pretty well. It was a much, much smaller lab -- maybe 20 scientists; whereas in Illinois, you were dealing with probably 300 scientists in the building. So it's just a different world. But I really agree that somebody needs to work the case, not just the evidence; I guess that's the bottom line, yeah.

JOHN BUTLER: Thank you. We'll have time for more questions for Bob after all the other speakers.

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Go ahead, Gerry.

GERALD LaPORTE: Thanks, John.

First of all, I want to say I'm very humbled to actually be on the same panel as Dr. Gaensslen. I don't know if he knows this or remembers this, but when I was in graduate school back in 1992, he was brought in for a week to lecture us and cross-examine us on some lock evidence that we worked. It was actually a great learning experience, and I mean this truly and honestly – he's probably one of the most memorable people that I've ever had teach me, and I learned a lot from that whole thing. Then sort of after that, there was this big thing called the O.J. Simpson trial, which kind of carried over from all of that; so I think that's where all the memories come from – anyway, great sitting next to him.

Where's the clicker?

First of all, I'll put up the default slide. Anything that I say, any opinions that I give, are my opinions and not those of the National Institute of Justice or the Department of Justice, although this presentation is mostly factual.

I saw this in an article in *Nature* in December; I thought it was pretty interesting. I won't read it; I'll just let you all read it.

(Pause)

I think what was interesting is if you're from the world of forensic science, the actual title of the article, which is "Post Publication Scrutiny of Papers is Essential for Science, but It Should be Done Politely." I think that's something that us in the forensic science world don't necessarily usually encounter, but I think this is a really good takeaway point. By the way, I'll just sort of put a plug in for NIJ. NIJ research has made *Nature and Science* this year in about three or four articles, which is a great boon to our program.

NIJ is the lead federal agency for forensic science research and the development, as well as the administration of programs that are dedicated or with objectives to improve laboratory efficiency, reduce backlogs, and then provide technical assistance to the forensic science field. As you can see up there – and probably this goes back about 15 years – so in the past 15 years, we've funded about 722 projects totaling about \$284 million. So my goal is to retire once we hit \$400 million, which should be about six years or so. Once we hit that \$400 million, then I'm done. I hope my boss isn't in the room.

Pretty simple vision – the vision is justice through sound science, scientists, and forensic practice. So if we have good scientists, good science and then good practice – all of it – put it all together, and you get really good justice from all of that.

The problem is when you have a problem with only one of those, it causes a problem throughout the whole system. So you've got to have good science; you've got to have good scientists; and you've got to be doing it the right way. Those are three kind of separate particular areas, so the programs I'm going to discuss today are going to really be focused on science and scientists, not necessarily the forensic practice.

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Then the mission is pretty simple: Advance forensic science by supporting research and innovation to protect the public and ensure justice for all. Commonly, a lot of people think of forensic science as being a reaction to a crime that has occurred. A lot of people don't really think of it as being proactive in terms of making sure that the bad person goes through their due process, a good person doesn't go to jail, all of that. Then in the end, it's all about creating safety for our nation in the end. So that's how I view forensic science – is that it's not just a reaction, but hopefully the work that we do is actually making our society safer in the end.

The one thing I wanted to talk about very quickly is that in 2013, Attorney General Eric Holder issued a scientific and research integrity policy; and part of that policy really called out NIJ. He blessed the independence of NIJ in that memorandum. A lot of people don't realize this, but all decisions related to research and development stop at the level of the NIJ Director. There's absolutely no control/no input from the Department outside of the National Institute of Justice. We retain all control over the timing and content of research projects. We're not told what to do, what to fund, whether or not to hold back certain reports. We've issued reports about high error rates in specific disciplines and specific methods, but all of that stops at the NIJ level; it doesn't go any higher than that. So we have complete independence when it comes to research and development.

A little bit about the process – it's a dynamic process. One of the things that we do, kind of where it starts, is we identify the needs. We get this from practitioners, where they identify what the problems are, where they're struggling, and what the challenges are. Then, with that information, we develop a research agenda. Then we put out a solicitation; and we hope, or the goal is, that for researchers we'll find ways through research to address those needs that have been identified by the forensic science community.

So like I said, it's a very dynamic process. We're continually evaluating research; we're evaluating the research results; then we're trying to disseminate that to the field; and then we're trying to figure out how that impacts in the field. Then we kind of back around every year, and then we continue to look at the gaps that need to be filled. So like I said, it's kind of an ongoing process; but keep in mind that slide in the beginning that generally in my experience, whenever you do research and you have a question, you usually come out of the research with three additional questions or more questions. Research just opens the door for more to find out about.

So the first program that I'm going to talk about is what I would call our big forensic science and research development program. This solicitation, which is currently live – it was opened on November 18th, and it will close on February 28th – the idea is to fund proposals for basic or applied research and development projects really with two main goals. One of them is to increase the body of knowledge to guide and inform forensic science policy and practice, and then also to use the results from those studies for materials, devices, systems, new methods, and any kind of potential for forensic science applications. It is our biggest program by far with respect to research and development.

So if you look at the funding levels over the past few years, we really started increasing the amount of funding in research and development. I took over the office in 2013, and then my commitment was to really start to boost up the amount of research and development funding. I don't want to get into my budget, how we make decisions, because that's about a two-hour discussion; but all I can say is trust me when I say I put every single available nickel that I have into research and development every year.

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I'm one of those little scavenger fishes that swims next to the shark; and whatever money comes flying at me, I grab it fast. I do everything I can to put as much as I can into research and development while balancing a portfolio of about \$125 million. Well, we get an appropriation of \$125 million; we actually see about \$107 million after everything else; but I do everything I can. I work with the research and development team. I push them to nickel and dime as much as we can out of proposals. We go to our PIs all the time and say, hey, can you cut down a couple of these trips in your budget? We do everything possible to try and fund whatever we can.

We do actually have a pretty good funding rate though, as you can see on the right graphic. About 23% of applicants do receive funding. I don't know if it's just a trend or identified on the issue; but in 2012, we really saw an uptick in applications. But that was one of the years that we had very little money for research and development. So I don't know if there's sort of a little effect, where people thought, oh gosh, I applied and I didn't get anything; but we kind of expect a little bit more of an uptick to come because our percentages for awardees is going up as well too.

If you look at our portfolio, the big blue piece of pie is DNA; and then it's divided up with everything else. So that's the big pie chart on the left. We don't necessarily target, if you will, a specific amount or a specific discipline because our solicitation is wide open; and we go on the merits of the proposal, and we go based on peer review. We have a rigorous peer review process, and we highly depend on what comes from that peer review.

The chart on the right is kind of interesting. There are a lot of misconceptions about what NIJ funds. If you see, most of our funding actually goes to academic institutions, FFRDCs, nonprofits, profits Only about 4% of funding from this solicitation actually goes to laboratories. So we fund – I don't want to call it certain institutions, but Stanfords and Yales and Harvards and all that; we fund a lot of top-notch academic institutions.

I'm going to talk a little bit about our four portfolios. We basically have four portfolios; I have four R&D scientists, each of them runs a portfolio. So this is a great slide when I explain it to you; at first, it looks a little noisy. So this is our Forensic Biology and DNA R&D portfolio. If you look at the bottom, the red bricks on the bottom are more foundational projects that are related to DNA. Then you have a green pipeline, so a lot of those projects are focused on the flow of DNA, the procedures that are used, the methodologies in the lab and so forth. Then the cloud represents projects that could result in potential paradigm shifts in serology, screening or DNA analysis; so those are things that are just kind of out there. We hope to see, like I said, maybe some sort of paradigm shift in the future where we're funding things that are new technology and those sorts of things.

The Medical/Legal Death Investigation and Crime Scene Investigation portfolio – we've got approximately 90 projects in here, about \$37 million. This includes forensic anthropology, forensic pathology, crime scene investigation, and then other MDI disciplines. This is just kind of a word cloud based on about 90 abstracts; it's just to kind of give you an idea. I'm trying to give you sort of the 50,000-foot view because I could talk about each one of these portfolios for – I could spend 20 minutes on each one of them.

The next one is Controlled Substances and Toxicology. This is a very dynamic portfolio. It goes all over the place, as you can see; but there are big differences between controlled substance analysis and toxicology. A lot of people think they're kind of the same, but they're truly very, very different; and we're

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looking at some specific areas and looking at different matrices for testing, such as hair and oral fluids, those kinds of things. Of course there is some emphasis on opiates in this portfolio as well too and synthetic drugs.

Then we have the Impression and Pattern Evidence areas, which is lumped in with trace evidence as well. So really the five impression and pattern evidence areas that we focus on are firearms and tool marks, footwear and tire impressions, question documents, blood stain pattern analysis. Those are the bigger areas that we focus on, and then we have a trace evidence portfolio in there as well too. It just happens that I have limited resources with respect to my staff. I wish we could have another individual that really handled just the trace chemistry part of it too, but I've got a very well-qualified person that handles this portfolio and can handle the diversity of it.

Then we developed a new solicitation a few years ago, and this is research and evaluation for the testing/interpretation of physical evidence in publicly funded forensic laboratories. This was a new solicitation, specifically designed for labs for process improvement. It's not intended to be basic science, if you will; but it's more about understanding what happens in your laboratory, validation protocols that can be published, a full host of different things – business process-type decisions that can be made. But this is also the solicitation where we included post-doctoral fellowships as well too.

One of the things that we are trying to do is we're trying to facilitate a research culture in laboratories as well, too. So we're trying to provide those resources to forensic laboratories for them to bring in postdoctoral fellows to bring more science into the laboratory. So that's one of the hopefully intended consequences from that in the future. It's only a couple of years old; we're going into our third year with this one. Actually, this solicitation was released on December 29th, and it closes on February 7th. That's just kind of pie chart to show the different disciplines that we're seeing things in – so not a huge portfolio at this point in time; but we'll see what happens this year.

Then the Graduate Research Fellowship Program in Science, Technology, Engineering and Mathematics is one of our fastest-growing programs. We commit about \$1.5 million a year to this. We give out \$50,000 stipends which is, I think, one of the higher amounts of all of the science agencies. So we did do that on purpose to try and make it more enticing. It's at a point now where we're sort of maxed out for the number of GRF-STEM folks that we can bring in. We fund them for a period of three years, so that's up to \$150,000 for a graduate student.

This program has a few different objectives or really two main objectives. It's all about bringing in scientists and introducing them into the world of forensic science. The purpose of this program is not to necessarily recruit scientists from broader fields like biology, chemistry, physics and mathematics and have them come and work in a laboratory; that's not what this program is about. It's about really bringing these folks in and introducing them into the world of forensic science; and then hopefully, as they progress in their careers, then they start to think more about forensic science and how their science may be applied to that.

Finally, we collaborate with a number of Federal agencies. I love working with my NIST folks, and we have a collaboration with NSF. I think Rebecca is probably going to talk about that a little bit more. Just some numbers from just this year – we awarded NIST \$900,000 for a forensic firearms research database and firearms imaging metrological standards study. NIST commonly applies through our competitive solicitation. We've awarded NIST probably a little more than \$20 million in the past five years.

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We also entered into an interagency agreement with the FBI, and they're working on the development of a national footwear database. We've also provided funds to DOD through an interagency agreement over the past few years that have totaled a little over \$1 million as well too.

Finally, I just want to sincerely thank my research and development team, Greg Dutton, Danielle McLeod-Henning, Minh Nguyen and Frances Scott. They're actually so invaluable to me. They run the whole show, and I just kind of stand back and watch.

Also, I actually wanted to thank the Commission publicly. There are a lot of things that are said in here. There are a lot of really good comments that come from folks in here that I take back to the group and to the team. We try and build a lot of the things into our solicitations. We try and take all of this in and use it productively. So I do want to personally thank the Commission for a lot of the input that we've gotten to sort of steer in our direction.

Then I also wanted to personally thank the American Society of Crime Lab Directors, ASCLAD. They've been extremely supportive of our efforts in research and development, and I think they truly recognize the benefits of this. So I do want to publicly thank ASCLAD; they've been very supportive of the program.

JOHN BUTLER: Thank you, Gerry. Do we have one or two questions? We'll have time for more questions at the end of the whole panel.

Cecilia?

CECILIA CROUSE: Thank you, Gerry. That was very informative, and I definitely appreciate all of the work that you guys do.

What I was wondering is, we had a discussion several times actually over the last couple of years that had directly to do with the publication of results from grants; and I was waiting for you to present how – well, maybe the percent because when you send out the PDF of the final reports and we can read all those, whether it has to do with juries or whatever the research is, one of the first things I do is try to find out where it was published. Can you comment on that?

GERALD LaPORTE: Yes, so we urge everyone that we fund to publish in a peer-reviewed scientific journal. We do have some numbers; I didn't put them up here today, but we've seen about a 400% increase in publications when we look at our 2009 data versus, I think, 2012-2013; so we are seeing that more and more. It's very unfortunate when somebody spends two/three years doing research and then they don't publish it. At one time, we had a peer review process where we would peer review the final technical report; and then all of our final technical reports do go on NCJRS, the National Criminal Justice Reference Services. So all of our reports do go there; but it's not the same. It's not going to get the same accolades or the same recognition as being published in a peer-reviewed scientific journal.

We actually do look at that for repeat applicants. So when people apply in the future, we do look at whether they published in the past – if we funded them in the past as well.

JOHN BUTLER: I have Suzanne, then Peter, then Arturo.

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SUZANNE BELL: Thank you, Gerry. I just wanted to publicly thank you because a lot of the things that you see – like the solicitation for the postdoc – came out of discussions and then ultimately work products from the scientific and inquiry and research; and that was very gratifying. I appreciate it, and I know that that was a big task – so greatly appreciate it. Can you talk a little bit about how the Center of Excellence and RTI falls under the portfolio? Thank you.

GERALD LaPORTE: Yeah, sure, so we have the Forensic Technology Center of Excellence; RTI International was the award recipient from 2011 to 2016. We rebid it this past summer or past year, and RTI International won that again. Really, the purpose of the FTCOE, there are a couple of things that they do. A lot of times there's really good research; there are great new technologies that are developed, but they don't make it into a laboratory for whatever reason. Laboratories are production lines; and any kind of disturbances, if you will, trying to implement new technology can cause a lot of disruptions, a lot of focus on backlog, getting the work done and so forth. So RTI helps us with what we call technology transition.

Then as well too, RTI does do a lot of workshops, seminars. Gosh, I could show you just some crazy numbers; but I think over the past four years, we've provided information on the Web to over 300,000 people and that's internationally. We have tons of products that come from the Forensic Technology Center of Excellence that are divided into workshops, knowledge/technology transfer. We've done stuff for lawyers, police; it's not just for forensic scientists.

JOHN BUTLER: I have Peter, Arturo and then Randy.

PETER NEUFELD: Gerry, thanks a lot for the presentation. \$281 million is a lot of money to give away in grants, what a pleasure. But I'm thinking of the questions that were asked yesterday, where a couple of the speakers tried to differentiate between grants and studies that are done for implementation or efficiency, and even research and development broadly, as opposed to studies that are done specifically to evaluate the reliability of a particular method. You talked about the money that went to R&D, but R&D itself is a very broad and at times vague term.

So my question is, number one, do you have a method internally that you can identify how much money is spent each year to support studies that actually evaluate the reliability of a particular method? Two, if so, how is that done; what is the method that you utilize? And too, how much money has been spent over, let's say, each of the last five years for studies that evaluate the reliability of different pattern impression and trace disciplines – putting aside DNA, putting aside things like toxicology, but really looking at the ones that were more controversial?

GERALD LaPORTE: That's such a great question, Peter. I can answer that sort of from the 30,000-foot view. Based on our last analysis of our portfolio, about two-thirds of our funding has gone towards what I would call applied – like applications; and about one-third has gone toward accuracy, reliability, statistical studies, validity, those types of things. So about one-third of the portfolio has gone in that direction.

We did have a specific solicitation in 2009, 2010, 2011 and 2012, where we specifically called out basic science or fundamental studies. So that gave us a pretty big uptick. It's across the board though; it's hard to answer. Some years we'll get a lot of proposals. My guess is that when we see reports, like the PCAST report, when the NAS Report came out -- there's an uptick afterwards in those kinds of studies. So

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hopefully this year with the PCAST report that actually spurs more research in these particular areas, and we see black box/white box studies – things that are more focused on accuracy, reliability.

As far as disciplines though, it's across the board. Impression and pattern evidence, I'd say probably about 25% of our portfolio is funding in impression and pattern evidence disciplines.

PETER NEUFELD: So 25% of the one-third goes, you think, to pattern impression reliability assessments.

GERALD LaPORTE: Yeah, if I had to—

PETER NEUFELD: What does that come out to in dollars and cents per year – last year?

GERALD LaPORTE: I could work that out, but it varies from year to year.

PETER NEUFELD: Just a ballpark figure, what are we talking about?

GERALD LaPORTE: If I had to ballpark this, on an annual basis I'd say maybe \$5 million to \$8 million on foundational-type projects.

PETER NEUFELD: For pattern impressions excluding DNA?

GERALD LaPORTE: So pattern impressions and trace excluding DNA, tox, controlled substances.

PETER NEUFELD: And we could get a list of all those studies that fall into that category?

GERALD LaPORTE: Yeah, absolutely – actually, there are the Web links in the presentation. You can go in "Search" in there on the website. The only thing I would warn you is that it searches on a keyword in the title. So we don't have keywords just yet; we're working on that, but it will work for titles. And the portfolios are broken down into the impression and pattern evidence disciplines.

JOHN BUTLER: Arturo, then Randy, and then Julia.

ARTURO CASADEVALL: Gerry, thank you for the presentation; it was very informative. I guess you have the same problem that most funders do; that is that on the studies published, there is no way you can put in money to something (inaudible). I was going to relate to you that other funders have the same problem.

The NIH recently found that – I don't know if it was the NCI or the Heart and Lung Institute – one of those found that one-third of the clinical trials – think about that – were not being published. That's talking about enormous effort; and on the site it's published, people will say, "Well, it's a negative study; I can't published," something like that.

I just was going to make you aware that there is a bio archives movement out there in which biology is very rapidly embracing it. The way this works is you take a paper and you post it in bio archives, and it's searchable. It's not peer-reviewed, but it does get crowd sourcing review; that is, people put comments on it. So the excuse that, well, you know, I can't get the paper published because the results were negative;

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Journal of Forensic Science won't take it. That excuse sort of goes away. So you could make it a requirement. A lot of journals are moving into this thing because at least there is a record of the work that's done; and even though the data might be negative, somebody else might be able to use the data. It's free; they will put forensic science studies up there, and it's totally searchable.

The journals, by the way, are all moving to accepting work that is – in other words, putting it in the server doesn't mean that the journals won't take it. A lot of journals are not treating it as a publication; they're treating it as a disclosure. I think that is very rapidly taking over a lot of areas, and you may want to think about it.

GERALD LaPORTE: Definitely the one thing that we've seen is that with open source – we're seeing a lot more open-source publications. The one thing that our previous NIJ Director did do is we used to have a requirement for an extensive final technical report, and then his thought was we were no longer going to ask for that extensive final technical report, that we wanted more of – I'll call it a long executive summary, if you will, so that the grantees would spend more time working on their publication as opposed to just doing the final technical report for NIJ.

We haven't really assessed or evaluated whether that's had the impact; but I can say unequivocally that there's definitely an uptick. We're seeing more publications from the work that folks are doing. And just the quality of the research that we see now is far superior than what I've seen in the past; it's getting better and better every year.

JOHN BUTLER: Randy and then Julia and then we'll go on to Rebecca after that.

RANDY HANZLICK: Thanks, Gerry, for today's presentation and also what you talked about yesterday in terms of trying to follow up on Commission recommendations to increase the number of forensic pathologists.

We've been talking about journals, publications, research; and I wanted to just describe something to get a feel from you maybe for how big of a problem this might be in other disciplines. But the National Association of Medical Examiners started a journal in 2011 called *Academic Forensic Pathology*; and it was developed to improve the quality of our field and publish more academic-related papers, research, et cetera. But to this date, it still hasn't been indexed by the National Library of Medicine. So if somebody does a literature search, those reports and series and things that are in that journal – unless you just google and happen to run across it, you can't find them. I wondered if that's a problem in other disciplines, where the research that's being conducted either doesn't get published in a recognized journal or it's being published in a journal that's not indexed in the National Library of Medicine or a similar body.

I have hope that the main journal will in the next few years – it can take up to 10 years to get indexed; but it's been, what, six going on seven years now. Is that a problem in other areas that you know of?

GERALD LaPORTE: Randy, I would say actually we're not seeing that much of an issue in the other areas now. I mean, even the work in firearms, latent prints, friction ridge – those folks are publishing in high-caliber journals now too. So actually sometimes we get a little disappointed from the forensic pathology stuff just because we don't see a lot of it. This past year, I think we funded a few projects in forensic pathology. We've had some good work on Sudden Infant Death Syndrome and pediatric head trauma; so we've had some really good work in that particular area.

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I understand that you have a challenge – your field – you're in a challenging position. You have guys that are working hard and trying to do autopsies, and research is kind of secondary to them. But I would say fairly, we don't really see that much in the other disciplines where it's not getting into index journals.

JOHN BUTLER: Julia, and then we'll move on to Rebecca Ferrell.

JULIA LEIGHTON: Two points – I was really struck by the first presentation yesterday; and when I look at the \$5 million going to foundational research -- and I look forward to looking at some of those -- it made me go back to thinking about who reviews your research projects because the problem of research design to spend any money – any of this not a lot of money – to answer what I think there's some consensus is one of the biggest questions to be asked about disciplines that are still used at a very, very high rate around the country. Fingerprints on firearms – it's what's being used day to day all across the country. While it might not be sexy in some respects for some researchers, getting the right design to a research project is critical. So I was curious about what is your review for research design.

It also struck me that to the extent that it's done at a very sophisticated level, it would also be an incredible teaching tool to everyone you reject.

Then I have one just plea, and I don't know how you answer this. That is, it goes to the issue of access to the indigent defense to experts. I'm not going to name them; but we have had people refuse to work with us as testifying experts because they received DOJ money, and they have concerns. I'm not suggesting you do anything that causes that; but what I'm suggesting is that there is an institutional perception that actually you probably have to actively work against. You talked a little bit about your independence; but I would ask that you think about that in the world of how you interact, which is that whether you like it or not, your money is aligned with a side.

I don't have a solution for you. I just think it's something I ask you to be aware of and think about how would we address that. Thanks.

GERALD LaPORTE: Julie, you bring up two completely valid concerns. We talk about this every day. First, to address your peer review, we have a rigorous peer review process now. We have statisticians that are always involved.

(inaudible)

So we do have a standing scientific review panel, and all of those names are published on the website for a couple of our portfolios – our Impression Pattern Evidence Discipline portfolio, trace evidence. So Dr. Gaensslen was on there at some point, and Dr. Almirall was on there. But we have statisticians; we bring in – Christophe Champod was here yesterday. We bring in sort of high-caliber folks. We go internationally; we have somebody from Australia on that board. It's not practitioner-focused at all. So we do have some practitioners on there to kind of keep things checked and balanced, to make sure that there's an understanding.

When I used to do my peer review panels, we had what we called ad hoc peer review panels, which is three peer reviewers. I had an academician, a statistician, and then I had a practitioner on there; so it was

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two-thirds kind of leaning non-forensic science practitioner. Then the forensic practitioner is there to kind of keep things in check and just more to educate a little bit on the forensic science standpoint.

With respect to your comment about perception, one of the things that I made a decision about two years ago was we asked the National Academies of Science to review us; and Dr. Leshner was here talking about that. There's nothing worse than going in and asking somebody to – saying come in and look at our house and tell us what's dirty and what's not. We went through a year-long process. I made the decision that, look, we had made a lot of changes; I knew internally I was very confident of the changes that we made since 2009. We were growing; we were getting much better as a science agency and then finally decided, well, let's find out if we're on the right track and let's just figure this out. We'll take the good news and bad news, whatever it is.

NAS did an excellent review of us. They complimented our peer review process, which was really a big thing. They understood the independence; they made comments in the report how we are truly independent now. The idea that someone – a researcher or somebody that got NIJ research that won't testify is absolutely absurd; and I would say publicly that that's absolutely not true. When we're reviewing applications or applicants, we're looking at the quality of it. We don't care if you testified for the prosecution or the defense. In fact, most of our applicants though are academicians; that's mostly what our PIs are. So that's kind of an absurd thing; it's saddening to actually hear that. We would never hold that against anybody.

JULIA LEIGHTON: And I'm not suggesting that you do; I'm suggesting that because you're still part of the Department of Justice and because this is an adversarial system that you may have to take affirmative steps to remind the audience that you encourage – and I suspect this doesn't happen at state and local levels, but it's when it's actually testifying where FBI experts are on the other side or other DOJ experts are on the other side. I think that is the reason I have seen this – is because it is specific to FBI and DOJ. Some of it may not be your money; it may be the FBI's money. But I think it is still perceived as DOJ money.

ARTURO CASADEVALL: Maybe a statement to what you said is what's needed to the website that you could then (inaudible).

GERALD LaPORTE: Yeah, I would say I'm proud to be an employee of the Department of Justice. I think the Department has come a long way. I understand science; and like I said, we have the blessing from the Department. Nobody ever calls us or says what are you guys doing? Can you hold back on that report? There's none of that goes on. It's kind of ironic that you hear these things; that's so untrue. We have complete independence of what we fund, who we fund, the reports that are released. We don't think about any of the – I'll call it the unintended consequences to the Department of Justice. We don't think like that.

JULIA LEIGHTON: And I'm not suggesting you do, but I think Arturo is right – some sort of statement assuring the people seeking funds that you don't look at where they testify and who they work for.

GERALD LaPORTE: Well, I'll finish here. We are working on a massive strategic plan; we're kind of in the midst of that based on one of the recommendations from the National Academies of Science. We call it the 2015 review. So that's one of the things that we'll talk about too, but thanks for that.

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JOHN BUTLER: Okay, if we can get Rebecca's slides up. Then we'll move to NSF and the discussion about basic research funding.

REBECCA FERRELL: It's an honor to be part of this Commission, and I'm really pleased to be able to speak today and tell you a little bit about NSF and the kinds of activities that we have been involved with in support of forensic science research. I am the Program Director for Biological Anthropology, which is one of the programs in the Social, Behavioral and Economic Sciences Directorate. I am also Co-Lead for All Things Forensic Science at NSF, along with Dr. Kelsey Cook, who is the Math and Physical Science Director.

The National Science Foundation is *the* independent federal agency with a charge to support basic and fundamental research in science and engineering, and it's also in support of science education and broadening participation in STEM research. You can see from the slide, in FY16, we had a budget of about \$7.5 billion; \$6 billion of that goes to research, and \$1.5 billion goes to education efforts. We do support about 24% of all federally-supported basic research.

I put in a couple of points from the last strategic plan -- I think we have a new one in development -- but the last strategic plan. One is just to emphasize that we are focused on fundamental science. The second is that in doing fundamental science, one of our goals is to inform other issues; and that includes the goals of mission-specific agencies such as NIST and NIJ and other groups. I didn't include it here, but at the end of the slide deck, which I think you'll get a copy of, I have supplemental slides that include information about some of our inner agency activities.

NSF has -- NSF calls it a "gold standard peer-reviewed system." We do not have an intramural research program. We are funding people at institutions across the United States, and those researchers are the ones who are carrying out the activities for the most part. There may be a few exceptions to that with cooperative agreements and so forth.

I mentioned "unsolicited," and I italicized it there. One of the ideas that NSF had, I guess at its inception, was that if you have a grassroots bottom-up approach where you're soliciting all kinds of different ideas from the research communities, that that is one of the best ways to foster creativity and innovation and, in some cases, transformative science. So we do have a lot of unsolicited proposals. There are also calls for proposals in either the form of a Dear Colleague Letter, which just says, hey, we're interested in this area of research but there's no money attached to that and then solicitations which have a pot of money attached to it.

Our review process -- we bring in independent subject matter experts from all kinds of research communities across science and engineering. Our two research review criteria are intellectual merit and broader impacts. Broader impacts includes things like data management: Are data going to be disseminated? How is public outreach going to come into the project? And what are the broader impacts for society? So forensic science and the application of forensic science is a broader impact activity related to research that NSF may support.

So out of about 40,000 or so proposals that we receive each year, about 12,000 of those end up being recommended for award and awarded. And you can see that there are research projects and workshops and various other kinds of efforts. Our awardees are a variety of different types of organizations, primarily universities but also other U.S. institutions.

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So there is the famous 2009 report cover. When this came out, NSF asked themselves, and were asked by others, what will NSF's role be in supporting and strengthening forensic science? I've listed a few activities. As you know, Mark Weiss was my predecessor on the Commission as the ex-officio person for NSF; and he was involved in a lot of these earlier activities, some of them along with Kelsey Cook.

I want to just point out, the proposed Senate legislation – it didn't end up happening – but actually identified three things that they thought NSF could be doing. One is supporting basic research that would support things going on in forensic science; two is to create a center that would support forensic science research; and three was to do a literature review. Some of those things might not really be the kinds of things that NSF typically does; but certainly the first one is. And in terms of the Center, we do have centers and that is an option. So we had to think about how can we be part of this effort and still stay true to our mission as a funding agency for basic and fundamental research.

So the two, I guess, NSF responses to that report and to all of the discussions that we had with various other stakeholders were two Dear Colleague letters. Again, these are notices to the research communities at large that we are interested in a particular area of research, and we invite proposals on those areas.

The first one there simply said if you have research that you're doing that you think is relevant to a program at NSF – anywhere across NSF – that you think also may serve the dual purpose of supporting forensic science, then we would like to see those kinds of proposals. So that's actually kind of a hard thing to ask people to do, especially if they're not already interested or involved in forensic science research.

But our belief is that there are people out in the broader research community who are doing important fundamental work that could be really important and transformative for various methods in forensic science, and we're hoping to continue to receive proposals. We don't always know if people are responding to this particular DCL because they're submitting to the various programs; but we're enthusiastic about that. I will mention here that we do have a Memorandum of Understanding with NIJ whereby NIJ can provide co-funding for projects that we agree have relevance to forensic science.

The second one, which I'll talk about in a few slides, is about the Industry University Cooperative Research Center program; and that is the other prong of our efforts in forensic science.

I want to step back for a minute and just mention that before 2009, if you look at the NSF award database, there is already a lot of research related to forensic science, either directly or indirectly, in the portfolios across NSF. We do not have a forensic science program. The forensic science research that we have is spread across all of the research directorates; and I've shown them here. They're abbreviated; but you have biology, computer science, education, engineering, geology, math and physical science, and social, behavioral and economic science. Those percentages at the bottom are the equivalent of a pie chart, where you can see that size and education have almost 50% of those awards, followed by SBE and MPS.

One of the things we were asked about related to the PCAST report was: What are you actually spending on forensic science research in recent years?

This is something that we had not had a chance to look at, and so I had a chance to look at this last summer. What I did was I broke it down into things that looked like training, things that looked like potential relevance – these are all grants where people have mentioned the term "forensic" in some part of

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the abstract or title, things that might have potential relevance but might not be directly related, and then things that are directly related to forensic science.

So the PCAST numbers I think ended up being close to an average of the bottom row there, so something around I think they said \$4.5 million for direct research. But again, I want to emphasize that NSF is supporting foundational and fundamental science; and we don't always know when something is funded if it's going to turn into something important or not. There is transformational research -- and I don't have specific examples, but NSF does -- of things where people thought they were really stupid and then later on realized that they were critical to some major advance in science and engineering. So that's why I've included those larger figures because I think that training the next generation and also new methods that may come into the various disciplines of forensic science are really important.

All right, I hope you all can see some of these. I wanted to just give a few examples, by directorate, of the kinds of projects that I think are related to forensic science either directly or indirectly. I'll just say MRI at the bottom is major research instrumentation. So one of the other things that NSF does is support equipment that will be used by people that are doing relevant research.

I'll just mention a few. In my own program, I'm interested, as a biological anthropologist, in phenotypic variation; and so we have some overlap there. I'll mention an example in a minute.

Yes?

Can you move the mic closer?

Sure.

Cognitive bias is another thing that's been addressed in some of our psychological programs, forensic examiner behavior, and jury behavior in Law and Social Science and in our Decision, Risk and Management Science programs. That's in SPE.

We have in Math and Physical Science new methods in our trace evidence analysis the inverse problem -- mathematical models to try and understand/reconstruct trajectories for things like blood spatter; the Education directory, which is supporting a lot of cyber training, and that's where those big numbers come for the training -- those \$22 million -- that's mostly cybersecurity training; but also, undergraduate research experiences, also in math and in the social sciences. Size, as you might expect, is doing cybercrime detection, but also things like automated pattern matching. Then engineering has what's sort of on the continuum more applied research, the small business kinds of projects and also the Center projects -- the IUCRC Program that I'll talk about in a minute.

I just want to give this one example of fundamental research that I think represents something that could be important for a forensic science discipline. This is a project where the investigators are going to go out; they're going to get a much larger sample of hair types from all over the world; and they're going to look not only at that larger sample, but at whether there are new and additional ways that hairs can be classified. I think that this is in progress, so we don't know what kind of information we're really going to get out of the project; but the idea would be that you need to know what your universe of hair variation is to be able to talk about that, as was mentioned yesterday, in a reliable way.

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Another one I want to mention – this is a workshop. Workshops are another important way that NSF supports discussions about gaps in the science or important directions that sciences going in. I believe that Ed Bartick presented about this workshop at a previous Commission meeting, so I won't go into detail here but essentially looking at how to evaluate the scientific literature and how to make research designs better in forensic science disciplines.

The last thing I want to talk about is the Industry University Cooperative Research Center Program and how we are attempting to use this mechanism to support a center that would be focused on forensic science. This is a long-standing program at NSF. It involves collaborations between federal agency-funders, like NSF, industry and other agency stakeholders that have an interest in a particular research topic, and then of course researchers at institutions.

The idea is that you take membership money, which is money coming in from industry and agency stakeholders; you take administrative money, coming in from NSF; and you work together with researchers to come up with projects -- generally small projects that graduate students can work on – that will move a particular topic forward in innovative ways.

From the perspective of an institution, I'll just briefly mention this is a way to get additional funding for research; to know what kinds of interest industry has in terms of perhaps later, with patents or other intellectual property, marketing that information; and also to have training and future placement for their students. And on the industry and agency stakeholder side, you're leveraging your funding. The big issue with the IUCRC is that you put in, as an industry partner, a small amount of money; and you have access to all of the intellectual property and research going on across all sites in the Center. So it's not just the one that you end up being interested mostly in; you get information on everything going on in the Center.

This is just a chart to kind of show you what a center might look like. I've put NIJ up there with NSF because they would, if this happens, would be supporting such a center. So at the bottom there, you've got different research sites that are all part of the same center. So you can see that blue circle; that's a project that's overlapping between two sites. Then you have the Industry Advisory Board, which has representatives from all the members who have put money into the Center. They have a few meetings a year, and they hear what's going on in the Center and how those projects are progressing. Again, the important thing is that they're shared IP. This is a precompetitive research space; this is not proprietary information, but it can lead to very interesting kinds of proprietary projects on the part of researchers and on the part of other stakeholders.

So in terms of how we might use this forensic science, it does have a name – although I want to stress this is not an actual center yet; it is under development. The way that we do these is that we first give out small grants for people to have planning meetings, where they try to find interested members for their site. So we've made nine Planning Grant Awards to the institutions listed there, including Florida International; and you may hear a little bit more from Jose Almirall about his site. We hope to be getting full proposals in from a subset of this list in the very near future, and I guess all I can say is stay tuned.

That's it. I want to thank you again, and I'm happy to take questions now or later.

JOHN BUTLER: Do we have any questions right now?

Arturo, do you have a question you want to ask?

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Okay, Julia.

JULIA LEIGHTON: I'm curious about the interplay between NIJ and NSF. It seems to me that rather than recreating institutions from the outside – and I'm probably stepping on all sorts of toes that I don't know anything about -- that it would make so much more sense for the research studies into reliability and foundational belong with you, and that the process development – because one comment I was going to make when you talked about your stakeholder group and who you were going out and talking to, it seemed very practitioner-oriented as opposed to this kind of stakeholder group, which may not be a wrong thing but it doesn't get at those with PCAST-type critique. It seems to me that rather than trying to duplicate it, that it makes much more sense for the Dear Colleague Letter coming from you all about the sort of foundational research and that you continue to work with the group that you've always worked with on issues that go to process and quality management.

REBECCA FERRELL: I would comment; I think that NSF and NIJ are really dedicated to moving forward and working together on these issues. I think one of the challenges for NSF with things like validation studies is that they would not tend to do very well in review because the focus of most projects coming to NSF are theory-driven and hypothesis-driven. So something that is a validation, that doesn't really address theory directly, may not be perceived to fit either by a program officer or by a panel that's reviewing the work.

GERALD LaPORTE: I completely agree with you, Julia. I think especially when you see the limited amount of money that we have. So it's difficult, and that was one of the cognizant decisions that we made a few years back and why we didn't have a separate solicitation for basic science. I will say – and I say this sort of in a polite way – but most forensic scientists don't understand what basic is; and it was really difficult when we had a separate solicitation. We had to specifically define what basic science was. So it did get very difficult. And I say that in a polite -- I consider myself to be a forensic scientist, and I had a difficult time sort of understanding basic science versus applied science.

And then there's what we what we call the "inbetweeners," and that's fundamental science that's focused on forensic science; but that's still a little bit of an (inaudible).

JULIA LEIGHTON: Maybe this is part of my not understanding, but I'm thinking – I understand the issue of sort of black box studies and the concern that those don't go to the kind of fundamental research you're talking about. I was looking at the example you gave of hair. These building databases for population frequencies and determining whether or not the theory of uniqueness is actually correct, it seems to me those kinds – isn't that within your purview? I mean the notion of unique tool marks, unique fingerprints, unique handwriting and sort of building databases of population frequencies to assess those claims?

REBECCA FERRELL: I can give you a couple of examples. One is the hair morphology project. Yeah, we were interested in having useful data and sharing useful data that come out of projects that are supported by NSF. The other thing about that project though is that when they submitted it to my program, their questions were about, "How can we understand human adaptation and natural selection as part of larger questions about evolution and biological anthropology?" So those two things had to be there for the panel to say, yeah, I understand why it's here in biological anthropology; and I also see the broader impact of using that in a forensic science application.

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Now, we did co-support for several years a population genetics database. This was before I was at NSF, so maybe I could let Gerry just mention that one.

GERALD LaPORTE: I don't know enough about that database. I see Minh Nguyen sitting back there; she's the one that knows it. I'm not going to put her on the spot, but the idea of continuing to populate that database is more of an NIJ thing. The whole idea of developing it, getting all that sort of foundational science – that's an NSF thing. We found a perfect meld there between the two agencies; that worked out perfect. So we co-funded.

The other thing is I hope I made it very clear in my presentation that we have agencies like NSF that are great at basic research. We have agencies like NIST that are great at measurement science, and we realize that. We know that. So that's why we provided funding to John Butler's group for years because we knew they did it the best; it wasn't going to be us. And NSF the same thing too – so we recognize that we have other federal agencies who can do things a lot better than us; or at least they have the resources if you will, and they have the outreach to certain communities that we just don't have.

JOHN BUTLER: Arturo?

ARTURO CASADEVALL: So I'm hearing that there may be a gap -- some of the work that is needed may not fall right within the kind of work that both agencies are kind of the best at, and I'm going to give you an example of how the NIH solved this problem.

So the example – I mean, there are zillions of these, but I'm going to (inaudible) in my own field. Currently, the diagnosis of aspergillosis infections is a big problem. Many times, the diagnosis is made at the time of death. So the country has a great need for rapid diagnostics. There is no way in the world a grant on rapid diagnostics will survive the science in a typical reviewed thing. So what they do is they have a contract mechanism. So what they do is they put out a call for a contract, and then they get applications that are peer-reviewed. Then the agency establishes a contract and supervises that.

So yesterday we heard from Eric Lander six challenges on six areas. It sounds to me what is needed is a contract mechanism to establish reliability, and this is how it would work. Instead of putting these questions into a scientific review panel who are going to argue is this hypothesis-driven research, is this procedure or something like that, one just goes out and gets the data. That's no different than asking the scientific or medical enterprise to come up with a rapid diagnostic kit for aspergillosis. There is probably no new science there. What is needed is making it work, figuring out the sensibilities, the precision of it all. So it's something to think about.

JOHN BUTLER: Let's go to Jose, and then we'll have a little bit of time at the end for further questions.

JOSE ALMIRALL: Thank you very much for the invitation to the Commission. It's an honor to be a member of this panel. Let's see if we can get my presentation up. Ah, there we go.

My name is Jose Almirall. I'm a Professor in the Department of Chemistry and Biochemistry at Florida International University. You may have read from my bio that prior to my appointment in the Department of Chemistry, I was a practicing forensic scientist at Miami-Dade Police.

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I was asked to speak about the forensic science research activities at Florida International University, and we do have quite a bit of a history. It dates back to the 1970s, when the Director of the laboratory at Miami Dade Police was looking to staff the forensic laboratory with drug chemists and came to FIU Chemistry Department and wanted more formal training. That included some criminalistics. So we had adjunct professors from the police department come to FIU, and that made part of the Criminalistics Certificate Program since 1974.

Shortly after I joined FIU, we established a Research Institute, which celebrates their 20th anniversary this year. We were one of the first to offer a Master of Science in Forensic Science in the state of Florida, and we were one of the first to be accredited by the AAFS/FEAPAC in 2004. We're now in our third accreditation cycle for FEAPAC.

In 2005, we established one of the few forensic chemistry Ph.D. chemistry programs, and now we have over 30-plus students in the Ph.D. in chemistry. We also have a Ph.D. in forensic biology that was just established a few years ago.

In 2014, we have a 100% online Professional Science Master's in Forensic Science that is designed for practicing forensic scientists who want to go on and get a Master's degree. That is going very well; we have about 20 students enrolled in that program, cohorts of 10 students per year.

Today we have 40-plus Ph.D. students in either Forensic Chemistry or Forensic Biology, 30 Master's students, and 30 BS students in chemistry or biology; and all of these students require a research experience.

So what are the strengths?

Just like any other organization, the people – the faculty, the scientific support staff, and our awesome students. We've been very fortunate to be able to recruit and draw from a very good pool of students, which makes our research all the better. So we have a critical mass of Ph.D. students, and that allows for seminar series and all other kinds of activities that go on in mature graduate programs; and that numbers about 80 students at the moment.

We also have research capacity at FIU that we've developed over the last 20 years; and some of our faculty, most of our faculty, have practical experience in forensic science. So they bring to bear that knowledge and that background when they're asking questions that are relevant to the forensic science community. We have over a decade of sustained productivity in forensic science research. For example, we have about 20 active grants right now; and we've been able to put together, over the course of the years, a state-of-the-art laboratory and instrumentation facilities that are very similar to what you'd expect in forensic laboratories for the students to gain that experience working with those facilities.

More importantly than anything else is existing relationships with government and industry partners that develops trust and collaboration amongst the faculty, the students, and the people who eventually hire them.

So here's a list of what we consider the core faculty. Ken Furton is now our Provost, so we have a lot of support from the University; and one of the reasons is Ken Furton.

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Bruce McCord was at the FBI Research Laboratory at one time and then went to Ohio University, and we were fortunate enough to recruit him to Miami.

Dee Mills does human and non-human DNA molecular biology.

Anthony DeCaprio is working on forensic toxicology and environmental toxicology.

Jeff Wells is a forensic entomologist.

Yi Xiao is a young assistant professor who is doing some aptamer chemistry work doing rapid drug analysis.

Myself, and then we have Ph.D.-level staff that are supportive of the students and the research activities.

But in addition to this core faculty, we have other Ph.D. mentoring faculty at FIU to take our students and work in their groups in things like large molecule mass spectrometry projects. Then those students go on and still do a forensic project with non-forensic faculty, but they're overseen in their committees by one of us.

So what are our strengths?

Knowledge creation, curiosity-driven research, but also very applied research, and the products are our publications. We expect faculty to publish; we expect the students, before they graduate, to have publications. So over the last six years or so, 177 publications and we have this consistent productivity.

We also maintain these accredited graduate and undergraduate program in forensic science. We also provide service to the community, like my coming here. I had to cancel my class today to be able to speak to you all; but we have four faculty, for example, that are members of the NIST OSAC. We have several faculty that serve on editorial boards of forensic science journals. And again, we offer service to the community.

Every year we offer an annual workshop or symposium that we invite the local forensic science community; and people in Cecilia's lab, for example, will come and participate. We get about 200 participants every year. We don't charge anything for this. We hold it on campus, and it's an opportunity for our students to talk about their research and for the forensic science community to hear about our research and also to present their research. Gerry was talking about establishing a research culture in operational labs, and we are very interested in doing that.

It's hard to read this. This is just a list of grants that were received or active in 2013-2014, a total of about \$5 million -- \$1.7 million in expenditures that year. I bring this up because you want to know about your return on investment, and funding agencies what to know what's the cost of a paper; so we just average. We had 34 papers that year, \$1.7 in expenditures; that's about \$50,000 per paper, and that's at what we're averaging. So if you want to look at metrics, this is one way to see what you are getting on your return on investments.

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We can also look at patents; the University does this. You can also look at presentations at conferences – and of course graduates. But there are other things, like what is the impact of that research? How many views?

Well, as an example, approximately 500 views of a paper of mine over the course of a year, but you can measure impact a number of ways. Dr. DeCaprio's group, for example, from NIJ funding has developed a database of designer drugs; these are new compounds that are being generated all the time. As soon as standards are available, Dr. DeCaprio's group characterizes them by mass spectrometry and a number of different ionization methods.

Dogs got a bad rap yesterday, but Ken Furton's group is very active in canine olfaction; and dogs are very useful as detection devices. And he's been funded by NIJ as well in this effort – very important part of forensic science.

Dr. McCord has been working with degraded DNA and rapid DNA analysis for years, having a tremendous impact on the field.

Dr. Mills is doing non-human DNA, and she's been able to use some of her new techniques to solve some local cases – killing of horses in Dade County and selling the meat, and able to identify carcass with the meat and the people selling the meat out of the back of their vans.

In my own group, we've been interested in both basic and applied research and doing some of these inter-laboratory studies. All three that I list here have been funded by NIJ. The elemental analysis working group, a two-and-a-half year effort involving 21 different forensic laboratories, 35 different scientists generating papers in good quality journals, but also ASTM methods that eventually will be used to apply what we learned from this collaborative research.

We're now in the midst of a glass interpretation research project, which is also inter-laboratory, 10 laboratories, and tape analysis, which eventually will lead to standardization of the methodology and eventually get on the OSAC Registry.

This is what we look like. This is Ken Furton's group and his students – Ken Furton in the middle. Bruce McCord is hiding towards the back there with his students. I forgot to mention that we have about 20 grants right now; only about 9 of those are from NIJ. We also have some NSF grants; we have TSWG grants, but also from industry. Dr. Mills' group doing molecular biology, Dr. DeCaprio's group, Dr. Wells' group, and my own group.

So we do have these core facilities that have been put together with external funds and with University investment over the course of the years. They're recharge facilities, and the students all get access to this state-of-the-art equipment. They're all managed by Ph.D.-level staff. And I mentioned this new Professional Science Master's Program that is now in its third cohort.

One very important thing that we do is we have an external Advisory Board of mostly the local lab directors in the state of Florida. Cecilia is one of the members of the Advisory Board, and we look to them to guide us on curricula, on relevant research, and on other matters that are relevant. We want to be relevant, so we engage the local community of lab directors to make sure that we are relevant.

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We are one of the applicants to the IUCRC Program. We received a Planning Grant; and in July of 2015, we held a planning meeting in Washington D.C. in conjunction with George Washington University. Part of that process was to present some example projects, and I list them here. You can see that they run the gamut from some basic research to very applied research to answering some questions that are relevant to forensic scientists or to the industry that is servicing the forensic scientists.

Why are we interested?

I'm really glad that NSF and NIJ have partnered together to form this Center that will provide agile funds to do small projects for graduate students. That could lead to then generating preliminary data for a larger proposal, for example. It also provides a mechanism to collaborate amongst universities and also between industry. By industry I mean not only companies that service forensic science but also agencies – federal agencies, state agencies.

There is some skin in the game that is required from the agency and from the company to participate and get a seat at the table to guide that research. We're very excited about this prospect. We do have some commitments now from agencies and companies to be able to do this. It allows this collaboration. We will be able to expand on already existing collaborations with industry, and it allows for that transition of basic and applied research to tools. FIU, based on our provost's strategic plan for FIU, does want to encourage more startups and more entrepreneurial activities at FIU. This just melds perfectly.

Here is a picture of all the Chemistry faculty that received patents. This is a recent ceremony with our President Mark Rosenberg. Ken Furton is actually one of the recipients; even though he's Provost, he's still very active in research.

I just list here some of the titles of the patents that have been either awarded or applied for, and they are very diverse. We've also had three companies that have been spun out of FIU's effort in IFRI in forensic science.

The main product, though, is our students – workforce development – people that go out and work in your laboratories in the service of forensic science. The people sitting are the recent graduates this last December. We have two ceremonies per year, and three of them are Forensic Chemistry graduates. You probably know the enormous amount of resources it takes to mint a Ph.D.

I was asked to provide some alumni metrics. In addition to Ph.D.'s, we host visiting scientists, people who come on sabbatical to FIU from all over the place, all different countries. Postdocs are very important for research activity, so we've had 15 postdocs; 54 Ph.D. graduates since we started the program in 2005, 6 in Forensic Biology, almost 100 Master of Science in Forensic Science, and all of these require a research component. Then a very large number of BS in Chemistry and BS in Biology. Many of them are employed in academia, and I list some of the universities here. They're employed in national laboratories or government research labs, and I list some of the laboratories there – and operational labs including federal, international and, of course, state and local.

We benefit from having seven large forensic labs very close, within 50 or 60 miles of FIU; so they hire a lot of our graduates. So there's a lot of activity in forensic science.

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This is just a list of the postdocs and the visiting scientists – just some examples of people. I have a visiting scientist from Israel who's spending 14 months with me. I have a visiting scientist from Japan who works in the forensic laboratory in Yokohama Prefecture, and he wants to do some work with fiber analysis at the moment; so he's there until March. But you can see there's a list of different postdocs and visiting scientists.

Here's a picture of one of my former students, Rhett Williamson, doing a TedX Talk at FIU – very competitive to just get in to do the TedX Talk and extremely courageous. I don't think I would have been able to do this when I was a graduate student, but he's the second Forensic Chemistry student to do so in the last few years – very exciting stuff.

Then we've had some alumni that have gone on to do great things. Maiko Kusano went on to work with Koichi Tanaka in Japan; he's a Nobel Prize winner in Chemistry; and now she's a Professor at Nagoya University School of Medicine. My own student, Gigi Guliana, went to Princeton for her Ph.D., and now she's at Yale University as an Assistant Professor doing imaging mostly for cancer research.

Even our Vice Chairs have some connection with FIU. John Butler was a former student of Bruce McCord when Bruce was at the FBI Laboratory and John was at Virginia; and Nelson Santos is an FIU graduate.

Thank you very much.

(Applause)

JOHN BUTLER: Thank you, Jose.

Any questions? Arturo, do you have a question you want to ask? Okay, you're welcome to ask.

Go ahead, Wes.

WESLEY GROSE: Yes, thank you for your program. Obviously, I work as a Lab Director for a local crime lab in LA. I wanted to ask because we have so many applicants who come through our application process who fail out of backgrounds because of drug use or of debt. I don't know if any of those issues are brought up with your students, just to help them think about getting careers in the forensic science field because drug use is something that in our society is not looked down so much upon anymore. However, our Department and a lot of forensic labs do still hold the standard that you can't randomly use drugs, as well as just running up debt for buying new cars and all sorts of stuff that runs up debt that creates a problem. So I just didn't know if that was an issue that's brought up with your students.

JOSE ALMIRALL: Yes, very much so. We have a statement on our website. When students are looking to apply to our University, we have it very explicitly that this is an important aspect. If you have a criminal record or extensive drug use, don't even bother applying for any forensic science jobs – at least in operational labs – because it's just not going to happen. So it's on our Web page; it's actually a requirement of the FEPAC that we make this explicit very early so that people don't spend two years or five years on a forensic degree and expect to work in a lab; and then they find out at the last minute that you can't work there.

WESLEY GROSE: Thank you.

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JOHN BUTLER: Cecilia and then Bill.

CECILIA CROUSE: I don't know if you remember, Jose, but at the EFRA meeting last year for the first time you bussed in a lot of high school students who were interested in forensic science -- I was actually surprised at how many showed up -- and that was my talk. It was what to expect if you enter the world of forensic science. And the very first thing I said was, "Before I begin, put your phones away." I mean, the whole place lit up with phones; and then all of a sudden, it became appropriately dark again. But we had that discussion that was very frank, and Stephanie Stoiloff from the Miami-Dade Police Department -- we gave numbers on how many flunk out, how many don't pass the background because of this; and it doesn't matter if it's only once. So Jose did an excellent job of asking us to very specifically touch on these in the real world. It's not who you know; it's how you act.

So I appreciate your point, and I appreciate you bringing the high school students in; that was actually a very successful part of the program last year.

WILLIAM THOMPSON: Jose, you and your colleagues have obviously done a tremendous job establishing a successful graduate training program in forensic science; and I think it's obviously a tremendous asset to forensic science. But I think one of the problems that has been widely observed is that we don't have enough such graduate training programs in the United States; your program is one of the few. I'm wondering if you could give us your perspectives on why there aren't more programs like yours and what steps the Government might take to facilitate the development of more such programs for the benefit of the field.

JOSE ALMIRALL: Well, I think I could speak about our program. There's a lot of blood, sweat and tears over 20 years to establish such a program. We've been very fortunate that we've had the support of the local forensic science community who hire our graduates and advise us and work very closely with us. I am very optimistic that this IUCRC Program that NSF and NIJ are putting together will really bring in -- you saw the list of universities that Rebecca put up -- will really push the development of academic programs.

Phil had a good question that I forgot to answer about we're losing that trace evidence instruction. What we do that seems to be effective is we do case studies from our own cases over the years -- just like MBAs, they learn from case studies -- and that seems to be effective.

But to answer your question, I think it takes -- in our case it's been administrative support from the University Administration to invest, the local community, and just hiring good people.

WILLIAM THOMPSON: Do the traditional academic departments in biology and chemistry support what you're doing?

JOSE ALMIRALL: Well, I am a chemist; I'm in the Chemistry Department. So we made a decision very early -- Ken Furton and myself -- not to separate from the Chemistry Department, and they've come around. I was the No. 18th hire in the Chemistry Department, and now we're 38; so we've kind of established ourselves, so we don't get any blow back from Chemistry.

JOHN BUTLER: Phil?

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PHIL PULASKI: No.

I have a question for Bob Gaensslen, since I – I guess I could put my tent care up for a moment now. If you're not aware, he mentioned briefly coming to work here at NIJ back in the early '80s. And what he did when he was here was he produced a serology source book, which 35 years ago and still today is probably the most comprehensive description of serology. To me, it was very helpful just as an example of what you can do in terms of the effort to put together a really comprehensive set of literature. It inspired me in some of the forensic DNA stuff I would write later.

But I wanted to just ask, what were the challenges with coming into the Government to do that from an academic standpoint – the challenges with doing that? And if we're trying to go forward and look at gathering some of these comprehensive reviews and critical reviews, what are some of the things that we should be looking for from your experience from having done that now 35 years ago?

BOB GAENSSLEN: Well, thanks for the question, John.

I actually decided I wanted to write the book; and this was the book I wanted somebody to hand me when I came into the field, and it didn't exist -- so maybe I'll try and write it. I actually put in an NIJ Fellowship Application to do it, and it meant coming down here. This is a good town for libraries, if you don't know this; and this was before word processors. This was before automatic databases for references, so everything was kept on index cards with little holes punched in the corners and stuff; so this was very manual.

The National Library of Medicine, which is up in Bethesda, is the best medical library in the world; and you need stack access to actually use it, and so through the Government, you got that. So I had stack access to the Jefferson Building at LC, Library of Congress, which is also a fabulous library. The Department of Agriculture maintains a fabulous library up in – I don't know, the northeast corner someplace up there, I forgot. And between all of those – and there's a patent office library; there are lots of libraries here that have oddball stuff that you've got to go to. In those days, you actually went in and you went in a card catalog and you looked stuff up; and you went into the stacks and you tried to find it. I opened books in the Library of Congress that had never been opened before, and they were published in 1815 and things like that. It's a fabulous experience.

I was completely left alone. I almost never came downtown to NIJ, which at that time was about 10 blocks from here. So I spent all my time up at the NLM for the most part; and it was a long, pretty tedious process. It took about three years. It wasn't totally, completely complete; let's say it that way; but it was enough, I think.

John is the source book of forensic DNA analysis, and I said this in a review of his most recent or 2005 edition. So if there is a source book on DNA analysis, that's it.

The fingerprint people took this on, by the way; and that's published. It's out there; at least it's on the Web, so you can download it. What they tried to do is somewhat what I did – to go back and just find every reference. Go all the way back as far as you can go and find every reference to every technique that's ever been used for that purpose and record it and kind of weave it into a narrative. So that's been done, I think; I think it's finished. Am I right?

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JOHN BUTLER: Yes, it's published.

BOB GAENSSLEN: Yeah, and so it was a really good experience. I was here in the Institute part of the time. The guy who was running the Grant Program – sort of Gerry's cohort, Gerry's predecessor at the time – he relied on a couple of us for different things, and so that was fine. But it was a very good experience. I had absolutely no other responsibilities, just sat in the library all day long.

JOHN BUTLER: I'm envious that you had a job like that.

BOB GAENSSLEN: I know, it was the best job ever.

JOHN BUTLER: Gerry, do you want to comment on anything like the source fingerprint?

GERALD LaPORTE: If anybody wants the Fingerprint Source Book, it's an NIJ product; so you can get it off the website. I have some hard copies, but I don't want to advertise that too much. But definitely go on the website, and I'll actually give credit to Danielle Weiss behind me; she was the force behind the whole Fingerprint Source Book.

JOHN BUTLER: Any other questions?

Well, I'd like to thank our panelists again for excellent presentations.

(Applause)

We'll break until noon; we need to be back 12 o'clock because Cedrick Neumann will be speaking to us remotely.

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Part VI

NELSON SANTOS: So let's get started with the afternoon session. We're actually going to reverse the order of the presenters. We're trying to get Cedric Neumann on the WebEx. So we'll start off with Bill Thompson who will be talking to us about jury understanding of statistics. Each will talk about 20 minutes, and then we'll have another ten, or so, minutes for questions. So Bill.

WILLIAM THOMPSON: All right. Thank you. I'd like to talk about a body of research that's starting to emerge on how lay people, such as jurors, evaluate forensic science evidence. And this is a body of evidence -- it's kind of in its infancy. It hasn't progressed as far as we would like, but it's starting to give us some information about the way lay people understand, and sometimes misunderstand forensic science, and that can be relevant, I think, to decisions about how forensic science should be characterized and presented to them. There's a variety of -- let's see if my -- how do I advance? This one? Okay. Okay.

So the basic research approach has people being presented forensic science evidence. The research is typically done with lay participants. In some cases researchers have used actual jurors, people coming off

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jury duty. There's extensive use of online workers, such as people recruited from Amazon's Mechanical Turk, and, of course, students, with some differences among these groups.

One approach to doing the studies is what you would call a trial simulation. So basically people are asked to evaluate a hypothetical criminal case. And the cases are usually constructed, so they do the evaluation either with or without forensic science included or before and after receiving the forensic science evidence. So the researcher might say, all right, here's some evidence in a criminal case, how likely do you think the person is to be guilty? All right, now let's give you a little more evidence, including forensic science, now how likely do you think he is to be guilty. And that gives you some sense of the weight being given to forensic evidence.

Another approach to this research, which I've used in some of my research recently, is what we call an evidentiary contest, and that's where we present pieces of forensics science to people in pairs. So we'll say to people, all right, imagine that an expert compared two fingerprints or two DNA profiles and found consistency, and here are two statements that the expert might say about what that means. Which of these statements would you say is stronger? What would you give more weight to of the two statements? And we give multiple -- you know, multiple people are given multiple pairs of these statements, and so we get some sense of how different statements fall out one against the other, just to get some sense of the relative weight.

All right, so then -- forward. Okay. Within these [inaudible] -- it isn't responding very well here. The experimenters introduce variations, such as in the strength or the nature of the forensic science evidence. Does it matter DNA evidence versus fingerprint? Does it matter if it's a random match, if's a match probability, is the rare match probability given more weight than the common one, and so on. So presentation format, quantitative or non-quantitative has been varied, a number of other variables. Okay. So, all right, let me -- now I skipped too far ahead. All right. So, graphics.

Now, the key issue for all the research is which kinds of presentations lead to the best understanding or the most appropriate respond to the evidence. When do people respond appropriately? And, of course, that raises the question of what do we mean by "appropriate," okay? What kind of response are we looking for from lay people?

There have been three criterion that I've applied in my work that I think most researchers apply. One is we would like people to be sensitive to the strength of the forensic science evidence. We would like to see the people give more weight to the forensic science evidence when it is stronger by some objective standard than when it is weaker; right? When the random match probability is rarer, we would like to give more weight to the evidence. So that seems it.

We look also for logical coherency and their responses. If they think that the match is on a really rare characteristic, do they give more weight than more common characteristics? Do they update their judgment as much as we think they should, based upon logical rules or logical norms, such as Bayesian and Bayes rule. And a third criterion is do they fall victim to mistaken or fallacious interpretations that cause them to, you know, wildly misinterpret what the evidence means. That would be bad too. All right?

So sensitivity to strength of evidence, let me show you some examples of data -- well, let me save -- I guess I'm ahead of myself. There is research from a number of studies that look at people's sensitivity to variations in RMPs, random match probabilities, in various contexts, and this appears not to be a problem.

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People are appropriately sensitive to variations in random match probabilities. They give more weight to shared or matched characteristics when the RMP is lower than when it's higher, appropriately enough. Every once in a while you see a few people getting confused about this, but the general tendency is that people get this right.

There's mixed evidence about likelihood ratios. Some forms of evidence, such as voice comparison, DNA mixtures require presentations of likelihood ratios. There's early findings from some studies suggested people were not as sensitive to likelihood ratios and didn't understand them. These findings have not generalized well and I think they're not holding up too well. And my sense from the literature is that if you present likelihood ratios carefully, people can respond to them appropriately, and I'll give you more details on that.

I think we need a lot more research on people's sensitivity to verbal statements that are designed to convey the weight of evidence. I mean a lot of people have suggested that forensic scientists talk about the weight of evidence or the strength of evidence and how well the responses are calibrated with the intent of these statements is something that we need more work on but could be done.

Here's some data from a study from Christy Martire and her colleagues at University of New South Wales that have caused a lot of consternation and concern when it was published in 2013. This shows people's responses, how much their belief changed in response to shoe print evidence, with three very different likelihood ratios. The evidentiary strength of these are low, likelihood with four-and-a-half are moderate, likelihood ratio of 450, or very high, likelihood ratio of 450,000. And the disturbing part about this is that this huge variation in the strength of evidence seemed to make no difference in the amount that people's belief changed. This is bad, insensitivity; right?

And if you look -- she's showing, I don't know if I have a pointer here, but the lighter bars are -- I didn't mean to go ahead. I have to go back. All right, so the lighter bars are where there's a quantitative likelihood ratio. The darker bars where there's some verbal characterization of the likelihood ratio. With the weak evidence, if the jurors are told this evidence provides weak support for the hypothesis of same source; that actually caused people to decrease their belief that the hypothesis was true, so a reversal. So people looked at this, and said, oh, my goodness, likelihood ratios just are not working, people are not understanding that, and it led to a lot of research to see if likelihood ratios could be presented better. I did some of these studies.

This finding does not seem to be generalizing to other areas. When you get into DNA and other areas, likelihood ratios seem to be responded to more correctly. It's also the case that when you present the likelihood ratios in more detail. The Martire study gave a written summary of the likelihood ratio.

Here is data from a study that I've run recently at Irvine with a couple colleagues, where we had a videotape of an expert giving likelihood ratio testimony in connection with voice comparison evidence. So this is an actual voice comparison expert, an experienced expert witness who has presented likelihood ratio testimony. And we varied the likelihood ratio for voice comparison evidence from -- the lighter bars are likelihood ratio of 30, the striped bars are likelihood ratio of 3,000. We also varied the other evidence in the case, you know, the prior probability either low or high. And what you see, then, when it's explained for carefully, people do seem to be responding in the appropriate way, which gives me hope that likelihood ratios can be understood.

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There is some question about whether they are giving testimony about likelihood ratios as much weight as they should. And this gets to another question of is forensic science given appropriate weight; that is, too much or too little weight relative to what people should give it. You know, the usual comparison is to use some sort of Bayesian norms, based upon Bayesian modeling of the evidence.

It's been widely reported by researchers who have done this kind of work that people tend to undervalue forensic evidence; that is, they give the forensic evidence less weight. They update their judgment in response to forensic evidence less than an ideal Bayesian thinker would in light of the value of the evidence. But -- and I've written about this -- this kind of finding, although widely reported is a bit controversial. The Bayesian models that have used to model the evidence don't always capture all the relevant variables, so people might be underweighting the evidence because they're taking into account uncertainties that the model didn't capture.

There are some measurement and calibration issues. It's kind of hard to measure how people -- changes in judgments about probability are hard to measure, and the results do appear to vary based on context. So there's some context in which people appear to overweight evidence relevant to Bayesian norms. And this is particularly the case where it's evidence where there's a potentially high rate of error. So in those cases it can tend to be over weighted.

The major problem is less about how well calibrated people's judgments are relative to Bayesian norms. I think the more serious problems is that sometimes people, in responding to evidence respond in a way that's wildly inconsistent with logical norms; that is, they misinterpret the evidence and think that it means something quite different than what it means, which can lead to wildly wrong judgments, and, you know, fallacious judgments. And so let me give an example of this.

So let's imagine that's sort of a thought experiment. We have a DNA profile from a crime scene that appears to be from a criminal that's found to have the same profile as a suspect. And the expert says same profile, and the random match probability is one in ten million, what does this mean? Now one interpretation that I've 30 years in an article I called this the prosecutor's fallacy because I noticed a lot of prosecutors were giving this interpretation, is to say that means there's one chance in ten million that the defendant is innocent.

Now, this is a misunderstanding. It's a fallacious interpretation of what the evidence means, and, you know, a good defense lawyer can explain why it's a fallacy. Say, well, one in ten million, but that doesn't mean he's the only person who has the matching profile. And there may be 300 million people in the U.S., so there are at least 30 other possible people who would match. So the DNA evidence given could have greatly narrowed down the range of people who match. But it doesn't show that there's one chance in ten million that he's guilty. It just shows that he's a member of a relatively small group that could be guilty, and, therefore, you can't go from the DNA to the one in ten million.

Now some defense lawyers, having gone this far, unfortunately, sometimes take it a step further, which leads to something that I call the defense attorney's fallacy, which is to say this, that means there's only 1 chance in 30 million that he's the source. And some jurors also think this is true. Now this is also a fallacy. This is also wrong, for reasons that a good prosecutor can explain. The prosecutor could say, well, it's not necessarily true that there's 1 chance in 30 that he's guilty, because, I mean, out of those 30 people in the United States who might have the same profile, well how many of them could have committed this crime, like our suspect?

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I mean, maybe if all 30 of those people were exactly identical to our suspect, same criminal history, same alibi, same other evidence, if everything was the same, maybe it would be 1 in 30. But in reality that's pretty unlikely. The 30 people could be anybody. I mean, one of them could be a policeman in Peoria and one could be a little kid. I mean, so how many of them are also incriminated by the other evidence in this case.

And at that point, at that point we're starting to understand and, you know, the smart prosecutors and defense lawyers start to converge on the truth, which is you can't tell exactly how likely somebody is to be the source of the DNA from the DNA evidence alone. You also have to consider the strength of the other evidence. But this fallacy, the tendency to think that the forensic science alone can tell you the source probability is something that jurors often assume is true; okay? So we have this disjunction between what the expert can say based upon science, something about the rarity about the matching characteristics, and what the jury wants to know, which is what's the probability that it came from the defendant? Those are two different things.

The danger is that people will assume that when they're hearing statistics about one thing that they're hearing statistics about the other thing. And we can test. And we know that they do this, because when we do studies we ask them, well the expert just said -- made the statement, "What do you think the statement means?" Those who give the incorrect interpretation, and a substantial percentage do, that is associated with how they vote on the case. And so here's some data that I guess you can't see very well. But basically people who are falling victim to the prosecutor's fallacy are more likely to convict. People who are falling victim to the defense attorney's fallacy are more likely to convict, and so on. So this is a problem. We need to be concerned about how to avoid people making these fallacious interpretations that might lead to a misleading interpretation.

And we also need to think about whether experts should be allowed to opine on these issues. And this is an issue Christophe Champod raised yesterday, you know, I thought quite cogently. His question number one yesterday, is should the expert be making a decision about whether the evidence is strong enough to indicate somebody's the source? I mean do you want the expert to be stating an opinion on whether the suspect is the source or how probable it is that the suspect is the source if that requires the expert to consider or make assumptions about the strength of other evidence in the case, some of the other suspects there might be.

So I think the position of a lot of the Europeans, Champod's position, the position of some of the European forensic scientists and the MC guidelines that Champod cited, the European Network of Forensic Science Providers, all of those guidelines suggest that the experts should stick to statements about weight of evidence; okay. Whereas if experts are stating source probabilities or making verbal statements about likelihood of common source, you know, they are implicitly having to take into account non-science events.

So one of the concerns about having experts stick to likelihood ratios or weight of evidence statements is that there's concern about maybe jurors won't give as much weight to statements in that form as they will give to statements that are more conclusory or that involve statements closer to the ultimate issue.

The research we're seeing recently suggests that's not necessarily true. Here's some results that just collected recently in some evidentiary contest kind of studies that my research group conducted, where

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we're looking at how people rate the strength of various statements you might make about a DNA -- same source DNA or DNA profile match, where we have large numbers of people evaluate pairs of statements, you know, enough people evaluating enough different pairs that we can sort of see which pairs emerge most likely has the stronger pair. And in this particular study, likelihood ratio came on out top. So the expert said, well they have the same profile and this is ten million time more likely if they're from the same source than from a different source. That was treated as strong, right up there with saying the random match probability is one in ten million.

The different colors there are statistically significant differences. So it's actually stronger to give the ten million likelihood ratio or random match probability than for the expert just to come out and say that have the same profile, so, in my opinion, he was the source. But it does suggest that likelihood ratios are being given substantial amounts of weight, and, of course, the larger likelihood ratios are being given more weight than the weaker likelihood ratios. Down at the bottom just saying "he could have been the source" is pretty weak. So this is one set of statements.

Here's another study in the same mode, where we're having large numbers of people compare pairs of statements and we see which statements emerge, are perceived as the most powerful most of the time. This is about a fingerprint comparison, and we show here that saying that -- my 20 minutes are up -- saying they are practically certain to be the same source, was strongest here. Stronger than saying the random match probability for a fingerprint was one in a hundred thousand. But those statements are all considered very strong, higher than random match probabilities 1 in 1,000. So you can look and you can see this gives you a sense of the different levels of the statement.

Let me show you one more of these. This one is interesting because we threw in the term "match" about a fingerprint. So just saying, "Well, I looked at the fingerprints and they match." That is interpreted by people as the strongest statement of all. And other researchers have found this as well. I mean, saying a match is really powerful, which is dangerous because researchers sometimes say it's a match when they don't have statistics. They just say a match means sharing common characteristics. But people treat the term "match" as being more powerful than a match probability of one in ten million, even more probability than -- even more powerful than saying that the expert has identified or individualize to be the sample.

In this study, also, we put in as one of the items to be compared, this item down toward the bottom, extremely low likelihood of correspondence, we say it's an army standard. It's a standard that has been proposed by Henry Swafford of the U.S. Army Defense Lab. And he proposed some language in connection with latent print analysis. And it was treated as being weaker than identified or individualized, a little bit less than a 1 in 100,000 RMP. Stronger than a 1 in 1,000 random act probability. So whether you think that's correctly calibrated or not is an issue worthy of discussion, but at least the research allows us to discuss whether these statements are falling out in the order we want.

I think what it suggests to me is that people's responses to these statements seem pretty sensible most of the time. Research of this type has the potential to allow us to calibrate our statements more carefully to make sure that the meaning people are assigning to forensic science testimony is consistent with the meaning that we intend and want them to assign, and more research is needed to assure that's true.

I'll stop there, and hopefully Cedric will be on the line.

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NELSON SANTOS: We'll hold our questions until Cedric is done. I believe he is on the line. Are you there, Cedric?

CEDRIC NEUMANN: Yes, I'm here. Can you hear me?

NELSON SANTOS: Yes, we can hear you, we just can't see you just quite yet.

CEDRIC NEUMANN: Okay. I've switched on the camera and let me share my PowerPoint.

NELSON SANTOS: Okay, we see you now. Okay. So this is Cedric Neumann, who is with South Dakota State. So go ahead, Cedric. It's all yours.

CEDRIC NEUMANN: Oh, thank you. Good afternoon everybody and hello from the frozen tundra here in South Dakota, where it's presently minus 15 Fahrenheit.

So I'm going to base my talk on these two references. So it's final Technical Reports for NIST Award with Graham Jackson, David Kaye, Anjali Ranadive and Valerie Reyna. And also from a paper that was published in 2008 by Biederman et al., in Forensic Science International.

So I just want to start by exploring a little bit the decision-making model that was proposed by Biederman that I think makes a lot of sense. So when a forensic scientist looks at the particular trace, what happens he has a certain knowledge base. I look at the trace, the evidence, and he wants to make a decision. The knowledge base is essentially representing your background, belief, training, education, experience, SOPs, policies, case information, and so on and so on. It's everything that the scientist know coming into the case.

The information, the evidence, is the comparison between the trace and the control, the observed concordance is discrepancies, frequency data, some statistical model that the scientists may have available and so on, and a decision is yes/no, it's him, it's not him, identification and conclusive, exclusion, whatever he decides the decision to take -- whatever format of the decision he tries to take. So the question is how do we move from the knowledge base and the information, or how do we combine them to reach the decision.

So the first thing is the knowledge base obviously influences how the trace is analyze and what kind of priorities are taken, what kind of SOPs apply, and so on. But that knowledge base also influences what the prior beliefs of the scientists are about the source the trace. And in that decision model what happens is that those prior beliefs are updated by the information that are obtained from the trace in order to create some posterior belief. And that's just a particular process.

So let's say that you're looking at a fingerprint evidence and you have some friction-rich detail, you walk into the case, despite what you're claiming, you have some feeling, whatever that feeling is, but you have some feeling whether that particular friction-rich detail belongs to the source or not. So you may believe that it doesn't it, you may believe that it does, or you may believe that you don't know if it does. But you have some probability.

And then you look at some general aspects of those friction-rich details, and if they do correspond with the fingerprint from the suspect then you update your initial belief into some posterior belief, and then

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you look at your further minute details, and then that keeps updating your belief. So let's say that those minor details don't correspond, so, of course, your beliefs are going to be reduced. Or if you correspond, of course, your beliefs are going to be increased, and so on and so on. And that's a fairly secular process.

Now these posterior beliefs and prior beliefs are probabilities. But the aim, or at least one of the aims, is to render a categorical decision. And you can see here that there is a link missing, because posterior belief, don't necessarily go directly to the decision. There's something missing here. And what is missing is what Biederman and Allen in decision theory is called a loss function. And that loss function is what is used to move from probabilities to an actual decision. That loss function here is anything that can really affect that what has been called a leap of faith. So how do we move from 90% certain to, yes, I'm going to do this? That can be a fear of losing a job, a reward for catching the bad guys, SOPs from the lab.

I saw a lab once in England that was measuring performance of examiner based on the number of items vacation they were making per month. So their salary increase was directly linked to how many items vacation they were making every month. And that's the kind of reward that I would influence how do we move from a posterior to a probability to decision.

And if you think about it, this is making model is applicable to a lot of situations, not just forensic science. So if, you know, you decide what to do for supper, you have some knowledge base on what you can cook. You have the feeling of what you want to eat, and then what's in the fridge would be the evidence, and then so you're like, okay, I'm going to cook that. And then eventually you're going to make a decision whether, yes, you're cooking that or, no, not, you're not going to be cooking that. And that's going to be based on the time it's going to take, whether other people in your household are going to like it and so on. You can apply that to buying a house, buying a car. Any decision you are making, you can try to map that to that model. And it's a fairly interesting exercise, and if you can do it, it's worth it.

The type of conclusion that Bill was talking about earlier, they are in three different places. So in the information here, evidence, those would be typically the likelihood ratio type of conclusion. Posterior belief here, that would be your, I'm 95% certain that this particular object is the source of that trace, and here the decision would be those categorical conclusions, identification, exclusion, and so on.

The categorical conclusion, so those will be your definite statements of source. You can find that in identification and conclusive exclusion kind of scheme, database searches schemes. That's the only conclusion types that can be associated with error rates. You cannot associate error rates with other types of conclusions. So that's really the only one. So when the NAS report or some other reports ask for error rates, they essentially ask for that type of conclusion.

Posterior probabilities, so the trace has 95% chance to originate from that source. Evidence, that will be also that other type of conclusion, consistent with, analytically indistinguishable match/no-match, although the term that be here defined, and some people would think that the match is actual a categorical decision. There's no clear consensus on what match/no-match actually means. Random match/non-match probability, random and exclusion, likelihood ratio, Bayes factors all of those types of conclusions are just solely based on the evidence.

Now, some people are claiming that the loss function, anything based directly on knowledge base can introduce bias in the decision-making process. And some individuals -- and Bill was mentioning the Europeans -- mostly believe that these have no place to take. This should not influence the decision-

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making process. So if we don't accept forensic scientists, we don't accept that they are making those kind of decisions, that they're entering into the analysis with any prior belief or that there's no loss function that they can define, then the problem is we can't have that. We can't have that. We can't update the posterior abilities and information, and ultimately we can't render a decision. So the only thing that is left the conclusion related to the information. And that's why there is this debate between should we report likelihood ratio or information Bayes conclusion, or should we report those categorical decisions. It's mostly because of that particular source of bias originating from that information that we have.

So the question is, really, if we have forensic scientists if they're only able to report the information related to the evidence, is it better than those categorical conclusions? Is it more objective? Is it really more scientific? Is it less confusing for the audience? And Bill gave some interesting data about that. And there is this push to report those likelihood ratios or Bayes factors, but I have several issues with them.

For example, there is not a single correct way to calculate them. That's a big issue that is debated in the forensic sentencing community right now in terms of how do we calculate them. How do we make sure that that Bayes factor, that weight of the evidence that we're reporting actually is representative of the actual weight of the evidence? How do we communicate them? For example, are these three objects that I put on the slide, are they mathematically equal objects to an audience?

So if I have a ratio of a thousand but you can represent that as one over one in a thousand, or you can represent that as one in a thousand by one in a million. And essentially likelihood ratio of a thousand may be reasonably power evidence. If I'm saying well the probability of showing that evidence, if it comes from the suspect is one, so it's certain to have that evidence if it comes from the suspect, versus if it comes by somebody else, it's one in a thousand. That may carry some different weight to an audience.

And if I'm saying for the third element here, I'm saying, well, there's only 1 in 1,000 chance that also evidence comes from the suspect, but it's even more rare to absorb that evidence comes from somebody else. So I'm basically saying it's impossible to come from the suspect, but it's even more impossible it comes from somebody else.

But, ultimately, mathematically all of these three objects are exactly the same, and the question is what do we want to disclose to the audience? Do we want to disclose the 1,000, do we want to disclose the middle one, or do we want to disclose the one on the right that is not necessarily great?

And we can do the same thing here. For example, there was some interesting paper that was published. I think Bill was one of the authors, including error rate into the various statements. So, for example, I have those three statements, which report pretty much the same information. So the way we see the evidence, I can report specificity of the observed genetic material in the trace and laboratory rates is 1,000, and the weight of the DNA evidence, based on specificity of the observed genetic material is one million, but we have some quality control process that have shown that our laboratory mislabels samples in one in a thousand cases.

So, here, I'm splitting the weight of the evidence into the weight of the evidence without error, and some measure of error on the side, where in the first stage I combined both of them. So which one do we want to report? Which one is the easiest for a jury to understand? And the last one is just purely verbal. I don't put any statements, any numerical statements, but it means exactly the same. So is an audience going to

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understand those three statements in the same way when they actually means the same thing to a scientist?

So, really, what we want to do is we want to ensure-- and what Bill said, we want to ensure that the information is understood as intended and used in a very rational way by the decision makers. The decision, the conclusion should be expressed in a way that -- that's my belief, expressed in a way that maximize the chance a juror with different levels numeracy and experience will understand that information the same and use that correctly.

So that's another new problem, and that has been investigated in many, many different fields. For example, climatology, how do we talk about global warming in order for most people to realize how serious it is? Medicine, how do we present some bad news to a patient? So, you know, when somebody goes for an exam and then eventually the doctor has to explain the different options, the different threats to show the health of the person, how do we communicate that kind of information? And obviously in political decision-making, where intelligence officer have to provide information to political decision-maker or to military strategist and then they have to use that information to render a decision.

So there are many different fields where that issue arise and how do we communicate that evidence? And that issue has not been solved in this field; that being exactly a lot longer than forensic science, and they have obviously the impact of not resolving this issue in this field is more serious. However, these fields have an advantage of a forensic science in that they are possible to train and educate the recipient of the information, because it's dialogue between the person who communicates the evidence and the audience. And it's a very different situation in forensic science, especially in the United States where we have, really, a one-up shot with the audience. We can't interact with the audience. We can't discuss with the audience. We have to literally be on the stand and communicate that information through a jury of untrained people. And I think that's a key limitation of what we are trying to do in forensic science.

Now, in terms of communicating information, all these studies from the different fields have not be in vein. Obviously they have not taught us a lot of different bits and pieces of information, so in a sense, one of the big things that they have shown is that individuals prefer to communicate information in a qualitative way, but they really prefer to receive that information numerically. So they really want to have precise information, and also make the decision that when you ask them to express the information, they don't want to make it look like it's very, very precise. They want to communicate that there's some uncertainty.

So it seems that there are different processes going on in the decision making of each individual. And that's one of the theories of how to communicate information and how to understand information. It's called a "fuzzy trace theory." There's three or four of those theories. This one is the current leading one, if I say, and it originates from cognitive research, and it shows that individuals rely their gist, which is essentially just getting the substance of the information and the exact presentation of that information at the same time to make decisions. So it's not necessarily that they prefer to receive verbal statements or numerical evidence, they want to have both of them at the same time, and they use both that distillation of the information and the exact information to trigger a mental process in order to make decisions.

And according to that theory, the decisions that are taken, they usually are influenced by the ability to mentally conceptualize the problem. So if I receive some information, I'm going to try to understand what's going on here, but I'm also going to try to trigger some memory in order when have I been in a

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similar situation, what have I done, and what was the outcome. And also, my abilities or my training and experience, so how do I apply reasoning process. Am I more like a rational person or am I a person that makes harsh decisions, and how do I process information.

So if you really want to influence somebody, and not necessarily in a bad way, but if you want to trigger the right mechanism in an audience when you communicate evidence, you need to be able to make sure that they conceptualize the problem. They need to make sure that they retrieve your previous experience, and that they can apply a proper reasoning process with information you're giving them.

So there's some guidelines that have been issued for climatology and in the medical context, so some of the guidelines are use analogies to common situations; for example, try to trigger this mechanism. One of the nice things would be able to use case-specific information, and I know that there's an issue here with potential bias, but that will help the audience to conceptualize the problem.

And another thing is also manage expectation regarding the value of the evidence. So, for example, we've seen that if you talk about fingerprints and fibers for example, and you present those two evidence with the same value of the evidence, because the audience may have perception that fingerprints is a much stronger evidence is fiber, even if objectively they have the same value, the audience may actually perceive the evidence as a much stronger evidence than the fiber.

So that leads us to the next guideline, which is that information must always be presented with the range or scale for the people to be able to put the information you're putting them into context. And obviously we need to find some balance between triggering memories and biasing the audience. And one easy example here is, for example, if you say, well, this particular piece of evidence is very rare and I expect to see one in a million times in a population, which is about the chance of being hit by a lightning strike on the golf course.

Okay, well if you're in the audience and you never go on a golf course, then you say, well that's really, really rare and I'm never going to be hit by a lightning strike. But if you actually go off with one of your golfer friends and one of them has been hit by a lightning strike, you're not going to think that one in a million really rare anymore. So triggering those memories is a good thing, a necessary thing, but that can create some further bias as well.

From all these studies in these other fields it shows that it does not matter if the information is presented verbally or numerically, because there are these two different processes there's verbatim process, and since they're running in parallel, if you're telling me some information verbally, I'm going to try to trigger some memory to try to convert that into a number. And if you're telling me some number, I'm going to try to trigger some memory to convert that in a verbal statement. So ideally you really want to present your information in both ways, verbally and numerically at the same time, and, if possible, also graphically.

So, in general, they show that it's better when you present information in separate ways. So when I gave the example about the likelihood ratio, the way I combined the error rate with the weight of the evidence, versus when I separated them, ideally those evidence should be separated, because people will be more -- the proper mental processes will be triggered by if you present the information with different salient points if you separate them. Even if the person cannot necessarily combine this evidence using or information using proper Bayesian norms, it's still better to present that error rate separately.

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The other thing is that the information must be arranged such that the meaningful pattern appears to the audience. So there's ways of presenting that information that we need to be very careful about. And, again, if we present it in a different way, we can trigger different mechanism and have the audience think something different, which is not necessarily what we want to do, but we need to be careful about that.

Now I think Bill mentioned that, but there are some further issues with communicating evidence and the likelihood ratio. And I was fairly convinced by the need to report likelihood ratios. Don't misunderstand me. But I feel more and more that there's a disconnection between what the forensic scientist wants to report and what the audience wants to hear. That's what Bill Thompson was saying as well, in terms of the audience is interested in the crime level. They're interested in did that person commit that time, versus they did not. And it's not necessarily directly interested in what we call the "source level proposition."

For example the bullet came from this weapon versus another weapon. Mr. X manipulated the weapon. And I don't know how to reconcile that exactly, but I think that's maybe why forensic science went for categorical conclusion, because they may have believed that it was more help to the audience to address indirectly what the audience wanted to know, as opposed to now if we go back to ratio we're going to be further away from what the audience is going to know. And that may be explaining why Bill observed that when you -- likely ratio they don't necessarily update to the correct Bayesian genomic because they are a level of thinking that what we're trying to communicate.

And finally, I still want to put it out there that we want to be more objective. We want to be more scientific. We want to be helpful. We want to be understood by the audience. And the question is do we care about some aspects than others. When I read the NSA report for example on communicating evidence, I feel that they really want to be very scientific, very unbiased, but they don't really care about being understood or helpful. And I think we need to find some balance between these different aspects.

And, also, especially for the MC, we need to be aware or remind ourselves that they have a completely different judicial system, where they can actually train a professional juror and they can train judges. They can train prosecutors and defense there, which is very, very difficult to do in the U.S. court system. And so we need to be, also, aware and take care of the different issues -- how do you say that -- the different way of doing things between Europe and the United States, and not necessarily jump to likelihood ratio that because that's what they're doing over there. So that's it.

NELSON SANTOS: Thank you, Cedric. We have time for a few questions. I think, Fred, you were up first.

FREDERICK BIEBER: Larry Tribe was a column law professor at our school, wrote a law review article, I think in 1984 called Trial by Mathematics.

MALE SPEAKER: 1971. Older than that.

FREDERICK BIEBER: Yeah. Okay. In which he argued not about DNA at that time but about math confusing the average juror. And he may have had a point, because if you use a verbal predicate to answer a question, what's the chance I buy a winning lottery ticket at the local Circle K, you probably say it's not zero but it's vanishingly small, yet there's a long line of people the day for the lottery. So that's a bit odd, if not bizarre.

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But what I'm wondering, Bill, is if you have looked at your experiments using different data; DNA versus latent prints versus firearms and tool marks versus tire tread or shoe prints, because I wonder if people nowadays are preconditioned to have more confidence in DNA matches and maybe latent print matches than they might be about other forms of comparisons. And I'm wondering as a second experiment, could you try something where the context of the case doesn't matter whether this match helps or hurts either advocate in the process, so that it's not the be-all and end-all piece of evidence in the case. Because I'm wondering if that has an effect, the context of the so-called match in the instant case. I'm wondering how that would affect how jurors would vote or how they would consider the importance of that evidence if it doesn't necessarily matter. It's just one piece of circumstantial evidence that neither helps nor hurts prosecution or events.

WILLIAM THOMPSON: No, you're thinking along very similar lines to the way I've been thinking. I have done the study that compares DNA evidence with footwear or shoe print evidence, where the experts are saying exactly the same thing in terms of the match probabilities of likelihood ratios and so on, and we vary one in a million versus one in a thousand and so on. And your intuition is correct, the nature of the forensic evidence makes a difference to how they respond. So the very same statistical testimony, when attached to DNA evidence, leads to much greater impact on decision maker than one attached to footwear evidence. I think there's some people come to the case with some inherent skepticism about how strong footwear evidence can be, and particularly when you're telling them that the footwear evidence is a million times more likely if it's the same source than the different source, there's a lot of skepticism and people tend to give that not a lot of weight.

So, you know, I have a published article on this that I could show you, where we directly contrast those two and show, as Cedric mentioned also, that the nature of the evidence, so these decisions are complex. People come to the case with their own ideas about how strong different kinds of evidence can be. And what the expert says, the expert's testimony and the numbers that the expert gives have influence, but that's in the context of whatever kind of evidence we're talking about.

The other question you ask is, well, does it matter, like, which side it favors and so on. And I haven't published any of this, but we have some kind of intriguing findings where we're looking at do people believe in theories of DNA transfer, that DNA accidentally transferred from one item to another? And, yeah, it turns out that they're much more likely to believe that DNA transfer occurred if it helps the prosecution make the case than it helps the defense get out of the DNA evidence. So I think people's sort of preexisting notions about how things go affect their willingness to accept the viability of a scientific theory. Or it may be that a scientific theory advanced by a prosecutor is seen as more plausible than advanced by the defense attorney, even though it's the same theory.

FREDERICK BEIBER: One final thought is that you might try lower likelihood ratios, because there are a number of circumstances, especially kinship studies where the odds ratios or likelihood ratios aren't in the billions and millions, they're smaller. And I'm wondering how those numbers would affect --

WILLIAM THOMPSON: Yeah, we have run a series of voice comparison evidence with likelihood ratios that are 30 or 3,000, which are more in the range of what the voice comparison people are doing, and, you know, those studies actually show sensitivity. So those studies are encouraging.

NELSON SANTOS: Judge.

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JUDGE JED RAKOFF: So this was very helpful and very interesting. But one problem that I -- or one question of focus that I would ask you about, so the jury system is largely going the way of dinosaurs, and right now, and for quite a few years, only 3% of all criminal cases go to trial at all, some of them a bench trial, most of them jury trial. But it's a tiny fraction. So the real decision making, including the evaluation of this kind of evidence, is being made in the negotiations between the prosecutor and the defense counsel. They will take account, of course, to some extent of what they think the jury might think if the case were to go to trial. But I wondered whether any studies have been done about how prosecutors or defense counsel understand this kind of evidence, because I think very few prosecutors have much of a background in statistics. Very few defense counsel have much background in statistics. But I don't think they're quite in the same situation psychologically as jurors. They have a greater sophistication of the system, even if not of the statistics. So I'm just curious whether any studies have been done how prosecutors or defense counsel, or both, react to this kind of evidence.

WILLIAM THOMPSON: Yeah. No, that's a good point. Because I was rushing, I neglected to say that some of my research has been funded by NIST through the CSAFE grant. And although I haven't done it, the CSAFE grant has also funded some research by Brandon Garrett and his colleagues at the University of Virginia where they have looked at lawyers and judges responding to some kinds of forensic evidence. So research along those lines has started. You know, as with the rest of the research, we don't know nearly as much as we would like to know in order to make good policy decisions, but I think people are starting to think about those questions as important questions.

NELSON SANTOS. Greg then Wes then Susan.

GREG. Thank you, Mr. Thompson. That was an interesting presentation. I have to say a couple of us were noticing in your slide presentation that the prosecutor was depicted as fat, balding and in a pinstripe suit, and the defense attorney bore a slight resemblance to you. So I wasn't sure what the psychological or behavioral influence of the slide deck was supposed to do to the commission.

But let me ask this question. The study that you talked about were cast in the context of forensic science, and I'm curious, have you been able to tease out, because in the early life of this commission there was a lot of talk about the CSI effect. Is there something distinctive or unique when testimony is cast as forensic science as compared to merely scientific? So have you compared, for instance, maybe any testimony in the context of a civil paternity suit as compared to DNA context in the context of a criminal prosecution? Are there different results when the jury pool, which is exposed to forensic sciences as an entertainment medium, is viewing science?

WILLIAM THOMPSON: Good question. I mean I have run some studies involving DNA evidence in a civil context, like in civil paternity kinds of actions. And, you know, the design hasn't been directly comparable to anything I've run in the criminal context. I don't know if I have direct data on that question. The broader question on the CSI effect, there's been some interesting academic writing and discussion. One of my colleagues at UCI, Simon Cole, wrote a nice article reviewing the empirical evidence for the existence of the CSI effect. I guess there are multiple ideas about what the CSI effect really is. I mean some people talk about the CSI effect, meaning people won't be willing to convict unless they have forensic evidence. Some people say the CSI effect is people overvalue the certainty of forensic science evidence, you know. And there's not a lot of good empirical support for any of those claims.

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Certainly there were claims being made for a while that juries had become a lot less likely to convict in the DNA era in cases where DNA evidence wasn't presented. And further analysis of the conviction rates and actual, you know, conviction rates did not support those claims. So, you know, I don't know if --

GREG: But you're trying to distinguish between the scientific representation as compared to forensic science representations?

WILLIAM THOMPSON: Ask that again. I'm not sure I followed that question.

GREG: So if I understand your answer correctly, your studies have not been designed to distinguish between the effective scientific testimony, which is not cast as forensic science, versus scientific testimony that's cast as forensic science.

WILLIAM THOMPSON: Correct. Right. All of mine is forensic science. And as far as the cartoon, I didn't draw the drawings. It was drawn by an acquaintance of mine who was a cartoonist who has -- and I think it's probably fair to say that my friend, Chad, who drew the cartoons, has a more favorable opinion of defense lawyers than prosecutors based upon his particular life history. But we'll leave that aside.

NELSON SANTOS: Okay, Wes, Susan, and then we'll end with Barbara, and then we're going to move on.

WESLEY GROSE: Both Bill and Cedric, I want to thank you for your work. I think it's really important for us on the lab site to understand the impact of our words. I think we're condemned to use words, and unfortunately they mean different things to each of us. But the question I had is, I don't know, has there been any research to see how the impact of an expert's testimony is changed by how the defense or prosecution summarizes at the end of trial? Because a lot of summary goes on the end, and I don't know if you've heard anything on how it could sway someone's perception of the evidence based on how it's summarized at the end.

WILLIAM THOMPSON: Well, I mean, it's a good point. I mean, the more elaborate study has included, you know, the summaries of closing arguments or summaries like those that a lawyer might make, and I think those studies are giving us better information than the more paired down studies that simply present the evidence alone. I mean, I think everybody recognizes it's a complex phenomenon, and that jurors can be influenced by a variety of different things, and certainly lawyers' arguments are important.

This is particularly true when it comes to the fallacious interpretation of testimony. That's one of the real dangers, is that jurors will think that the expert is saying something other than what the expert is actually saying. And I think lawyers' arguments can go a long way to either correct for that tendency or to reinforce that tendency. I mean, there are unfortunately some cases where the experts will testify in a way that is completely correct scientifically, and then the lawyers will get up, and in their summaries and arguments will distort what's said and they'll think, well the expert told you X, where it's not true.

The first case that went to the U. S. Supreme Court that raised this question that the prosecutor's fallacy was a case called Daniels versus State that went to Supreme Court in 2010. So the U.S. Supreme Court has recognized that the prosecutor's fallacy is an error that experts and lawyers should not make, although they decline to rule that making that error was a fundamental violation of due process when it occurred.

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CEDRIC NEUMANN: If I may.

WILLIAM THOMPSON: Sure.

CEDRIC NEUMANN: I think that's a very good point. And that's what I was trying to communicate, is that, as forensic scientists, we always fit in a bigger picture, whether it's a trial or whether it's during a plea bargain negotiation. And I think that we're spending a lot of time wondering how objective we should be and maybe not enough time worrying about how well we should communicate and what's the impact our message is on the jury and not so much -- and make sure they can't be manipulated by a prosecutor or defense attorney, and maybe that's one of the biggest fears of this issue is they're easily manipulated.

SUSAN HOWLEY: Hi. My question is for Dr. Neumann, and it builds on Judge Rakoff's comment earlier about how trials are such a minuscule part of the number of cases that we have. How hard or how heavy a lift would it be for forensic scientists to routinely communicate their findings in a way that Dr. Neumann described earlier? Those different points routinely communicate that in a concise written form so that the prosecutors, the defense attorneys both had it and it could be easily shared with victims so that they would understand the true import of the forensic results?

CEDRIC NEUMANN: So it's not that hard in theory, but it is clearly an issue of training, because I've been in involved training forensic scientists for 15 years now, and training them in something quantitative is quite a challenge, especially with all the kinds of evidence in forensic science. So it shouldn't be that hard to find sort of a model statement that people should use. But it would be a lot harder to train them to understand what it means and to train them to be able to understand what they are saying.

NELSON SANTOS: Barbara, last question.

BARBARA HERVEY: A couple things, you all know Lynn Garcia from our Texas Forensic Science Commission, and she's been working a lot on hair analysis. And part of the schematic she has is to look at the arguments of counsel. And as we all know, arguments aren't evidence but they can influence the outcome of a case, and particularly when we're looking at it, Judge Rakoff and I, from an appellate standpoint. So that is very important. But I just wanted to comment on that. She's got a great schematic. If you want it, I'm sure she'll give it to you.

But we did an interesting thing years ago. I had to go and give a speech in Seattle, and what they wanted from me was my judicial impression of, you know, forensic science. And I was like, I can't do that. I can't speak to the judges of Texas. I can't speak for my court. I could speak for myself. But instead, I decided to tell them about a survey that we did, and it was real easy. It didn't cost anything. And we did a survey of our criminal judges in Texas, and this was years ago, and we could always update it. And surprisingly, they were honest. I'm glad. But we asked them basically about -- this is what the NAS reports so we update it to PCAST. And we asked them if they had read it. If not, we gave them the cite, at least the summary. And then we asked them a series of questions about forensic science, their knowledge of forensic science, if they knew anything about their gatekeeping function, those kinds of things. And they were very honest, and we could train from that. So we could do the same thing with lawyers.

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I tried a different kind of survey with the Defense Bar and the Prosecution, and both sides told their constituents not to answer our survey, which wasn't really good, since we control their training money. But those surveys are easy to do, and it does help with training a whole bunch.

And then I was thinking about, you know, listening to both, and I appreciated the presentations a great deal. And I remember in the old days when I was a DA and I was always in the appellate section, and then juries all expected there to be fingerprints on everything, or fingerprints everywhere. And so it got to be quite easy for the latent examiners to go in, they learned to say, okay, right up front, the state would tell them, "We don't have fingerprints" and we just put on the latent people to say, "There aren't any fingerprints in this case and this is why," you know, whatever the reason was. So as far as other sciences, I guess they could do the same thing. There's no DNA, so don't expect it, you're not getting it, so just, you know, rely on some of the other evidence that you're getting. So I just wanted to make those comments. Thank you.

NELSON SANTOS: Thank you. All right, thank you, Cedric and Bill. Very many much appreciate it. All right, we're going to move right into reporting and testimony with Matt and Jed.

JUDGE JED RAKOFF: So we have one report for a final vote, and one for discussion, and the one for a final vote is the contents report, so I'll turn that over to Julia who headed the working group that worked on that report.

JULIA LEIGHTON: Thank you. And thank you to everyone that worked on this report. Let me tell you that what we did, as a process after the last meeting, is that we took all the public comments, gathered them all together, shared them with the entire subcommittee, but more importantly with the working group, and thank you very much to the members of the working group. We reviewed those documents, came up with responses, came up with a draft, submitted that to the subcommittee, which then discussed it on a November 1 conference call. We then made final changes to the documents in response to that call and put the documents out again for a vote on November 17th, and the vote was 22 to 0 to send it onto you all. So here we are.

I think the best way I can do this, I'm going to try and address a couple of the overarching concerns and then I'm going to break things down of pieces to discuss. You know, one of the concerns, and I think this was not surprising -- is that it felt like we were asking for a lot of material. There are a couple responses to that. One, a lot of what is being asked for is already required under accreditation standards. Some of what we included in here is actually now, with the most recent supplemental coming out, also going to be required. But in the end, some of it is our decision, that even if not required under current accreditation standards, that it needed to be part of the report or part of the case file.

Another concern was that we go and justify everything we had in there. And part of that, that's a daunting task, and so on some level some of it is, I think, fairly obvious why you have page numbers, so that you know that you have the whole report; why you have authors' names seems obvious. And so rather than make the document extraordinarily long, we put forth the number of people that worked on it, the number of opinions that were brought to bear, the number of forensic practitioners that were involved in both the working group and in the subcommittee, the number of stakeholders that really spent a lot of time talking about when do we make decisions, what do we make decisions based on, so when do we need the information in the report, and when can we wait and get the information in the case file, and when a

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matter is reaching the sort of level of litigation that has us going to the case file, what is it that we need to be able to then present our cases in court. So I think that that was the tiered level of responses.

And I'm sympathetic to the -- there's some jurisdictions that make the case file available, like, routinely, and so they sort of wonder why anything needs to be in the report, because they can get the case file just at the drop of a hat. That actually is sort of rare. And in the end, even if it's available, the report is something in overburdened systems that prosecutors and lawyers are relying on rather than trying to read the entire case file. So even when it's readily accessible, there's some things that the system needs in the form of a report.

The other overarching sort of concern that we had was how we addressed and making clear what we meant by reporting on uncertainty, errors, and statistics. And we actually had some conversation about that, not only through the public comments but at the commission hearing, the last commission meeting. And we incorporated that into the Appendix A changes that we made as well.

I'm going to apologize right now. The red-line version is not perfect. This went to a lot of different people with a lot of different hands making changes in it, including a last round of changes for which I am thankful that was done by DOJ staff to try and clean up language, change language. And not every strikeout was captured, but I believe the clean copy is everything we intend to be in it. The red-line copy, I think, gives you -- I was about to use a statistic. I won't. We came as close as we can, but it is not perfect. And I think I can identify some areas where it wasn't perfect that may have led to some confusion.

But my thought is to start with -- because you should always start with, I hope, what is simple -- is to start with the document itself before we get to Appendix A. I believe it would be fair to say, and I believe John has that up there, that the changes made in this document were all smoothing out the language, changing upper caps to lower caps, getting rid of some these, using although instead of while, putting in some periods and splitting sentences, trying to clarify what Appendix A was, and Appendix A was standards and other sources, and clarifying what we meant by at this juncture in time, a comment that was raised, and deleting appendix -- the original -- an appendix that we had in the first draft that was for discussion purposes only.

But I want to take it if there are any questions or concerns about the changes made to this part of the document before I turn to Appendix A. I wanted to see if there were any concern or questions about that. All right, seeing none, I will move on.

SPEAKER: Susan, your tent is still up, if you want to just.

SUSAN HOWLEY: Oh, sorry.

JULIA LEIGHTON: I'll move on to Appendix A. There's a fair amount of -- one of the issues we saw as we went back through it -- and Cecilia gave us some very helpful comments -- there were a lot of duplicative sort of language, and I think part of it was, in the first front of going through this, we were pulling from a lot different sources, and we tried to tighten it up. And I think you will find we were pretty successful at getting rid of sort of items that were gesturing at the same thing and defining what it is exactly it was in one item. There was certainly language that was added by DOJ, a lot of include, include, provide, which I think just makes it all read more smoothly.

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Moving on down to -- I wanted to point out one other change. There's a section where we ask that the -- when there's a request for testing, that that request should be documented even if the evidence wasn't analyzed or the testing was halted as the customer's response. I point this out only because the only changes to it were some wordsmithing. Except that as I've gone back and looked at it, I wanted to address it was confused for a comment that you made to us, Cecilia. It was that that we were looking at and saying we weren't looking for an explanation, not the section of the report you referred to. And I'll go ahead and try this make this clear to everyone now.

Cecilia asked the question why we were asking for an explanation of why comparison or testing wasn't done on some items received. We incorrectly said in our response that the document doesn't ask for an explanation. That was wrong. We do ask for an explanation for testing wasn't done. What we didn't ask for was an explanation why the customer wasn't making the request a customer was making. And I apologize for not having fully understood your question.

And so if you look -- just come down a little bit further, and unfortunately it's split on the page. Keep going down -- We do ask that the case record contain an itemized list of items that are not compared or tested, and an explanation of why no comparison or testing was conducted. And Cecilia has subsequently raised with me, and I understand that she may not be alone, that this feels like a lot of work. And she gave me a number of good hypotheticals of reasoning. And I got a chance to briefly discuss it with her and Linda, and I want to respond to that and then open the floor for more conversation about it.

And the issue was that, yes, it might be as simple as the customer didn't ask for it, period. We're not asking more behind that. You didn't make a decision. It's not a fact. It's just a fact not a judgment within the lab's control or a judgment the lab makes, so you can't opine about it. You can't speculate. You weren't asked, period. There is the, it's our standard operating procedures to only test, you know, baggies of drug, not to test paraphernalia. That again is just a straight-forward fact and why certain things were tested and others weren't.

You then, I thought, raised a hypothetical, when the lab is making a decision about what stains may or may not be probative for DNA testing, and that I think our group collectively thought was important to document; that the stakeholders, customers, people reading it need to understand the decision you made about how you determined what was probative to be able to assess whether or not if they know different facts or have a different set of data that they're thinking about, about why something you didn't think was probative might be probative for an alternative theory, and that without knowing the basis of why the decisions were made, the customer who finally gets to the case file, which means we're pretty much down in the litigation of people that are really interested in how they're going to approach this, need to know that thinking to be able to decide, make an intelligent decision of whether or not they're going to do additional testing or seek additional testing. So that was the basis for that.

I don't know if you'd like me to stop there so we can discuss that or to continue through with some of the other changes. I see my chair, my boss telling me to move forward.

I glossed over other changes, because I think they were mostly language oriented. To the extent that they included item that people didn't want, it was our collective belief to keep it in. We tried to make it clear, you know, what we were talking about with some EGs, when, you know, what is a brief description of what the items look like, they're wet, they're dry, they're clumped, they're faded. And that, again, when we

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were making those kinds of decisions, we were think about not only what decisions have to be made by prosecutors and defense lawyers when they're looking at the report in terms of whether they're going to plea, the other piece of it is whether they're going to seek the case file. And so there's a balancing there of if I have enough information I can make a more informed decision of whether there's something I need to go find in the case file.

If the material arrived wet and that matters in this instance, then I know I need to go look at the case file. Just that it came in wet won't tell me that everything that wet did to the testing and the decision making, but it's the red flag that in my world that matters, go take a closer look.

Probably the next most verbiage that was addressed in the report had to do with the concerns that is were raised about how we were defining and making clear what we went by "uncertainty and limitations," and that appears under "conclusions, interpretations, and discussion." And I should note that in the draft we were all talking about last time, twice in the report we talked about it. We talked first, in the section above, we talked about statistical analysis and this were probative value, including statements of uncertainty or estimates of variability associated with them. We deleted that language up above and put all the discussion about quantitative and qualitative results in the conclusions and opinions, and interpretation section. And what we addressed was in the prior report, and this is, again, where unfortunately this red line lost some of the language that was struck and replaced.

NELSON SANTOS: Do you want to put up the final version?

JULIA LEIGHTON: No. No. No. It's actually what the other draft was. And the other draft had tried to talk about quantitative results and what sort of statistics -- you know, all quantitative results should include the estimated uncertainty or estimated variability, and then we talked about all comparison or qualitative results should include statements of possible sources of error and limitations in the method, data, or conclusions. That sentence was struck as well, but it didn't show up in this red line, and it was replaced with what you see here, which is "All qualitative results should include known limitations and potential sources of error in the measurement and analysis methods, interpretations, opinions and conclusions" -- I won't keep reading, but if you can scroll up just a teeny bit, John, we'll see if we can get it all on one page. We probably can't. You all have this in front of you, if you're looking for it.

And before jumping in -- because I know there were some people that had some comments on this section -- let me continue through to the end. There's not that much more. Again, going back -- going on, we tried to give some examples to address some of the concerns people had about what did we mean. Again, they're not dispositive. We addressed them as "e.g.'s," so it's just an example. And one of the issues that we heard from is the issue of how to address disagreements and how they should be documented, and, again, how much information you're asking for. And so we suggested that it's as simple as saying no disagreement, disagreement resolved, disagreement resolved after arbitration, unresolved disagreement over whether --you know, to something more detailed.

And the point here, a lot of the comments we heard is differing levels of disagreement that people thought ought to be in a report and what ought to be in a case file. And rather than sort of picking out, saying, "Well only this kind of disagreement needs to be documented," it was our perspective that all disagreements needed to be documented. Granted, some may have a different value and may be relevant in smaller and smaller contexts, but it was our opinion that all disagreements had to be documented

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because there was a place or time that they may be relevant. That all we needed in the report was a flag about the nature of the disagreement, not the details.

And then again, the people that are the consumers of the report could decide whether a disagreement that was resolved or disagreement that was only resolved after arbitration, whether those types of disagreements matter in our case. And if they don't matter, then I don't need the case file. If one or the other does, then I need to get the case file.

So I think that is sort of a summary of what, really were a lot of comments. And maybe I didn't go through each specific one that was made because I don't want to take up all the time, and I'll just open it to the floor.

[Inaudible].

JULIA LEIGHTON: Oh, I apologize. There was one concern that was raised. Let me get you to go back up to -- thank you, Cecilia -- where we discuss database searches. Help me, John.

[Inaudible].

JULIA LEIGHTON: Okay. So I'll find it there. One of the concerns, when we asked about describing reporting on database searches was that -- and correct me if I've got this wrong, Cecilia -- there's an initial database search, and then some things sit out there and are just being searched over and over again. And we are not asking for that search. What we're asking for is the initial search and any subsequent search that produces a hit. Though I'm going to ask for a more thoughtful word than that, but it seems to be a word we all understand. And so a friendly amendment -- and I think it can be treated as friendly amendment -- would be to go to the end of that section and say provide a summary of the results --

JOHN BUTLER: Can I put it in the final?

JULIA LEIGHTON: Sure. That would be great. I'm sure Cecilia is going to give me some better language in a moment. But what were looking for is for the initial search and for any subsequent -- what would your proposed language be, any subsequent search that produces a hit? I'm going to look to Linda and Cecilia to help me out with the language you would use in your lab.

CECELIA CROUSE: Usually what happens is that if there is a hit, then a report goes out. So I would think that, besides the initial search, any time a report goes out that specifically concerns that item. Because if a report has gone out, it means something's happened.

JULIA LEIGHTON: So how do we describe to the community that they must report out on this initial search, and then they must report out on any subsequent search that results in a --

CECELIA CROUSE: That's generated in as a result of the search.

JULIA LEIGHTON: I know it's automatic. Yeah, I know it's automatic in your lab. But how do we tell a lab that doesn't report on searches at all that you have to report on the initial search and any subsequent search that produces a result?

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CECELIA CROUSE: Well, candidate matches are a result, and we're going to get that. That may change every week. I'm trying to get it out of the context of our laboratory maybe. When a search -- when the initial search is conducted and there's a hit, obviously we're going to be doing this. When an initial search does not -- there are no candidate matches, we include that as a hit. But subsequently, six months later, a year later, or two years later we get a hit, then a report must be written.

JULIA LEIGHTON: So I'm looking for a way of describing what that subsequent result is, other than the term "hit," or if that's the term I should be using.

CECELIA CROUSE: Well it's just the subsequent report is written, also must contain this information.

[Inaudible].

CECELIA CROUSE: Yeah.

[Inaudible].

CECELIA CROUSE: The report will be given a date that has this particular date as a result of a search.

[Inaudible].

JULIA LEIGHTON: Okay, that works. For the initial search and any subsequent search that produces an association?

GERALD LAPORTE: But that information is going to be in the work notes. And the other thing that I would have to ask too, are we talking about a source attribution database? So we're not talking about like a NIST chemical database, where, you know, you would do a search for a controlled substance, you know, an known compound?

JULIA LEIGHTON: Yeah. And that's the distinction we make that we talk about; that the databases were searched to identify a possible source or item. And then on the other side you see only in the case file are we talking about the draft detail reference, you know, searches for reference collection, so search that produces an association.

I understand that Cecelia's lab automatically produces these. She just was wondering, you know, because I'm searching every week even though I'm not getting any result, do I have to keep reporting, reporting, reporting. And we wanted to make it clear, we want the results of your initial report, which may have been no hits, and any subsequent search that actually produced an association, and that was the limit of what had to be identified in a report, as opposed to detailed in the case file.

CECELIA CROUSE: I would think it would be a reporter association. I mean that could be the impetus for generating a report.

JULIA LEIGHTON: Okay. So, having taken care of that piece, I'm now going to open it up for other comments.

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JOHN BUTLER: Is that the correct way, for the initial search and any subsequent search to produce a reportable association?

JULIA LEIGHTON: I don't think you want to use reportable association -- why report? I mean does that change that there's some associations you wouldn't report? I think the point is you report an association?

[Inaudible].

JULIA LEIGHTON: Well, I guess I'd push back a little on that, because I, as a defense lawyer, ought to know that there are 20 candidates pulled up. You may have decided that none of them were probative, but that there were 20 candidates is something that, as your customer, I want to know.

[Inaudible]

WESLEY GROSE: You define how many candidates you want to look at, and it gives you a chance that, you know, might be one. You can all pick up ten, a hundred. You can pick however you want. It will pick the closest ten or a hundred you want, and so if that's where it becomes to report that, where, if you're looking at it, it's not like it only gives you a candidate it thinks it's matches. It gives you whatever list of candidates you want.

JULIA LEIGHTON: Well, then, I guess what I'll look back on -- and I'll look to my colleagues if someone else has a concern -- I guess reportable associations is reasonable so long as your SOPs and your definitions include what it means to be a reportable associations, so I, the customer, know whether I should be asking questions about that threshold and whether there are items, there were associations that are below that threshold. Peter?

PETER NEUFELD: [Inaudible] with the candidates. We don't care about candidates, because like we all say, you can ask for as many candidates as you want. What you care about are determinations of is it positive association. I think that's it. And so I don't think there's any need to disclose.

JULIA LEIGHTON: So I think reportable association works. But whatever your reportable association is, I assume, something that's defined in your SOPs and a term that somebody could investigate if they needed to. So I'm in agreement that reportable association is fine.

LINDA JACKSON: So, Julia, now in the parentheses, where you have that the report should provide a summary of a results, including the number of searches and the number of candidates. If the number of candidates is something that is defined in the SOP because that's how your system is set up, there's really no point in putting it in every single case report, because it's always going to give you 20, because you have it set to an even 20.

JULIA LEIGHTON: And I think we made clear that for things that are standardized like this, that it is fine to just refer to the SOP. But if you go in and say "I want 60 candidates in this case," then you actually have to describe what you're doing. But if you have an SOP that addresses this, then that's it.

MATT REDLE: So then on the basis of deviations from the SOP, is that what we're looking for then?

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JULIA LEIGHTON: I mean, I suppose the other option is to, instead of asking for a summary, say, summary of results or some language that says you can just say, you know, your SOP on database searches. And, again, I'd look to the lab people for what language would simplify this process for all searches that are done -- for when you do searches the same way over and over and over again.

GERALD LAPORTE: So, Julia, are you interested in close non-matches as a defense attorney? Is that what you're sort of alluding to? You want to know what was close, but it was still not a match?

JULIA LEIGHTON: No. I think Peter makes a good point though. I think understanding what the initial search termed up is information that is useful to both sides about whether or not there were any candidates, some number of candidates, and then after that, I'm interested in whether you come up with a reportable association.

MATT REDLE: But, Julia, my understanding is that the result that you get, if you set it for I want to 20 best candidates, it's going to give you 20 candidates. Now they may not be worth anything. They may be terrible. But it's going to give you 20.

JULIA LEIGHTON: Again, this is ultimately a group decision here. To the extent that the -- would it be changing number of candidates to number of searches and number of reportable associations? Does that get us there? And presumably the case file will give anybody that's concerned about, you know, what the stringency of the search is the ability to go in and take a look at other candidates.

JEFF SALYARDS: So, Julia, I don't think that it -- and I had to learn this being a lab director. It wasn't obvious to me. It doesn't work the way most people think it works. The fact that we searched the database is irrelevant, really. And that's what a lot of people are saying. The fact that I have a notional association is not really relevant. What I did to verify that association, many labs rerun the sample, they check another biometric, and that makes it a reportable result. That matters. This is just a very trivial -- and I want to be very careful. I'm not arguing against transparency. I'm totally in the favor of you can have all this, but you don't want this in the report. It will actually obfuscate what you're really trying to read.

JULIA LEIGHTON: So I'm not fighting for it. What I'm looking for from you all is language that gets at what you all understand.

JUDGE JED RAKOFF: Yeah, this is a point I'd like to make; I think that the subcommittee is happy to accept whatever the lab people want here. Now please, lab people, tell us what language you want and we will adopt it.

1:41:30***MALE SPEAKER: Can I draw just a firearms database searches. So we're talking about fingerprints and DNA with these known IDs, and in a firearms database search you may have six or seven associated with one case. And what we do in our lab is, as those [NIVIN] or AFIS hits come in we make supplemental reports with just that evidence. If that's okay, then we refer back to the main report. The language of this is it makes it sound like we have to put every gun and every match in every report, which then extends to hundreds of cases.

JUDGE JED RAKOFF: So what language do you want?

MALE SPEAKER: I was just throwing it out there now. Let me think.

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CECELIA CROUSE: I think all we're saying is that the report needs to state that if an item was put into the database, that the search was conducted. And that's what we're supposed to be doing right now. I'm talking about the report. That's what the report should say.

JULIA LEIGHTON: So what if we just put a period after "and provide a summary of the results," period?

WESLEY GROSE: I guess the only thing for me, it comes down to describing the database, the size and providence in a report. If I say I went to the AFIS database, I search it in AFIS and I came up with this result, does it help in the report to have the size? Because the size of the database is going to change, so as prints are put into, like, an AFIS database. So you put a period at the end of "the report should include which databases were searched," period. Then you say, okay, I searched in AFIS and I identified a source item to candidate from the AFIS database, period. That way if there was need for additional information - - again, as with Jeff, I'm fully want to get it out there, but I don't know if it becomes very difficult, and is it really helpful to, you know, if the AFIS database is what we used and internal database or whatever, at least we tell you what it is.

JULIA LEIGHTON: So which database was searched and if we want to know more about it, we know to come to you.

WESLEY GROSE: Yeah.

JULIA LEIGHTON: And a summary of the result, because we still want to know what happened.

WESLEY GROSE: Right.

JULIA LEIGHTON: And delete all the rest of the language.

WESLEY GROSE: That would be any recommendation.

JULIA LEIGHTON: Does anyone object to that change?

CECELIA CROUSE: I'm still confused about the word "summary." I like to put the period at the end of -- where's your period -- of database search. [Inaudible].

JULIA LEIGHTON: I guess it's the result. I mean, you'd still have -- we could get rid of summary and just say the results, no hits, six hits.

[Inaudible].

WESLEY GROSE: Well we're not going to report that we searched unless we got an identification or if we associate it with a print. So we don't normally write a report every time we make a search. So there will be -- this report is generated from the standpoint that we did get a hit, and, therefore, we searched the database, we came up with a candidate. We then took it from the AFIS search to, now, a comparison, we made the comparison, and we came up with a good conclusion.

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JULIA LEIGHTON: So I still think, then, that we need to know that there were no hits; that nobody in the database matched. That's relevant information to the customer that nobody matched, especially if I happen to know my client's in the database.

CECELIA CROUSE: Well that's what we originally talked about, was that the hits is the easy one as far as the reports.

JULIA LEIGHTON: So that's why the initial search, whatever happens, is a result that needs to be reported, even if it produces no result.

CECELIA CROUSE: What I don't want is for someone to interpret the word "summary" as there were six possible candidate matches and this one was eliminated because of this particular marker or this particular whatever, and this one was eliminated for that. I mean -- the definition of summary.

JUDGE JED RAKOFF: Well, we took out the word "summary" for just the reasons you just mentioned.

NELSON SANTOS: Okay, we need to move on.

[Inaudible].

TED HUNT: Yeah, it looks good to me now. Overall I guess my comment would be that it's a very ambitious report column, given there's 570,000 backlogged cases in the country. I voice my opinion on that the last time, be that as it may. I just have some procedural problems, and one of them is prompted by this very discussion. I think there have been substantive changes here, and additions, that community hasn't had a chance to weigh in on. One is the database searches issue, which we're hashing out right now.

Below that is the issue of samples, which, from what I can tell, is brand new to this document, looking at the red line, and maybe most significantly -- this is going to play into our next discussion as well -- on Page 9, the statement that is accompanied with footnote 6, having to do with footnotes, conclusion, opinions, interpretations that are experientially based should be identified and should not include any implicit or explicit statistical statements. I think that's brand new in this document, and it's a substantive addition, and myself, as a commissioner, I can come and debate the merits of that here.

But there's 14,300 people in this community who have never had a chance to weigh in on this, and that's a very major statement. You're asking all those folks out there and every lab director or practitioner on this commission to endorse this and then go back to your laboratory tomorrow and not offer any probabilistic statements on any non-DNA future comparison methods. That's essentially what you're asking them to do.

So, merits aside, there hasn't been a chance for any type of public comment on that very substantive addition to this document, or the other two. So, I don't think that it's appropriate to take a vote on this document in this format at this time because the public hasn't had a chance to comment and weigh in on that.

JULIA LEIGHTON: So, I'm going to try and take this on a piece at a time, see where we end up. First off, with respect to the database searches, I think we did talk about a statement as to whether any individual characteristic -- if you're talking about the section we've just addressed.

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TED HUNT: Yeah, but I think there's some specific substantive additions in detail that are brand new to this document.

JULIA LEIGHTON: Okay. And I want to work my way through each one of them. That's my goal here, is to start with the database searches. And I guess, John, if you can go back to the red line. Okay, so essentially it now stops at which databases were researched and results. But what the -- because we are no longer having described the databases and provide a summary. So if you go back to the top, if you go up just a little bit, what we've done is replaced the sentence, "a statement of whether individual characteristic database searches were conducted in an attempt to identify the source of each item," we changed that with, "and if any databases were conducted to identify a possible source of an item or a list of candidate matches."

Again, this was -- all this was concern over the language, "individual characteristic database." We were trying to make it clear we weren't talking about reference databases but that we were talking about databases in which you're trying to find a match, a source, and I respectfully said that's no significant change in language where we are now.

The next issue you raised was sampling. And the next paragraph deals with sampling and starts with -- so we added the language when sampling is done, because it doesn't apply when sampling isn't done. The results of the sampling, including a description of the population from which the items were sampled, size, subgroups, provenance, and a reference to the sampling plan or procedure used.

TED HUNT: I think it's substantive.

JULIA LEIGHTON: I mean, I think what we're trying to achieve there is -- I think you had raised the issue of we weren't calling for a sampling plan. We're not calling for anybody to put the sampling plan in the report. We're simply calling for you to tell us which of your sampling plans you used, period. So if you're a lab that has A, B, C, D -- I'm sorry; what?

TED HUNT: That is a new directive requirement. I know this is a view, so take that in that spirit. But this is a new directive. This wasn't in a previous iteration of this document.

JULIA LEIGHTON: I guess I don't see quite how it's substantive change to add to the list of things that if you use sampling plan you name sampling plan A, and I'm not sure that that isn't something that's relatively simple. But perhaps the lab people feel differently, maybe that you only have one sampling plan, maybe that you have ten, but it's simply saying, which one did you use.

So I guess before we get to the next issue, are there other people that have concerns with referencing the sampling plan that was used?

NELSON SANTOS: Bill?

JULIA LEIGHTON: Fred?

MALE SPEAKER: [Inaudible]. I don't want to waste time.

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NELSON SANTOS: No, I don't want to waste time either. I can tell you that I'm on the side that this is way too much in terms of a drug report. We put a lot of stuff that's in ISO right now. I can tell you now that, unless this changes a lot, it would be difficult for me to vote this through, even though it's a view as it is now. I just want to put that out there. That's my personal opinion.

I think there's a lot of other points being made. But this is not onerous, but it's confusing in the volume of reporting of the front of the report, which right now has already a lot. So I don't know that adding these additional above ISO, from my perspective, in my drug chemistry report is really advantageous to the stakeholder's, primarily considering that the DAG has come out with a very liberal policy regarding case files. I understand your point, but they're confusing enough as they are. To add more to them, I think, just makes them more difficult for the average prosecutor or person to actually look at it. So that's my opinion.

JULIA LEIGHTON: I think Phil was next.

PHIL PULASKI: So, to add to what you just said, not only does it not add value, but I'm looking at it from perspective of coming out to a law enforcement officer, it detracts the value because it becomes more confusing. So it's not just not helping, I think it's hurting in terms of making that report readable and having people action it.

JUDGE JED RAKOFF: So there are two different points here that think are being made. One is whether, overall, you want to vote for this document or not, and some people think it's too onerous, and some people think it's not. That's been an issue from day one, and people will vote as they see fit.

The second question, the one that Ted is raising, is whether this is a substantive change. Although I don't personally think it's a substantive change,, I think we would have no problem deleting the new language from that particular, other than the when sampling is done, which I assume, Ted, you have no problem just leaving in the original language, which would not make it a substantive change, then we could still have our vote. Okay?

JULIA LEIGHTON: So, moving on to the next piece that you raised, Ted, it seems to me, as I look at this, that it's really the language that is -- so if you move on to the statistical language, it seems to me, what I would propose here is I think that the language that's causing people the most concern is footnote 6, and the language, "and should not include any implicit or explicit statements." And so it seems to me that we could strike that, because my thought is, if we strike that and go back, that each sentence that precedes that, we actually have agreement on based on the conversation at the last commission meeting; that known limitations and potential sources of error measurement analysis, that all results should include known limitations and potential sources of error in the measurement and analysis methods; that interpretations opinions, and conclusions should include an estimate of the uncertainty; for example, a confidence interval; that all statistical analysis and conclusions, including statements of relationship must include known potential sources of error and estimates of uncertainty. If the uncertainty cannot be accurately estimated on the basis of existing knowledge, the report must clearly state this fact, and state that all measurement methods have measurement greater than zero, and analysis methods have an error probability greater than zero. I think that was consistent with our conversation, and also what we heard in our discussion earlier, which is we may not know these things, but we know them not to be zero, and a full statement is to include them not to be zero.

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TED HUNT: Well, I'll agree with you there. I brought this up personally last time and criticized the vagueness of the language, so I'll take responsibility for anything inside the e.g., because I said you haven't given any examples. There's still no examples of what sources of error means. And I know this is a phrase that came up in the NAS report. But it's never been fully explained exactly what we're talking about with examples. I understand the rest of this.

I don't know that forensic scientists necessarily understand what you mean by "all possible sources of error," and how you could conceivably create a list that's not simultaneously over-inclusive and under-inclusive at the same time. It's going to be under-inclusive because you're never going to all the possible sources of error. It's going to be over-inclusive because you're speculating.

JULIA LEIGHTON: But I think that was the conversation that we had last time. And at some point, each analyst may not know what this is, but certainly the laboratories understand the meaning of sources of error in a scientific sense. And so --

MATT REDLE: Let me make a comment.

JULIA LEIGHTON: Oh, sorry.

MATT REDLE: So, Ted, it's not all source -- all potential sources of error, it's known sources of error.

[Inaudible].

MATT REDLE: Okay.

JULIA LEIGHTON: But that's what it -- you can't say that it's known because we don't know that it happened.

MATT REDLE: Julia.

JULIA LEIGHTON: You have to put the two words --

MATT REDLE: Julia. Julia, hang on for a second. I'll give you an example, Ted. In Daubert the court cited two voice identification cases; okay? Now voice identification, you can do that particular analysis perfectly and it has known error in it. Regardless of how well you do the examination, there is some error that may infiltrate. That, I think, is what the scientists are talking about when they're talking about error. When we lawyers talk about it, we have a tendency to conflate that.

TED HUNT: Well, that's a good example. But when you're getting to, for example, say, what we've talked about a lot the last couple days, future comparisons or powder matching disciplines, if you're going to give the community out there some kind of example of the possible sources in plural of error, give me an example of that just so they will know. And I'm not arguing the point necessarily, I just want to clarify the point.

JULIA LEIGHTON: Peter.

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PETER NEUFELD: Okay. Listen, this is going to be a bigger problem, because obviously a lot of this discussion bleeds into issues that involve fundamental principles of statistics. But the one thing that I took away from all those presentations, Ted, and I'm sure you did as well, is when you're trying to assess the reliability of any particular method, you want to know its sensitivity, you want to know its specificity; okay? And for every one of these methods that they're using there should be a known understanding of the specificity. Specificity is defined as the false positive rate

TED HUNT: Then why don't we say sensitivity and specificity instead of saying "all possible known sources of error?" Those are terms that I understand that I think most people understand. But it's made more vague by that nebulous phrase.

PETER NEUFELD: But there's another type of error as well with specificity.

TED HUNT: Okay. Let's list them.

PETER NEUFELD: There's human error; okay? And in certain situations for certain methods, we do know what the -- we can estimate the human error rate. For others we can't. But one of the key things they want to have in a report is that the analysts be able to communicate what he knows, what is there data on, and what are the questions for which he doesn't have any answers or data. That's all.

And, you know, and I totally agree with Julia that it's sort of incomprehensible to me that even though a particular analyst may not understand -- listen, there are plenty of analysts I've met that don't understand sensitivity and specificity. They've never used that terminology before. But the laboratory better understand it. And they better understand it when they're doing their internal validation studies for any particular method as well or we have some very serious fundamental problems here. So I don't think we have to spell out the meaning of every single word in this document for it to be a term of art that's well understood in the community.

[Inaudible].

TED HUNT: Sensitivity and specificity are well understood by scientists and many lay people. Human error is something that I think is intuitive to most people, and then if they want to know more they can look further. But the phrase "possible sources of error," because it's too vague.

JULIA LEIGHTON: I think that part of what this language allows is it's direct the -- this isn't language that's going to be defined by each analyst in each report. This is an exercise each lab is going to have to go through and then draft the language. We are not -- this isn't going to be done by the technician. This is something that thought leaders in the institution, thought leaders in academia are going to address.

GERALD LAPORTE: But Ted is asking a very simple question, give me one example of what you're talking about, and nobody can answer his question. So I don't know how we would be able to identify all potential sources of error in every report. I mean that just seems -- that seems crazy. As a forensic scientist, first of all, I'd be scared that I'm not listing everything if I put a list down or I'd be scared that I'm listening too much because now I'm kind of over estimating.

LINDA JOHNSON: I do think [inaudible].

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JULIA LEIGHTON: It was on then it was off.

TED HUNT: Yeah. I'm sorry.

[Inaudible].

LINDA JOHNSON: Yeah, challenged. So I do think that it flips back and forth a little bit between estimated uncertainty and sources of error in this paragraph. And when the folks in the laboratories are developing the uncertainty, the estimated measurement uncertainty for those measurement methods, such as weighing, quantitating drugs, those types of things, they are evaluating all the potential sources of error, and they are using those error values in their estimation of uncertainty, you know, going through and using the formula to determine what those are. And so those types of sources of error are already evaluated and included in the estimated uncertainty that is for measurements.

It's different when you have sources of error for something like fingerprint analysis. And the one thing that I can see with the paragraph the way it's written is that the terminology is a little intertwined and may be confusing just for that purpose.

JUDGE JED RAKOFF: So, I ask again, because the intent of our subcommittee which unanimously approved this report was we recognize this puts burdens on labs that they did not have before, except for the very best labs, which we think did everything we're asking for here. But we did not want to add to uncertainty or confusion. So give us the language you would like -- and I'm talking to any of the lab people -- and that will be fine. What language would you like?

JULIA LEIGHTON: Sorry. Suzanne.

SUZANNE BELL: Yeah, a couple things. I really want to vote for a document like this. I think it's important. I see reports in review for defense all the time. I would like to see this. I really, really think it's to our benefit to put it off and work on it, because, for example, the terms "uncertainty of measurement" and "accuracy" is completely different. The terminology must be right, and even -- I mean you think it was hard to define forensic science, let's define statistics.

So using the term "statistical," we have to be very careful about this. So, for example, one of the phrase -- you know, talking about uncertainty of measurement, it's just a range around a number. It has nothing to do with accuracy in some cases. Others it does. So maybe the wording we're looking for is simply, like, figures of merit of a method, or something else. But I think the concept is critical. I think it should -- you know, I really want to vote for something like this, and I agree with Ted, some of these changes, when I look at them, I'm thinking, oh, let's do this one more time, go through it. I know you want to get it through this time, but I would strongly advocate for one more shot through it by public comment, by internal work to get it, because I completely support the concept. But the terminology, I really think needs work. And it also relates to the next document where we have to really get those terms correct or come up with something like figures of merit. And I'll concede.

JULIA LEIGHTON: Well I certainly look to my co-chairs, but I think that we've done something like this before, where we did a public comment period between the meetings so that it can be completed in time, and so -- I said I would look to my co-chairs for leadership and I'm not doing it. But I'm persuaded that

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you're going to help me write this and that Linda's on board to help me write this, and that Cecelia and Ted will review it for us, and that we'll do that in the next week. I've still got thumbs up?

JUDGE JED RAKOFF: So, I can't, of course, see you. Yeah, that's been, I think, agree with that. With this, I mention two caveats. First, as a judge, I've never seen a statute that had every term perfectly defined. I've never seen a brief that lacked some ambiguity. You cannot expect perfection in the drafting of this kind of document. Second, remember, this is a views document. It's not binding on anyone. It is just expressing the thrust that the reports that are now being issued by many labs do not contain what is necessary to make them, ultimately, helpful to the overall justice community. And it's important to make the language as good as we can. I'm not arguing with that. But I don't think we should lose sight with the overall objective.

If the folks we have, of course, on our subcommittee, folks from labs who have helped us with the language that we already have, but if the other folks here who have the hands-on experience can give us very specific comments as to language that we should substitute, that would be wonderful and we can bring it up at next meeting. But I beg you not to just simply say, "I don't like this language. I don't like this language" without giving us language that you would propose instead, or we'll never get anywhere.

SUZANNE BELL: Yeah, I wouldn't argue that. But, for example, chemists in the room, we have a very different definition of selectivity and sensitivity than you do. Sensitivity is the slope of a calibration curve. And when you talk about sensitivity and qualitative methods you're talking about a limited detection. So, I mean, that's what we have to clear up. I mean we have to make sure, and I think there are compromised terms that allows every discipline to provide what you want, what we all want in those reports about how good is this. But the terminology uncertainty, all those things, I think you have to -- that is fixable, I think. But make no mistake, I think that, certainly from my point of view, I strongly support this effort and want it to go through.

GERALD LAPORTE: So I think Suzanne kind of hit the nail on the head, and maybe we can divvy this up on whether we're doing quantitative analysis or if there's qualitative. So if we're making measurements these questions become a lot easier to try and figure out or how to respond to them versus non-quantitative methods.

MATT REDLE: Gerry, let's go ahead and we'll pursue that. We'll do that, and be ready for the next meeting; okay?

JULIA LEIGHTON: You mean it's going to be -- I've gotten Jeff and Cecelia and Ted and Cecelia's commitment. We're going to hammer this out. We're going to hammer this out in the next ten days and get it done. But I ask that people think about what Jed said. As we do this, it will -- this is high level. We're going to have to ask people to do some work with this. We can't explain it for every lab, for every discipline.

MATT REDLE: And, Julia, remember that Jonathan than is going to see that this goes out for that kind of comment that you've requested. So we'll figure out whatever that timespan is going to be, make sure that it's reasonable, and then we'll go forward.

JONATHAN MCGRATH: I suggest and would encourage the heightened expediting of the development to typically have a 30-day public comment period, which is kind of in a tight fit for between meetings.

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And since we only have about three months until the next meeting, you know, I would just encourage all the participation to expedite the process.

JULIA LEIGHTON: So is ten days workable for you?

JONATHAN MCGRATH: Sounds like it will work.

JULIA LEIGHTON: So, but it's a real 10-day limit, not the 20-day 10-day limit?

GREG: Can I ask a question?

MATT REDLE: Sure, Greg.

GREG: This is kind of just a procedural question. So I noticed that, you know, footnote 1 harkens back to the original views document, December 7th, 2015, and this is kind of an extension of the concepts that were first referenced in those documents. So my procedural question, both with regard to the commentary and the work that's going to be done in the ten days is about the scope of application of this document; and that is, so, if I recall correctly, on December 7th, 2015, that views document was vetted at time when the charter did not include digital evidence. It was amended subsequently in early 2016. So my question is these terms, all possible source of error, it references all FSSPs. Is it intended to include the new reference to digital multimedia FSSPs?

So obviously -- so what's the scope of this application with regard to our understanding of the scope of the term forensic science service providers? Because we now have a document that talks about digital multimedia forensic science service providers, and when this document talks about all forensic science service providers and would suggest it includes digital multimedia forensic service providers for whom they may not have the kinds of sampling databases with regard to the IT infrastructure for which they're drawing conclusions. And I'm not sure what all possible sources of error would be in the context of different digital multimedia forensic science service provider services. So I'm just saying, as the committee looks at this, one option is you say "with regard to all FSSP except multimedia forensic service providers," and you save that for another day, or the comment period will have to include a discussion of its impact in regard to multimedia.

MATT REDLE: And I would suggest that, Julia, you and Linda's group take that into consideration; okay, as you work through this other issue, because I think it is a valid point; okay?

All right, the next one, first of all, there's a little clarification. This is on the statistical statements. The clarification is that in our report to the commission it's identified as a final draft of the document. This is not a final vote. The first draft, you may recall, the first draft was rough, and at Gaithersburg, Steven acknowledged that significantly different product would be provided at this meeting, and we would proceed at this time as though this was the initial presentation. We are currently in the public comment period as a result of that, and that will extend following this meeting to the January 25th.

We will, as is our practice, then, adjudicate those comments that we have received to date, as well as comments we receive today, and then public comments that we receive, I believe our deadline is January 25th. Neither is this a final draft, because, of course, that's going to depend on the comments and the adjudication of those comments.

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During the public comment period preceding this meeting we received comprehensive comments from, I believe it was six or seven individual, two of whom are commissioners, and I would just note at the outset that in many ways this document picks up where yesterday afternoon's discussion left off. And one of the commissioners that commented was Ted. And, Ted, as you know, we're advocating that databases and the pattern or trace disciplines meet certain general criteria in order to assure scientific reliability. And yesterday Dr. Landers suggested a method is reliable or scientifically valid only if the method has actually been tested empirically.

And I know that in reading your comments -- and this is -- I think the philosophical issue is what colors a significant portion of your comment. You acknowledge that the empirical and quantitative foundation in these disciplines is preferable, but your criticism primarily went to the fact that currently many of the databases that we would be talking about don't exist.

TED HUNT: Right. That's part of it. Before we even get to the substantive part, and I've got 23 line item comments I think I put on the record, and I'm not going to get into all of those. You can read as well as I can. So, overall, my comments are, from kind of a macro level, the document is still way too vague. It's internally inconsistent. It speaks in both the present tense and the future simultaneously without making a distinction, and it has structural and syntax problems as well.

So without getting into every single line item objection I would have to it, let me just sum it up by saying I think this commission can do better. I think it needs to be redrafted and rewritten. And I appreciate the fact that the subcommittee went back to the drawer board after the first draft and came up with this draft. And all my comments are meant to be constructive. You know, I think it's a terribly important topic, and I don't claim to have all the answers. I mean we've gotten what I consider to be a very narrow band of views on statistics and probability theory, and there's a lot of disagreement out there. We heard, you know, Professor Champod give a little bit different version that's over in Europe, and they do things their way, and we have our way of doing things here. But there are different schools of thought about probability and statistics and we've got a very narrow range or a very narrow focus of how that should be applied to forensics, I believe, in this case.

So I'm not necessarily taking a position one way or another. I fully support NIST's work, and I hope, you know, in ten years or so this is all quantitative, firearms and tool marks, pattern matching and whatever form, friction ridge, we all get there. But part of my opinion was is, well, just because we have numbers can be an illusion. Those numbers have to be reliable. So the databases don't currently exist. Let's don't pretend that they do.

And when you're simultaneously saying, "give no probabilistic statement," what are the lab directors and the folks around here supposed to do tomorrow? Are they supposed to go back to their jurisdiction and say, "Mr. or Madam Fingerprint Examiner, don't go and give any kind of probabilistic statement in your testimony. And then, of course, there will be an objection. And I don't think it's relevant because it makes fact in issue more or less probable, so it's probably irrelevant in some courts. Maybe not all. So there's got to be some way of accounting for the present as we reach toward the future, and I don't think the document does that.

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MATT REDLE: And let me start off there. This views document intends to do five different things; okay? The first thing that it does is it states a preference for empirically or quantitatively tested foundations for such things as statements of the value of a positive association of a questioned and known sample.

It also, at the same time, is advocating that databases be developed that are empirically based, and that testing support the testimony that is rendered over the more subjective and what you refer to as qualitative testimony, and it urges us to push development to strengthen the science and not settle for the status quo.

The third thing that it attempts to do is it requires a valid statistical model to be used in providing that support, but it doesn't recommend one model over another. The language of the document will support the use of likelihood ratios but not exclusively require them. Other valid models might be used or developed as well. And as we've discussed during the last two days, and previously, the views document continues the commission's preference for transparency in identifying underlying limitations, uncertainties and error rates.

It also recognizes, as we discussed yesterday afternoon, that not all evidence currently or perhaps in the future, will support a statistical statement, and yet there may be relevant information from comparisons made that would be of value to the factfinder. And consistent with our prior statements regarding the value of transparency, the absence of a valid statistical model or further empirical evidence sufficient to permit further conclusions should be expressed in reports and in testimony.

Let me make a couple of comments real quickly, just in the interest of time. In terms of terminology, we will correct the poor use of terminology. We're going to go to forensic science service provider where that's the appropriate term. We're going to use forensic science practitioner and forensic medicine practitioner where that's appropriate. That was a comment that we received from the other commissioner that commented, Cecelia. And, Cecelia, and, I think, Ted and everybody else that we got a comment from, we're going to spell tetrahydrocannabinol correctly. And we're not supporting. Go ahead.

JUDGE JED RAKOFF: I just want to add one other thing. Just so you all know a little bit. In some of the non-substantive points that you made, Matt and I were confronted with the following difficult situation, which was Steven was drafting this as he was dying, and he knew he was dying and we knew, and the rest of you did. And I'll just give you an example, the footnote, number one, which I don't think needs to be in there at all, originally read in Steven's draft, "inferring causation is always a statistical activity," reflecting, I think, his background.

And I argued with him a little and said, "Let's just take out the footnote." And he said, "'No, no, no, it's very important." And I said, "Well, will you accept a friendly amendment to 'usually,' and he said, "Okay." I have no problem -- I'm sure nobody here has any problem taking out the footnote altogether. I just want to give you the human background that was involved here.

MATT REDLE: And we understand the problems with blood alcohol sample issue. We'll be more than happy to take a look and try to come up with something that's either a better example or that explains the point more precisely.

CECELIA CROUSE: Well, I think that when we've been talking about the different type of language in terms and how they're being used interchangeably, when the question was, "What is the standard error of

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measurement," it turns out that it's not about that. I mean, I just think that that needs to be worded appropriately, so I'm glad you're going to take another look at it.

MATT REDLE: You bet. And we're going to take the balance of everyone's comments, those that have made comments previous to this, anybody that has comments today, and if you want to make your comment offline, as they say, follow thing meeting, again, the public comment is open until the 25th, and we'd be happy to address those comments and adjudicate the comments and then report back.

Ted, if you want to respond to the comments about the five points that we're trying to achieve there, feel free.

TED HUNT: Yeah. I just think, depending on what page and paragraph you look at in that document, you can see something different. And I saw one paragraph that had three or four enumerations in it that said that if you're going to offer a statistical statement it must be based on a database, et cetera, et cetera, et cetera. So it's simultaneously directive and that it acknowledges well the databases don't exist but then it gets to the recommendations and says this is how you need to do it now, as opposed to aspirationally.

So if I'm out in the community, as a forensic scientist or even farther removed, I am, as an attorney, I'm hopelessly confused by this document, what it's actually saying. I mean, you can interpret anything you want into it if you look a particular sentence, so it needs to be synthesized somehow so it has a clear, concise, consistent, cogent message, because it's extremely important. This topic is one of the fault lines here on the commission, along with things like validation and what is science; so we got to get this right. It needs to be rewritten.

MATT REDLE: And that's our intent. We expect that we'll be addressing the public comments and we'll come back with another document.

CECELIA CROUSE: Just for my own edification, in number four I mentioned that -- well the way it was stated that "confined evaluative statements to the support that the finding provide for the claim linked to the forensic evidence." And I wasn't familiar with the word "claims." I mean, I think the way I put it was that data is interpreted, then a conclusion is rendered and reported. And I wasn't sure what an evaluative statement was.

But the beginning of four states something about, you know, you shouldn't be using source. Don't use source. But then you go back to view number five and it actually gives you a way to do that. So if you could just -- I mean, I won't go into all my comments, but those are the kinds of things I just found just confusing, I think.

MATT REDLE: You bet. And that was point eight that you were just referring to now in your -- okay. Any other comments. Phil?

PHIL PULASKI: So in the context which the judge put the situation, I just want to point out, in the views the use of the term report, so sometimes it could be interpreted as a report, sometimes it could be interpreted as I'm reporting something to you, just like I'm reporting it to you now, and sometimes it means it could be testimony. So, from the report standpoint, we have a reports document that we're discussing, and then just in terms of kind of clearing that up. So that was, again, I fully understand the context, but I think that's something that deaf flit needs to be addressed too.

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MATT REDLE: I agree. Thanks, Phil. Any other -- yes, sir?

WESLEY GROSE: Judge, I know you mentioned that some agencies do this very well, the reporting process. I fully support and I'm really excited about what's going on here. But if you have reports that are done this way I would love to try and implement this in our lab. But I'd like to see if you have reports that are done, you can take agency headers off, or whatever, or take paragraphs out and say this is how they report it. Because it's difficult for me to see how this is actually going to come into a report when it comes right down to it. But I really want to comply with it.

So, as a lab director, if you had samples, I would love them, and then we can come back to them. And reading what's done here, I'll give this to my managers and say, take this and apply it and see without any discussion how they would apply what's done here, because that's a good practical test of is it really communicating to our staff what's going on.

MATT REDLE: Suzanne?

SUZANNE BELL: Thanks. On this, again, I realize that you have to be relatively vague. But unfortunately you stumbled into my wheelhouse with uncertainty of measurement, and so you have to be very careful about, because uncertainty doesn't imply doubt when you're doing quantitative analysis. It has nothing to do with doubt, it has to do with the range; whereas it's used informally in a very different way. And if you have any question about how critical that word is ask NIST about what happened the first round of the OSACs and how those terms are used.

So, you know, I would be happy to help you with definitions because I agree completely with the spirit of this, but I think the wording has to be right, because it is -- I mean, and recognize that different disciplines will interpret it differently. And you can do that, but I think, like, accuracy as a converse uncertainty, you know, those are all fixable. So I urge you. And I'm happy to help with this one too. I'll give you 11 days on that one. But it's a continuing resolution to assist.

MATT REDLE: Any other comments? Seeing no --

JUDGE JED RAKOFF: Phil.

MATT REDLE: Oh, Phil.

PHIL PULASKI: [Inaudible]. In other words what we've done this with this, we just want to go back [inaudible].

MATT REDLE: Okay. We're finished.

PHIL PULASKI: So it may be what Greg said could use a little discussion, if we have some time, because in the workgroup when we wrote this, we did not even have thought, at least I didn't, about applying this to digital multimedia evidence. So it may be beneficial, if we have the time, to kind of flesh that out. I'd love to hear what Troy has to say, so that we don't in this little teeny tiny time frame that we have get wrapped around a wheel. We may just decide today, just exclude them. Take Greg's suggestion, FSSPs, excluding digital multimedia evidence, and then we don't have to kind of worry about it after the meeting.

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MATT REDLE: [Inaudible]. And I wonder if Troy and Greg would be willing to help out in the discussion, because you're kind of the technical informs people on this topic. Would that work? Terrific. Thank you.

PHIL PULASKI: What I meant was, I'm trying to get the rest of the commissioners' ideas so that -- I don't think it belongs -- I mean, I'll weigh in and say I think it should say, "excluding digital multimedia evidence," because it was never even, at least in my perspective, wasn't conceived to represent that. So I'd like, if it's possible --

[Inaudible].

MATT REDLE: So, are you making a motion?

PHIL PULSAKI: [Inaudible].

NELSON SANTOS: Here's the thing, I think Bill Crane was here. Now the real question is, was the intent. But Bill Crane was a commissioner during the initial and, I believe, final draft of the views document of December 7th. Yes.

MALE SPEAKER: Can you clarify what the views document it is you're talking about? It is the reporting or is it the statistical? Because we don't use the statistical.

MATT REDLE: We're back to the reporting.

NELSON SANTOS: Nevertheless, I think it's something -- I don't know what Bill was thinking in terms of how that applied to him. But to say that he wasn't here or the digital evidence community wasn't represented, it was also 2015, December of 2015.

MALE SPEAKER: [Inaudible]. The DAG came and said he changed his mind. He was going to add it. But it actually took the department some months to amend the charter, give us authority to assess digital evidence.

NELSON SANTOS: I'm just telling you that Bill Crane was on. Anyhow, I think it's something the working group should discuss and see if it has any merit or if it doesn't.

JOHN BUTLER: I can give you the dates, if you want the dates, because I have a fairly good memory for dates. So the department, in August, it was late August they made the official decision, early December -- sorry, early September of 2014 to change. He was added in April 30th/May 1st meeting and then we had discussions in August. This document was voted on December 2015, and then so he was on the commission at that time, Bill Crane was.

MALE SPEAKER: Okay. I got it.

NELSON SANTOS: All right, you guys done? Okay. We're running kind of late, so if you need to take a break, please take a quick one yourselves, but I'd like to go onto the next topic with our two speakers who

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have been waiting patiently on the side. Three speakers? Okay, three speakers. I think I said -- so if I could have Cary, Suzanne, and Julia come up.

JOHN BUTLER: Okay, our last panel for today is on federal research efforts in forensic science. We'll first hear from Cary Oien from the FBI Laboratory, and Sue Ballou. And then we'll hear from Julia Dolan from the ATF. Cary.

CARY OIEN: All right, thank you, John. Thank you all for having us here today. This is kind of like being at work. I seem to be able to clear a room very well. So, but, no I appreciate the opportunity to talk about -- we've heard a lot about research but I think this panel is intended to talk about the research that goes on within some of our specific agencies, so I think you're going to get a very -- you know, a good flavor for all three agencies today.

A little bit about me, I serve adds one of six senior-level scientists in the FBI Laboratory. I say that now because that's going to come up as I go through my presentation. The six senior-level scientists kind of support different functions and different disciplines within the laboratory, but we work collectively on a number of things.

Okay, so my goal is to discuss how the FBI identifies, selects, prioritizes, and conducts our research projects, so these are the areas that I'm going to be going over in my presentation. Okay, research, the primary mechanism by which we conduct research at the FBI Laboratories through the Counter terrorism and Forensic Science Research Unit. And this is one of the units within the laboratory division, and the unit is -- they focus their research based on three real goals; one, developing new capabilities; two, improving existing capabilities; and, three, strengthen our current and future capabilities.

The unit itself is comprised of a number of different people. We've got the research scientists, the support staff, and then very importantly, participants in what's called our Visiting Scientist Program, and I'm going to have a couple slides on that. So just know that this is a very small unit in the laboratory. We have, I think, less than ten, actually, staff research scientists and a couple of support personnel, so this Visiting Scientist Program is critically important for how we do our business.

Visiting Scientist Program, it's managed within the unit, within the CSFRU, and it it's administered in cooperation with Department of Energy's Oak Ridge Institute for Science and Education or ORISE. It's a fantastic opportunity for us to enhance our research and R&D by bringing in highly qualified scientists from external agencies to help complement and work with our staff scientists, and they're really force multipliers so we can get more research done. And it certainly serves to build our relationships throughout the scientific community, whether it's forensic science laboratories or educational institutions.

Okay, I'll breeze through these somewhat quickly because I know we're low on time here. But the participants, they come from a lot of different places. They're selected usually base on specific project needs, and we'll get to the projects here in a little bit. But, most importantly, they are mentored by our CFSRU researchers or staff scientists. We get university faculty, post-grads, and then scientists from all different levels of education.

The benefit is they become very highly trained, well trained on how to conduct research, but they also get an exposure to life in an active forensic science laboratory. And their appointments can range over a period of time. But, again, this is critically important for us, because it helps augment our relatively small

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research staff but provides great collaboration opportunities for our visiting scientists as they go from our laboratory out to lot of different places. In fact, we may have some in the room who have come from the CFSRU and gone out into the broader community.

Okay, something as far as our budget, a lot of discussion on budget earlier today. You need to know that our laboratory receives no dedicated funding for research. So we're not getting any money that's earmarked towards research. So whatever money that we have has to come out of our appropriated money for our normal business operations, and you can see on the slide it doesn't account for a lot of money. And the money that goes to research also has to cover the costs of running the units, the supplies and all those things. So we have a very limited pot of money with which we can conduct our research. So, therefore, collaboration with other government entities and leveraging on those opportunities is critically important for us to kind of expand those dollars. Excuse me. I'll have a slide later onto discuss some of the collaborations.

Okay, so given that small budget, I want to kind of give you an idea of the process that we use to manage and conduct our research in the laboratory. About four or five years ago we established what's called the Research Review Team in the laboratory. It's comprised of those senior-level scientists that I discussed previously and we have a number of goals or missions from this group, and that's to drive our research portfolios, identify, select, prioritize, and move forward on research projects, and then provide ongoing guidance to our research projects.

This slide should look a little familiar. I was noticing pretty much this same slide in Gerry's presentation earlier. So, Gerry, I think had a six-step process. We have a seven-step process. We have a small addition in the middle of the process. But basically from the identification of the idea all the way through the project closeout we have eyes on the research as it's going on.

A little bit about how we do this. We do an annual call for research within the laboratory, usually at the beginning of the calendar year, and this gives an opportunity for anybody in the laboratory division to come forward with a need or an idea for a research project. The RRT then hears those, selects those, and then moves forward on them as appropriate. And we do a second semi-annual call for short-term projects later on in the summer. And the reason we do this, again, because of that tight budget, we want to identify these projects in time so we plan for the next year's expenditures.

And finally, one of the things that the RRT is doing, and the scientists are doing, is assigning all research that's conducted within the laboratory into one of our research portfolios. And I apologize if this starts to sound a lot like Gerry's talk, but we have a number of research portfolios also. Let's skip through that one. Get to the portfolios.

Okay, the portfolios, so with regard to our portfolios, we do internal research in the laboratory within these predefined portfolios. If we have a research project that we have to get done or we really want to get done and it doesn't fall within one of our portfolios, that's where we look for an external project or collaboration with an outside partner, or maybe putting on a contract to conduct that research. But all research that's happening within the laboratory division is assigned to one of those portfolio, decision analysis, next-generation sequencing, developing new techniques and technologies, emerging issues, and then there's always very specific -- case work unit specific research development testing, and evaluation.

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A little bit about the decision analysis. I guess you could use the word "black box." We heard black box come up a number of times. But this portfolio was developed based on the 2009 NAS report, which, rightfully, recommended more research is needed to address the issues of accuracy, reliability, and validity. And this, as we heard yesterday and today, this recommendation was echoed in the 2016 President's Council Advisor Technology Report. In fact, the PCAST report was very complimentary, as we heard today, about the FBI's black box and then, further, white box studies.

I won't belabor this. This slide will be available to you, but this is a little bit about that black-box study, that very first study that came out. It came out in 2011. It was interesting to note that within hours of this study coming out, it was used in court for the very first time.

Okay, following that initial publication there were a number of additional publications. There's the white-box studies. I'm not going to discuss these specifically, but more information if you want to read further, is here on the slide.

Okay, so current laboratory research, so given the recommendations in the NAS report and the PCAST report, and with that success of our black-box and white-box studies, we're currently moving forward on three additional projects within the decision analysis portfolio. We have an ongoing project in firearms analysis, and we're now moving forward on shoe print and question document decision analysis studies. As you can imagine, these are very large studies, and these take a little bit of time just to get them organized and then get them moving, just because of the amount of data and the amount of samples that are needed in order to move forward. But these are moving forward, and know that they are being informed by the latent print, black box, and white box studies.

And given the expansive scope, as I just said, of these types of studies, we've had to prioritize which ones we're going to do. Obviously it's a portfolio, this is an area that we want to keep moving forward in, but given our budget and the amount of personnel that we have, we have to prioritize them. I would love to see a black box or decision analysis study for every single discipline, but we have to do these in an iterative fashion.

Current research, I guess one more quick highlight of some active research since that was -- I think that came up earlier today, or possibly yesterday, in the emerging technologies area, we are working heavily with NIST on some 3D imaging technologies. I'm sure Sue will have probably some slides on -- no. Okay. Sorry -- some slides on that. But the 3D imaging technology or 3D topography has come up, I believe, today a couple of times, and it's that effort to take that firearms from just that comparative microscopic discipline into a more objective framework. So we are working very heavily on a number of different platforms in that area.

Okay. So, again, overall we've got about 60 research projects that are currently active, and as I said before, many of these involve close collaboration with a lot of external partners. NIST certainly, as I just mentioned with the firearms, DHS, Department of Defense, and the list goes on. And these are just examples. I didn't mean to leave anybody off the list. The list does go on, but these are some of the major groups that we're doing our collaboration with it.

I guess I'll probably close with one other really noteworthy collaboration that you may or may not be aware of. But it's probably our best example of a collaborative research center, and that's called our TIEDS Center, and TIEDS is an acronym based on an acronym. It's been TEDAC. So TEDAC is the

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Terrorist Explosive Device Analytical Center. So that's the part of the laboratory that's down in Huntsville, Alabama, that is working on IEDs or improvised explosive devices. The TIEDS Center is the TEDAC, Improvised Explosive Detection and Synthesis Center. So it's truly a collaborative or, in our parlance, a purple organization, but it's a project with TEDAC and the Department of Homeland Security Science and Technology Directorate. And the goal, you can read here, rapidly and authoritatively assess safety properties and performance characteristics of homeland explosives.

So their core mission is to do risk and performance testing, document those results, and send them out into the broader community so we know what are the risks associated with certain types of devices. And this is going to inform not only the law enforcement community but certainly something like TSA. So when we're going into airports do we have the right detection capabilities in the airports?

Okay, so in conclusion, again, very quickly going through this, our R&D in the laboratory division, the goal is to cultivate and to deliver new scientific technology and methodologies in support of, primarily, the operational requirements of the FBI. We do work in a wide range of -- only touched on a couple, but a wide range of very defined portfolios and they're all designed to support the advancement of our case work in the biological, chemical and physical forensic science. Thank you.

JOHN BUTLER: All right. I think we'll wait and do questions at the end of the speakers, so just in the interest of time. Susan Ballou is up next from NIST.

SUSAN BALLOU: So thank you, John, Nelson, and Jonathan for the invite to speak this afternoon. And since the commission was out at NIST at the last meeting, I feel like bringing your child to workday, that it was great to have everybody out there. We had an opportunity to show the size of the campus, the various laboratories that we have. You got to meet some of the scientist, other than those that are here in this room, and it was just a very enjoyable time on behalf of NIST to have your presence. And I'm not sure if you were able to hear the NIST mission while you were there, and if not, allow me to give it to you.

So the NIST mission is to promote innovation and industrial competitiveness by advancing measurement science, standards and technologies in ways that enhance economic security and improve our quality of life. You feel good? Are your feet finally warm, because mine have been freezing all day, so just thought I'd share that? But the point I want to make is that, from the mission, the scientists are born to meet that mission. What we would like to research, does it have an application to that mission.

And so when we were developing our -- do you have to have a touch to that. Am I too far away from it? I'll just -- can I hit next, or not? So I can talk about the coroner's office. This will be new to me. It will be interesting for you, because I can make up things. So while we're coming with that, so the point of this is when we developed a three year programmatic plan, we take into consideration the mission. And for that part of the plan, so next slide, thank you. Perfect. Yeah.

So on that particular program we were taking into account the new needs, the things that are coming at us today. And not just stuff, what was written in a mission a while ago but the fact that today the NIST laboratories address increasingly complex measurement challenges, ranging from the very small and the very large, and from the physical to the virtual.

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So taking that in account, the next areas that I have listed there on that slide for you are what we hold a thought, an idea, a possible project too. Does it have a nexus with measurement science? So if someone brings to me an idea for a research project I'll bring it up to these five listings; does it have a Nexus; are the staff available or have the applicable expertise to address that research; third, are the NIST staff available? Do not think there they're walking around hoping there's more bring your child to work days that they can give a tour for. Everybody is assigned to a particular project. Their time is allocated very specifically for what they have availability to do. Therefore, do I have staff that's available to do the research? And then is there priority need? Just because a few people request something, does it mean that it's at a national level and needs looking into? And then, of course, the funding. Cary gave that example of funding. Is there funding? We have a limited budget. We have \$7.5 million. That is absolutely identified for areas of research, and after that, we go for outside agency funding, which there is a lot of support.

So I wanted to bring you in line with some of the things over the years that have met those criteria and that we have been involved in and have been asked by DOJ and others, and specifically bullet point number three. So the Law Enforcement Standards Laboratory was established in 1971. I have a real connection to that, because when I left the Crime Laboratory, I came into NIST in the Office of Law Enforcement Standards, which was the next version of this establishment.

And the point was that the National Institute of Justice foresaw the need for standards development in the community. And at that time, it was established for the law enforcement individuals specifically to look at standard for the protective vests, for the holster. How dangerous is it for the officer to be out there in the field ready, responding, and cannot get the weapon out of the holster because it is too secure and held the weapon down? Or the other way around, they're struggling with a possible suspect and the suspect easily moves the gun out of the holster. So the standards were asked to create on that.

From that, it started to expand, and National Institute of Justice asked, can you create standards, material standards in the area of forensic science. So we started to expand our research in that and providing standards, as well as the other things that you can see listed here.

So moving off of that, during the, basically, change and the NIST establishment, the Office of Law Enforcement Standards was jet sinned into the Special Programs Office, and we actually separated out the forensics group to create the Forensic Science Standards Program. And under this we have a specific goal -- I'm going to skip through these next things -- and that we came up with focus area programs. So these generated from areas that were already in establishment under the Office of Law Enforcement Standards. We had a lot of work done in the firearms area; in digital and forensic genetics, John will attest to that, and in statistics. So it became very apparent that these would be our first focus areas, the first four. The last two were added the last year-and-a-half. So I'm going to take you through these next focus areas, very briefly touch on one or two projects because we do not have the time to list or discuss them all.

So the first one, the ballistics and associate tool marks, so the motivation, what came from this? Back in 1988, ATF saw the foresight that they needed a standard. We needed a standard bullet. We need a standard casing that could be used across the nation to make sure that the various types of software programs that are used from lab to lab are reading the same thing from lab to lab.

It was interesting when the standard was actually developed. It took us eight years to develop the bullet. And I like to think about Thomas Edison. You probably did think we got 2000 wrong, but, actually, it wasn't. It told us how many times we just didn't do it right and that we came up with the correct version of

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the standard bullet. And when we started using that, we gave it out to several laboratories to ask them to try it. It was interesting to find out that when they captured that standard bullet and have it imaged and put into the system and then scan the bullet again and asked for a comparison, the standard didn't come up, and we thought, what happened here. Everybody thought, what happened here. And it was interesting to find out that the human factors was coming into play.

Although the system said do not change lighting, do not change where you're actually scanning on that unknown or known sample, you can't help it. It's human nature. You want to fiddle with something; right? Something looks just -- don't touch. We should have a "don't touch" on there. People just tended to fiddle with the lighting just a bit so that when that standard was captured, and then if it was run again just with a slight variance on how it was captured, it wasn't getting a hit. So, therefore, we were able to explain across the nation to the examiners who were using this system, we are serious. Set it up according to the protocol and do not touch it. It will capture. It did an amazing job once that was starting to be followed through. And that just gave another example it will need for standards going across in that particular area.

So some of the efforts that are continuing on in that, just really briefly, these are the titles of them. We have the quality assurance, the metrics and algorithms for objective identification. Some of this also applies to the 3D that Cary mentioned is included in that. I'm going to talk briefly about number one and number two on the projects that relate to that. The next generation, National Integrated Ballistic Information Network, which falls under ATF, and I think Julia's mentioned you probably will not have time to discuss much on this.

So the NIBIN, that was the whole standard request. And also using the NIST standard bullet and casing what NIST did for that was, we were able, for the first time, to evaluate the algorithm that is put in place for capturing that image and compressing it, and then uncompressing to get the image back. So it was phenomenal on what we were able to find and work with the company that was producing this to improve the system. We're looking at the certainty error rate analysis requirement in firearm identification and other pattern evidence. That's the title of an actual project taking place, as well as the congruent matching methods.

The next focus area, I want to talk about digital forensics. So this, again, something about the late '90s was just hitting everybody. Can you imagine, if you go back to when you actually used the computer that had the back of it going out about three feet and you hit a dot on it and you had to wait. And we're waiting. And finally a blinky thing came up on the screen. Remember that? So look at what we have now. But back then, in the late '90s, we've got to say that DOD and FBI knew this was going to be the next hit. This was going to start to really be effectively used by criminals to do things that we can't even imagine.

So back then they both asked -- FBI wanted to know, were we're already working on file system that is are huge, and we have to go through it manually to determine where the files are that might hold the information we need to break this case. Do you know how long it takes us to go through one computer? They didn't even use the word "terabyte" back then, and they were scared. So NIST started to work with FBI and design and develop this national system that could be used that would filter rapidly through a program and determine what they needed, what was not, I should say, synced on a particular commuter, so they could just look at that area and reduce the time.

DOD, on the other hand, said, look, we have our analysts using these various tools offered by manufacturers and we have no idea as to whether what the manufacturer's saying is true or not. It's similar

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to you going to buy a refrigerator and you read what you can on the specs for that refrigerator, but how do you know that's actually true. So now days you get on Facebook and you post something and you hope you get less than a hundred responses so you can really easily read through it and determine which refrigerator is the best to suit your needs.

So we established with -- and Greg Mata [ph] was on our team at the time. We created a steering group at the various federal agencies that started setting up requirements for each of the tools, testing them according to those requirements and then issuing a report that DHS or NIJ would post for us so people would have a better understanding of the tools that they're looking at for determining the products.

Here's some examples of what came out of it. So the Supreme Court cited NIST's work in the mobile device numerous times in one of their renderings. This mobile apps, the NSA for Anna Serrell [ph] is showing the number of apps were increasing the volume all the time to help the changes and the new uses of digital devices. And we now are proud owners of a new name that, soon, I believe, will be in Webster's called "De-NISTing" so that if you have a situation where you need a quick response, the NSRL will be there to help you, just like Superman.

So CFTT test report, those are the ones that we evaluate the tools. And as you heard earlier, some individuals have already -- have in the past used these actual reports in court to show that whatever is being brought up, either side, prosecution or defense, that the tool has actually been evaluated according to requirements set by NIST.

Forensic genetics, so motivation, again, just like computer forensics world, back in the '90s DNA really took hold, really started scoring as to what was being used. So we needed such things as the next generation sequencing and rapid DNA. How is that working? What are some of the evaluations that should be done? NIST stepped in and took care of that. John Butler, right here to my left, your right, the World Trade Center, the big issue there is we had really never witnessed something of samples to this minute size. How do you handle evidence that is that way, that is degraded as much as that evidence was? And so NIST, along with some other entities, came up with ways of interpreting data and evaluating the information, as well as methodologies for determining such.

Applied group, I want to say the STRBase has been in existence about 20 years now. It's a phenomenal resource for any kind of information you need on DNA, and then, of course, the standard reference materials that through inter-laboratory studies have done a great job sending out the sample. People sending in the responses back as to what was the analysis results from their laboratory, and then being able to evaluate and give assistance in either improving their system, taking a look at what's being done or how many other issues might have come out of that.

Statistics, I heard today, or maybe it was yesterday, that what might be lacking in some of these research projects is a valid statistical plan on how should that research be conducted. I got to say, start thinking about in your education background how often did you have a course on how to set up research. Did anybody ever talk about what are the steps that you should be putting in place and what should be considered specifically about statistics? I got to say, I'm one, for one, that take help off my requirement list, put statistics on there and how it applies to forensics, I would be all for that in a second.

So statistics were always part of all the focus areas, but, for once, we were able to, with the funding that I mentioned earlier, set this aside as their own focus area. So not only do they help the other focus areas,

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but they're able to go out and initiate their own projects and start their own training in some of the areas that we see some issues occurring. And that, they're finding, is really exciting, especially the footwear impression comparisons. And, Gerry, I put NIJ up there, although I don't think we contacted you, but that's just an FYI. It's coming soon.

GERALD LAPORTE: Great.

SUSAN BALLOU: Okay. Sounds good. So we're definitely taking a look at the measurements in footwear impression comparisons, applying statistical evaluations to that, and setting up separate research projects for it as well. Now here are the two areas that are separate or different from the other four that had been long standing at NIST. Toxins, you can imagine that if the ICP is setting out notices that there are increasing difficulties with determination of intoxication per marijuana, you know it is a major concern across the nation. And has anybody thought is there a standard?

Now I'm sorry that Marilyn's not here today. She was here yesterday. But she had done such an amazing work on this topic at NIH, and NIST is hoping that we can get some of that information to continue the work, and that is to actually start getting values for what should you be measuring when you actually have somebody exhale into a contraption if they've been stopped? What's the limit? What shows impairment? People really don't know right now. Sure we have the Breathalyzers. That's for alcohol. And it doesn't read the same as when you're exhaling from intoxication from marijuana.

And DEA, we cannot say enough about the issue with Fentanyl. It's out there. And so right now we're looking at -- here are some of the topics that we're looking at. The checked areas are what we're actively engaged in. The bullets that are not yet checked are what we're interested in and have not yet started. So we are starting to look at that marijuana Breathalyzer. We're working with FIU, with Jose's team also on determinations, best way for inhaling and identification of that. And then, of course, NMR, we're hoping to get a database out there that has some of these information on it so that people can do a quick search and see if some of their unknown samples get a hit.

Trace, another new area that we're working on and focus. Motivation, definitely NRC report indicated that there need today be additional characterization on reliability of error rates on the procedure. And they mentioned for paint analysis as well. Standard language for reporting conclusions and sources of uncertainty. Here are some of the areas we're looking at right at the moment, and once again the ones that are checked are the ones that we're looking into. A lot of the input on this we're getting back from the OSAC participation as to what should be needed in here. And we hope to improve and expand on this area as well.

So right now what I've provided you, in a quick sense, staying in line with Cary's idea of keeping this brief, is the fact these are current activities. I've not given you any type of information on what we've accomplished in the past. And a lot of our criteria right now, our focus is not only on publication because we are dealing with scientists at NIST that, to them, publication is second nature. I gave them the worst task of all, which was go visit a crime lab and see if your research can be applied. You would have thought I asked for a new nuclear device.

So for them to actually have to go into crime lab is a little out of their comfort zone, but we're hoping that this will demonstrate exact use of the research and not that it's just in a publication on a shelf that people don't think to go to automatically. Thank you very much.

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JOHN BUTLER: All right, Julia, please. And then we'll have questions after that.

JULIA DOLAN: Oh, yeah, so much technology here. I have a lot to say, so I'm going to try and -- I know I'm the one keeping you from the end of the day, so I'm going to try to just highlight a little bit about our philosophy, who we are at ATF, and how that kind of drives the research we do, and just highlight one or two -- maybe a few more than that -- examples of the type of research that we do here.

So the first thing about ATF is we really are a small agency, and that kind of drives everything we do. We have approximately 5,000 personnel, and just under half of that are special agents. And in our laboratories we actually have just under 80 full-time personnel, and that's in three forensic laboratories that are traditional forensic labs, and also fire research laboratory.

We're also really specialized. Unlike a lot of the other laboratories that cover a wide range of crimes, a wide range of evidence types, we're very, very specialized, and that also affects the type of work we do, and we are very much focused on operations. Maybe that's because we're so small, but we really are very focused on case work. So all of these things kind of come together to drive the type of research that we do.

So part of being small, we have no money, no money dedicated for research. But we have a lot of thoughts and ideas and things that we want to have done, and so one of the ways that we get our work done that we care about is through leveraging partnerships. One example, our technical leader in DNA knows, I think, almost everybody on the planet who knows anything about DNA, and he really leverages those partnerships so that we can have some insight into how things are done.

Mentoring is another thing that we do. We have a training program, the National Firearms Examiner's Academy. One of their requirements is doing a research project. So in that way ATF personnel aren't actually doing the research but they are mentoring, they're guiding it, they're making sure it's relevant and statistically valid. So those are some of the things that we do because of being small.

We're very specialized. We have regulatory responsibilities, as well as criminal enforcement, so some of our research will be based on that, things like that affect safe explosive storage for example. Some of our research also is related to investigative activities, not just laboratory activities. And we have a very unique focus on our core mission, in reducing violent crime, related to firearms, fire and arson, explosives. So everything we do is really focused on those core areas and in reducing violent crime.

Our research is focused, really, on the techniques and methods that just support these things. It's not fundamental. It's not foundational. It is application based. I was just saying that everything we do really is not -- we've been hearing a lot of stuff that's needed, the basic science, the foundational science. Most of our research is not that. Most of ours is very application-based, leaning toward our specific areas in which we work. We're trying to improve how we do case work from the analytical standpoint, and almost all the research we do was inspired from an actual case work challenge or question that came up. And, as I mentioned earlier, because we do have regulatory authority as well, some of the research is related to improving investigative methods, particularly fire investigation, as well as some the regulatory issues.

So we have a kind of unique blend of investigative and analytical abilities. We've got the National Center for Explosives Training and Research. That houses some of our investigative programs, our Certified Fire

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Investigator Program, and they contribute quite a bit to our research in the scientific analysis with fires. We work through the Homemade Explosive Training Program. One of the important things that we're doing there is looking at the functionality of trending explosives to see how those things are working in the real world. I mentioned the NFDA, and then we have what I think of as our traditional science labs. We have three of those, and then we also have a Fire Research Laboratory.

So I'm going to talk real quickly about a few of the things, our research supporting fire investigations. So I said almost everything we have, almost every question we have. It actually comes from a case, and that's more true than anything for our fire investigations. It's very practical, and one of the things we're trying to do is be a little bit more transparent and improve our way of distributing this data. We have a lot of test data and we're trying to make that more widely available to other investigators, as well as to other agencies. So we're looking at trying to get an open data format to make it super widely accessible. Sometimes things don't happen as quickly and easily as you think, especially when you're working with your IT group. So I will say that's something that we're striving for but we're not quite there yet. But we are trying to make this test data much more widely available.

One of the other things about the fire tests is our way of distributing that. A lot of times it's not always going to be published in a peer-reviewed journal. Sometimes that's not the best way to get information out. A lot of our information is shared, very frequently is through training, either in small training classes of fire investigators, and we've also been coming up with some more innovative ways of getting the information out more quickly and to a wider group of people. So, again, we're trying to get a little bit of the force multiplier here going by mentoring some of these fire investigation related projects, the things that are affecting cause and origin, and a lot of tests that actually affect public safety, including firefighter safety as well.

So I want to talk about just a couple of the projects that our Fire Research Lab has been working on. One particular project was looking at the flow paths that occur in fire and how a situation can change so rapidly in a fire scene. This, again, came as a question that started with the death of a firefighter that was being investigated, and the question was, how did the environment from a relatively cool environment to absolutely untenable so quickly? So fire modeling techniques were applied looking at these paths and how it happened. And actually some of the things that happened during the ventilation process and during suppression efforts ended up affecting that. So this is information that had to get out really, really quickly, and we wanted to get it out as wide as possible, so this actually ended up going out on YouTube.

In the terms, we put together three training videos, and these are widely available on YouTube. They've been viewed more than a quarter million times, and this is potentially going to change how some suppression tactics, which will, of course, eventually save firefighter lives. So that was a really important project for us.

Another one, this is one of those things that came up in a case. Someone set the infant baby carrier on the stovetop and it accidentally ignited and caught fire. Now you're probably thinking what I'm thinking is, how does that happen? That can't possibly happen. We actually had two cases like that that came in a very short period of time. The research ended up showing that you know what it can happen. It can happen super easily, and it's a terrible thing. So the information that comes from research like this, it goes to regulatory agencies. It's really important that they know what are the product design flaws that allow for that to happen?

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This information also had to get widely publicized too, because it can be exculpatory. A lot of fire investigations, if they hear someone saying, "I set the baby carrier on the surface of the stove because the dog was running around and I didn't want the dog in the baby's face, and it accidentally ignited," most of us don't believe that. This is why it's really important that this information be widely distributed. And so, again, it's not the normal means we're thinking of scientific journals, the peer reviewed literature. This also went out on You Tube, because people need to know this. Because what if a thousand miles in a different part of the country a similar thing happened? It's very, very important that they know this can be an accidental ignition.

Another area that we've been working in is the fire hose failures. This, again, happens. Firefighters, this has been linked to or associated with a lot of firefighter deaths. Why is this happening? It turns out that you can make a fire hose a little bit cheaper, a little bit lighter weight, and it's still going to meet the standard, but they're failing. So a lot of the research and tests we did showed that this is not really a good standard. It was a subpar standard. We need to have a more stringent and more robust standard in order to improve firefighter safety.

The last one I want to talk about for fire is the flame jetting. This is one of those things you kind of have to see to believe, so I have a video of this. And I'm going to show this in slow motion, but this was another one of those things where it came out. It was a question that came from a case that was being investigated. The things that were said were kind of -- I don't believe that this would happen. The seven-year-old daughter was very far away. The father was pouring diesel fuel into a fire pit, why, I don't even want to ask that question. But he first said the daughter got splashed with the ignitable liquid and then some ignitable liquid spilled. But he was changing his story, so all these things kind of came up, making you think maybe this didn't quite happen the way he said, and that eventually he did say the fire just flu out.

And, again, that's one of those things that you don't always believe when you first hear it. So tests were set up to do this. And we did a number of tests with these looking at a number of different ignitable liquids. So this particular test is going to be a slow motion. It's a little bit dark on there, but the container pouring the liquid into the actively burning fire is to the left. And, of course, there is a mannequin to the right.

One thing that did come up in the laboratory testing was the diesel fuel was contaminated with gasoline, and if you're not familiar with that, even a teeny tiny bit of gasoline contamination can cause a diesel fuel to act almost like gasoline in terms of ease of ignition. But this particular test is being shown with Ethanol, if I can make it do its thing. It's kind of challenging. It's pouring into the fire. I wouldn't have believed that would happen. And that is one iteration of a test that was conducted multiple times, and it did show this flame jetting phenomenon could occur up to 15 or 20 feet away.

Sadly, actually one of the containers that was used in this particular case ended up going off the market because there were so many lawsuits as a result of this. So this also is on YouTube. Not necessarily what you think of putting your scientific research, but we need people to see this. And not only it could affect civil matters, it can affect certainly exculpatory issues for people involved in these things, as well as helping fire investigators do their job as well.

So one of the others that we look at in fire is also the laboratory aspect. When I think of the traditional forensic lab related to fire debris, some of our recent things, we've been looking at recent methods that are

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used for decontamination and sample collection. That's been kind of a hot topic because we're so much more sensitive on what we can detect now. We recently did a test in partnership with Oklahoma State University, and that was looking at preservation of evidence from meth lab fires to make sure that we were protecting both the fire debris evidence, as well as the drug evidence. And we also, again, take advantage of interns and mentoring relationships and have a lot of other projects related to the analysis of fire debris.

So DNA, here is the thing about DNA, ATF is a little bit different than the rest of the planet. Everything we do is hard. We don't do rape kits. We rarely see blood. Everything we do is touched. Those are your hard samples. They're all low level. They're all almost complex mixtures. They're frequently degraded. We have substrates that are really nasty for DNA. Copper is very bad. We look at ammunition. We look at pipes from bombs. We look at guns. So our DNA world is a very, very challenging world. And all of our research is really based on those particular challenges and trying to come up with better ways to meet those challenges.

We've done a lot of small changes to our protocols, including the way statistics are applied. That resulted in us really being able to nearly double our recovery of usable profiles from firearms to nearly 45%. We have a lot of projects that we've done in the area of DNA that aren't widely publicized. Some of them are law enforcement sensitive, where is the best way -- where and how is the best way to collect DNA evidence post-blast? What is the survivability? Those are not things we really want to publish? We don't want everybody knowing where the best to collect the evidence is. But it is, of course, shared with relevant agencies who also have responsibilities with law enforcement.

So copper is a big problem for us. And one of the things we were looking at ways to mitigate it. Normally a lot of times we use the wet swab and the question came up was the DNA was maybe sitting here happily nice and dry, and then when we add wet, maybe we're helping degrade it. So we started looking at other ways of collecting DNA. We've actually come up with some potentially good solutions for that, and that is something that I'm hoping to be able to make public relatively soon, but not public right now.

Polymorphic peptide analysis, this was something, again, it kind of came from a partnership. They were looking at peptides to see, hey, is this another way where DNA is relatively delicate and degrades? Are there other proteins that we could maybe be looking at that could provide us some information? They were actually looking at it from hair, but our question came up, hey, maybe this is something we could look at on our types of services that we're look at, so that study is ongoing.

Self-read DNA, that's another thing that came up. Also inspired from a cake. We were using a cell on a document, and the question was, does self-read DNA act differently listen than cellular DNA? And if so, are there way that is we can take advantage of that information and use that to our advantage in the analytical process. We did some research on DNA repair to see if that can help with our degraded samples. That's looking promising. We're kind of moving forward with validating that for forensic case work.

Bovine serum albumin, it's kind of been represented as a way of making a lot of improvements in DNA analysis. So we're thinking is that something we can maybe use in some of ours challenging touch samples, and that we're continuing to look at.

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One of the other things we're looking at is using the quant process to give us some guidance in sample combinations. We have something like a firearm where we'll take swabs from multiple areas. Sometimes we'll combine the swabs. Well that can be helpful because you can get a stronger sample, but sometimes you're making a more complex mixture. So we're working with an academic institution, as well as a private firm, looking at is there some information that we can glean during quant steps to provide guidance as to which samples can be combined.

We're also participated in the NextGen sequencing, the massively parallel sequencing project. That has a lot of private industries and academics involved but not a lot of working forensic labs, so we're able to provide some real-world input on that.

Finally, the last couple areas I want to talk about are two of our other real critical areas. Explosives we, of course, look at analytical methods. A lot of explosive materials, propellants that we may be seeing in improvised explosive devices have proprietary formulations, so we kind of need to figure out what will we expect to see post-blast, and how can we detect that. We've been requested to look at some things that have been published in Paris literature to look at the functionality of those things. Do they work as designed and what types of damage can be done? And as I said, we also do some things that are regulatory related. We've looked at damage to head locks. We've looked at how TNT being stored in a day box, what type of damage can occur from that.

Firearms and tool marks, we have done research there, relevant to the types of cases that ATF sees. For example, if a tool or a firearm was subjected to a fire, suppression activities, how does that affect its ability to leave -- tool marks are to be compared back to those tools and we've also participated in a number of foundational studies as well, looking at things like consecutive matching striate, trying to apply statistics to some of those things. We've participated in some of the larger studies, the black-box type studies as well.

So, I feel like I was trying to hit a couple highlights of a lot of the difference things that we do very quickly, but I thank you for giving me the opportunity to do that. And now I'll breathe.

JOHN BUTLER: Okay. I think we'll cut a little bit into our final wrap-up time. So we'll take about maybe about 15 minutes if we need it. Any questions for the panel. Phil, you have your tent up? Okay. Cecelia.

CECELIA CROUSE: I think that my question is for you. I was wondering if there's an instrument or types of instruments out there -- let's say the DOD has originally requested, for whatever reason and then they decide to come into the forensics. And specifically, I'm thinking of the hand-held Raman instruments like the True Narc and the Progeny, Rescue, and I can't remember the name of the other, PGR 1064, whatever. We've actually looked at all of these in our laboratory, and they're just -- not all of them anyway -- they're ready for prime time, and there doesn't seem to be any guidance as to how what kind of standards to use in forensics. Because I would think using them in a theater in Iraq or Afghanistan, the policies and procedures and standards are different than using them at the Palm Beach County Sheriff's Office. So how --

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CECELIA CROUSE: So how does NIST potentially get involved in helping guide this kind of a process, or don't they?

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SUSAN BALLOU: So, as I mentioned that the research I provided was from the focus areas that I selected. There is quite a bit of additional forensic science related research taking place on the NIST campus that are beyond the Special Programs Office. So we have other groups that are funded through Department of Defense or Homeland Security, whatever, to do some of things that you've just mentioned. So as far as that goes, what the best thing to do, if you need more information on how far they've gotten along with evaluations, or particularly looking at the requirements for, say, handhelds, just e-mail me and I'll connect you with the individual who's doing the research.

CECELIA CROUSE: Great. Thanks.

SUSAN BALLOU: Sure.

JULIA LEIGHTON: So thank you all very much. Very exciting to hear in particular, from my perspective, about the empirical research that may obviate many of the conversations that we're having here about what to do in the absence of empirical evidence. When we finally get the empirical evidence it will be easier conversation. So I think that's really great work that's being done and exciting to hear about. And what I didn't hear about and I'd ask any and all of you to address is efforts to make the various databases that you've all collected over time for, often, very different purposes but that seem just ripe for allowing for more empirical research to be done and to assist you in sort of free research; right? You're going to find an academic world very excited about what they could do with those databases and the willingness to do the work without it costing you a great deal. So I'm curious to hear how that's moving forward.

SUSAN BALLOU: We have a very uplifting outlook on things. That's really good to hear. And actually, there is a starting a database of databases that NIST pulling together and hoping to have available soon on the NIST site -- I don't think it's available just yet -- so that you can see what database is available out there. NIST did have a kind of, I'd say, a symposium or a workshop on databases this year, and one of the questions came up, and it was talking with Cary as well, from the FBI's viewpoint, is a lot of individuals do not understand there are different kinds of databases, so you have your reference database and then you have your other research database, and it goes on. So we really, again, just what you've been discussing here as to terminology and the terms that are being placed in use.

I'm not going to talk about CODIS because that could be where it could go, and also the database for [NIVIN,] those are separate for proprietary types of databases, but we are working on providing one on firearms through working with FBI, so NIST is gathering that type of information. That will be a very large database that is suitable for research.

And I did fail to mention in my last close-up slide about CSAFE, which Bill Thompson mentioned before, is it's on their plate also to help us find databases that are suitable for research points. But I'm going pass it on to another.

CARY OIEN: Yeah, I'll follow up -- excuse me, I was going to cover exactly what Sue talked about. We, the FBI, we have a lot of collections, and we also have some databases. And that seems to be parlance that oh, it's all the same thing. Well we have a reference firearms collection, but that's not a database. But we use our reference firearms collection in order to test fires to give to NIST so they could help develop

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this database of 3D imaging on spent cartridge cases or bullets. So we're looking for opportunities to do that. But many of our -- what a lot of people call databases are actually collections.

Now, since she brought up CODIS, I mean, CODIS, I can't even speak to, you know, access to CODIS. I know there's laws and there's statutes around that, but I mean that's a question for our general counsel's office.

JULIA LEIGHTON: I understand that, and I didn't ask about that specifically, though it seems to me it is -- I guess what I'm looking for is more what efforts are you making to make this happen and to communicate with the research world to find ways? So it's really are we moving forward at all in the conversation? However you define what the big database is actually engaging with the research community about whether or not there are things they could do with those different databases and their ability to help you assess the value of those different databases, which may not be sort of first and primary in your mission but really is first and primary in building the capacity to do the empirical research that will provide the empirical evidence that's being called for.

SUSAN BALLOU: So I would state back that it would really be helpful when we do make -- when NIST offers the database of databases, for individuals to take a look and say it's not meeting my needs, or we're lacking a database in this area, or the database that we're seeing on there, which we could use for research but is still insufficient in quantity, please expand it or whatever, so I do believe that our first step. And I have a feeling Gerry wants to jump in on this, or am I just interpreting out of the side of my eye that you want stay out of it?

GERALD LAPORTE: So it's a difficult question from a law enforcement agency standpoint. I can speak from when I came from secret service. So we had a database with well over 10,000 writing inks and printer inks that dated back all the way to the 1920s. We also had a huge database of threatening letters and handwriting samples that came to the Presidents, all the way dating back to, I think, Ronald Reagan it went all the way back to. We would never ever think of sharing that database with anybody, because we had a lot of proprietary information from companies that provided us, with information with an understanding that we would not share that publicly. So there's a lot of law enforcement sensitive information in those databases.

Although we had what was called the Forensic Information System for Handwriting or FISH, that FISH system we had, we had thousands of threat letters that were in there, but we would never think of actually sharing that with the public. It was a wealth, it was a huge resource, so when you have law enforcement agencies that have specific missions, sometimes they're very sensitive about those databases.

What becomes difficult is if a manufacturer learns that you're sharing that information, they're not going to provide you with any information any longer.

JULIA LEIGHTON: So, you know, I've heard that. I think we've all heard those explanations over time, for a long time now. And so my real question is, what work are you all doing to try to work around that, because everything I've heard from the forensic scientists at this table, and from the scientific community, is this kind of data and doing research on it, not giving it out to -- you know, putting it on YouTube for general public to look at, but to engage with third-party researchers is what's going to move things forward. And I get it, it's hard. But is the answer that it's hard so we're not doing it, or is the answer it's

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hard but we are working on it, ways of trying to protect some of the information but still allow researchers access to it using protective agreements?

SUSAN BALLOU: So I think turning my --

[Inaudible].

GERALD LAPORTE: I don't want to get too ahead of this. I know Cary and I are kind of looking at each other. So we sent \$1.5 billion over to the FBI this past September to build a shoe database. And the biggest part of this discussion that we're having, and it's kind of difficult to talk about because we haven't really ironed out all the detail, but when I went to the FBI, sort of my ask to them was, can we create a database that can be portion of it law enforcement sensitive so that if you're a law enforcement agency you can use a certain part of that database. But we have another part of that database that can be used for research purposes as well, so we have all the sole patterns from shoes from various manufacturers. So we're still talk about that, and I think kind of we've had CGIS on the line with us about creating that two-way database. We do it with NAMUS, and that's where we kind of got the idea from National and Missing Unidentified Systems for database for unidentified persons and missing persons in and a portion of it is in law enforcements sensitive.

But another portion of it is actually generally available to the public. So we're going with that idea. But I can tell you, from an IT perspective, that there's a lot of concern in the government that when you create these databases that have potential access from the outside, there's a lot of concern about back door entry into the law enforcement portion of it.

SUSAN BALLOU: So another quick response on what's actively happening is that NIST is looking into setting up protocol steps that a group or academia, whoever, wants something checked against a large database, you would send it to NIST and NIST would run it on a database. So you would not have access to it, but we would run it through exactly, let you know what the steps are that we took to vet the information, and then send you back the results. That is one way we're looking at to get around this very issue.

JOHN BUTLER: Greg is up next.

GREGORY CZARNOPYS: Just to add a little bit to Julia's talk on the database that we have in our fire research. We have a ton of data, terabytes of data, video and different experiments. All of them have case information. One of our biggest challenges is scrubbing that. I mean even to share it internally, it makes it very tough to share it with our CFIs because of all the case information in there. So we're working to scrub that. We put datasets out on, what is that, opensource.gov, or something like that, to get people to actually look at that dataset, you know, give them a sampling of it and figure out a way we can do that, because that's one of our challenges we face, especially the small agencies, it makes it very difficult.

JOHN BUTLER: If no further questions, then we'll go ahead and thank our speakers again. Okay, Nelson, you want to --

NELSON SANTOS: So, in the wrap-up, one of the things I think we need to kind of understand what we're going forward is with the summary report. So I'll turn it over to Pam, let us know where she's at and how we can move forward.

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PAM KING: So, after yesterday's discussion, I think we had a lot of really good ideas, and I think there was a lot of really good discussion, and the more that I thought about it in the evening, or even in the afternoon, frankly, the more quickly it became clear to me that I think that the document is something that needs more substantive changes, or at least substantial changes I guess might be a better way to put it in the way that it's organized and put together than what I felt comfortable bringing before this group. And I talked to John and Nelson about that, as well as a few others, just to get some general sentiment. But it just seemed to me that in thinking about how to incorporate the comments that this group had, that it was better to try to do this well than quickly. So I don't have anything else to present to you with respect to revisions today.

I did want to at least approach the idea of a compromise, which would be to commit to having a final revised document to this group as a whole sometime within the next 14 to 30 days. Apparently we have a ten-day timeline, so that maybe can get a little longer than that. And then the question becomes whether or not we can find a mechanism to take a vote remotely through e-mail or some sort of a -- I'm not exactly sure. But we all this magic technology, maybe NIST can help us with that, measuring something; right? I think that qualifies. Where's Sue?

[Inaudible].

PAM KING: So that was what we were sort of thinking about doing, is trying, if we can, to vote on a revised document that we'd have everybody have the opportunity to review as a business record between the meetings, so that's what I have for an update. Nelson.

JOHN BUTLER: You want to talk about ideas right now?

NELSON SANTOS: Well, I just want to comment. What we're going to do is we're going to see, because, as you know, all the business is conducted publicly. That's where it gets kind of difficult. So we're going to ask the FACA folks about how we can possibly make this happen, where we can actually doing it through an e-mail vote.

PAM KING: Twitter is public. We could do Twitter.

NELSON SANTOS: Twitter. There's a number of things that are public that we could utilize. But anyhow, that's where it gets difficult with the FACA rules. But we'll look into them, and I think we should be able to come up with something. So, John, what were you saying?

JOHN BUTLER: Well, we can collect a few other ideas if there's other things we want to discuss that might go into the document right now, if you want to do that.

PAM KING: Yeah, if anybody has any other ideas that they'd like to bring forward that they have thought of overnight or thought they missed or didn't have an opportunity to say yesterday, certainly this would be the time to voice those as well. And apparently everybody's talked out.

JOHN BUTLER: Okay. Randy Hanzlick has somebody he wanted to talk about briefly with MDI, I believe. You still want to do that.

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RANDY HANZLICK: Yeah. [Inaudible]. I'm not used to talking with a microphone. I wanted to ask Gerry about the program for increasing the supply of forensic pathologists. I briefly read the proposal. And, of course, I think everybody understands the only people who would will eligible for that right now are people who have accredited training programs in forensic pathology, because you can't qualify for the forensic pathology board examination and become a board certified forensic pathologist unless you've trained in an accredited program by the ACGME, Accredited Council of Graduate Medical Education. So that's 37 places in the country.

They limit the number of trainees you can have based on the number of deaths you investigate. So, for example, if you investigate 500 deaths a year, you can have one fellow. If you investigate a thousand, you can have two. So there's a population limiting step involved in that process. And then right now, between those 37 programs there's about 80 approved positions in the country to train, and about 55 or so of them are funded. So you got, what are we talking here, 20 or 25 possible positions, which I think fits into the budgeting. I just want to make sure that people have thought about these kind of -- let's not call them restrictions but limitations maybe on where it can go.

GERALD LAPORTE: So, Randy, the best way for me to answer that is I'm not allowed to really answer questions about the solicitation, per se, even though we're in a public audience. We have a mechanism for you to send the question in, or even a comment, because it will be built into FAQs within the solicitation. So I would say go to the solicitation. There will be a link there to send in a comment or a question. Send it in that way, and then it will go back out public so that everybody actually sees that as well. So that's the mechanism that we have.

RANDY HANZLICK: Okay. Thanks.

JOHN BUTLER: Okay. The other thing just to point out, the PCAST, the nine-page addendum is up on the website. And there's also a 250-page document of all the responses that they received, that they've included in there, just so you aware of that.

The next meeting, we wanted to talk a little bit about things for the next meeting. What we have right now, I'll just blow it up on the big full screen here, is we have, of course we'll have the summary document, depending upon what's able to happen between meetings under the FACA rules. We'll either vote on that in April, or before, if we're able to do that. We'll discuss and vote on the Report Content and the Statistical Statements Views Documents, depending on where those go at the next meeting. And then we have plans for more panels on various topics to inform the commission based on what you'd like to here.

So currently what we have listed are one that is we've gotten back from votes or from discussions with various people. We did not get to hear from Federal Research, from NIH, or from the Department of Defense, and so we did some reach out to try to get some of those, but we weren't able to get them in time for this meeting, and so that's why they would be put on the next meeting, if we'd like to do that.

Victim's issue, Susan and Katherine have discussed that a little bit. We have the wrongful convictions, a panel that Peter has asked that we have a chance to discuss. Number four is a new ISO standard that's currently being developed on interpretation of evidence that is in the process of happening and wanting to be informed a little bit more about that if that's something we'd like to do. We have a potential speaker, the U. S. Editor for that to come and speak on that. More on training if that's something you'd like to hear.

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Quality reviews and forensic commissions, kind of getting a summary of what's happening in other areas around the country, if you'd like to hear about some of the challenges that are being seen in quality reviews and the forensic commissions are looking at.

Number seven relates to performance management and metrics, and kind of key performance indicators, what other things could be done or are being done in other fields that might apply to forensic science. Then on the right side you see number eight, the update of the gap analysis that the AAAS had started. We heard about that in December of 2015, and I'm not sure what the status of that is, but if we want to try to get an update on that. OSTP, Office of Science Technology Policy has been working on getting together a forensic R&D task force to go and look at R&D issues across the federal government, we want to get an update on that, see where they are.

Update on OSAC is a possibility, discussing return on investment, so what's the impact of efforts that are being made for research or for other aspects in forensic science. And finally, getting feedback from various professional organizations on the impact of the recommendations that have come out so far from the commission. And, of course, it's meeting 13 so we have the number 13 for another possible ideas. Barbara.

BARBARA HERVEY: Well, it may be captured in some of these other things, but I'd really like to have some kind of discussion on actual intersection of all of this with the law, so something about how we're handling this on the legal side. So that would incorporate perhaps some discussion on writs, which kind of goes in with Peter's wrongful conviction stuff. But it's not always wrongful convictions, but, you know, how we actually dealing with all this, whether the judges are doing something different or better or doing anything at all as far as admissibility questions, but an actual legal presentation.

JOHN BUTLER: Okay. Cecelia.

CECELIA CROUSE: Your number 12 up there is kind of like a summary feedback. If possible, if the GAO survey is completed, I think that would be a good opportunity for them to come to us as well.

PHIL PULASKI: Yeah, same thing, number 12, very interesting seeing what the feedback is.

GERALD LAPORTE: Yeah, John, I definitely like number 12, and I'm wondering if that might be able to fit into Judge Hervey's, if we got somebody in the NDAA or the criminal defense lawyers in CDL, bring those groups in here as well, ASCLAD, and then maybe find out how it's wrangling around in the legal community, the things that are coming from here.

JOHN BUTLER: Julia.

JULIA LEIGHTON: A lot of choices, and if 12 ends up being one we do, one piece that I would put on it, or I would do, even if we end up not doing that as a presentation, is just some data gathering that, hopefully, would be simple for you all to do, which is how many hits on the webcast over time, how many hits on the work product documents and how much you can break that down. I think that that will not only get -- it doesn't tell you why or how people are reacting, but it does get you the silent group, some sense of the size of the silent group; right? We know ASCLAD's paying attention. We know NACDL is paying attention. We know IP is paying attention. You know, we can pick these big

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organizations. But just how many potential individuals are hitting on all these documents and on these events, I think, will also inform a discussion.

JOHN BUTLER: Okay. Others? Well, we'll take this back to the subcommittee on procedures and operations, and I think we have a phone call next Tuesday, and we'll begin discussing on how to turn this into an agenda.

So just in terms of impact, I will show -- I don't know if you're aware of this, but there was just a Harbor Review article that came out a couple days ago from Barack Obama, from the President, and in here it talks about -- on Page 860 it actually mentions the commission, National Commission on Forensic Science. So it has been referenced in a law review article recently, so. Anything else?

JULIA LEIGHTON: Yeah, what's the impact factor of that school in Boston's Journal?

NELSON SANTOS: Are you done?

JOHN BUTLER: I'm done, yeah.

NELSON SANTOS: Okay. So I think that pretty much closes it for this meeting. As all of you are very keenly aware of, there will be a change in administration before we meet again, and what that will look like and how that will impact how we move forward is still yet to be determined. But I'm sure this will be some change of some sort, just because you have different players.

So just to reiterate the recommendation -- I think the one recommendation that we voted on, this attorney general, the current one, the sitting one, will not be acting on those, and it still remains to be seen if the incoming attorney general will have an opinion on that one. So we'll see. So a lot of unknown right now at this point in time, and as soon as we find out something we'll let you know.

JOHN BUTLER: Public comments, is there public comments?

NELSON SANTOS: Oh, that right. Any public comment?

JONATHAN MCGRATH: So I don't think anyone is signed up currently for public comments, so I open the floor if anybody does want to provide up to three minute public comment. Seeing no hands, you guys have anything else? No. All right. Well thank you very much for making it out in a cold week in D.C. We'll see you in April. Thanks everyone.

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