NIJ’s Forensic Science Research & Development Programs

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Disclaimer

• Any opinions or points of view expressed are those of the presenter and do not necessarily reflect the official position or policies of the U.S. Department of Justice.
“... the scientific paper is a marker on the way to scientific progress, not itself a destination. Scrutiny of papers is therefore to be welcomed, if only to check that the signposts are pointing in the correct direction. New knowledge arrives constantly to correct and displace the old. It is a messy process, full of acrimonious discussions and painful realizations, but necessary. Errors must be rooted out.” ¹

¹. Critics’ choice: Post-publication scrutiny of papers is essential for science — but it should be done politely, December 2016, Volume 540, Nature, p.7.
NIJ’s Office of Investigative and Forensic Science

• The lead federal agency for forensic science research and development as well as the administration of programs to improve laboratory efficiency, reduce backlogs, and provide technical assistance.

https://www.nij.gov/funding/awards/pages/awards-list.aspx?tags=and%3aForensics%2cResearch%20and%20Development
Vision of the Office of Investigative & Forensic Sciences

Justice through sound science, scientists, and forensic practice.

Mission of the Forensic Science R&D Program

Advance forensic science by supporting research and innovation to protect the public and ensure justice for all.
DOJ Issues Scientific and Research Integrity Policy

U.S. DEPARTMENT OF JUSTICE
SCIENTIFIC AND RESEARCH INTEGRITY POLICY

If the law has made you a witness,
remain a man of science.
You have no victim to avenge,
no guilty or innocent person to convict or save
— you must bear testimony within
the limits of science.

I. INTRODUCTION

The Department of Justice (Department or DOJ) is the Nation’s litigator and, as such, is responsible for the fair and efficient administration of justice in both criminal and civil matters. Department personnel—including officials, attorneys, law enforcement agents and employees engaged in scientific disciplines—are entrusted with awesome responsibilities and, in executing DOJ’s mission and their respective roles, must pursue, rely upon and present evidence that is well-founded in fact and veracity. This is particularly critical in the scientific arena, where the credibility of the evidence often relies upon the integrity of its handlers, examiners, experts and presenters. Investigations and prosecutions based in whole or in part upon forensic science must be based upon sound science—from the crime scene to the courtroom to post-conviction reviews and each step along the way. When science informs criminal investigations and prosecutions or forms the basis for the Department’s litigation position in a civil matter, it is vital that the information relied upon be credible.

In addition to serving as the lead federal law enforcement agency and the People’s representative in federal court, the Department is the custodian of pretrial detainees and convicted felons incarcerated in federal prisons. Detention and rehabilitation strategies and policies must flow from valid social science studies.

DOJ Asserts NIJ Independence

“Across-the-board culture of scientific, technological and research validity, reliability, accuracy, objectivity and integrity”

“Director of the National Institute of Justice shall have final authority over all grants”

“NIJ retains control over the timing and content of research reports”
NIJ’s Research and Development Process

1. Identify Needs Through Stakeholder Engagement

2. Develop Research Agenda
   - Non-Competitive
     - Intramural research
     - Collaboration with other scientific organizations
     - Other
   - Competitive
     - Solicitations
     - Challenges

3. Implement Research

4. Post Award Activities

5. Evaluate Research Results
   Results from awards inform future funding opportunities and become part of the process of developing the program of research and agenda

6. Disseminate to the Field

Forensic Science R&D Program

The U.S. Department of Justice (DOJ), Office of Justice Programs (OJP), National Institute of Justice (NIJ) is seeking applications for funding of basic or applied research and development of forensic science for criminal justice purposes. This program furthers the Department's mission by sponsoring research to provide objective, independent, evidence-based knowledge to meet the challenges of criminal justice, particularly at the state and local levels. National Institute of Justice Forensic Science Technology Working Group (TWG) assists in identifying and prioritizing operational needs and requirements of the field. The forensic science needs discussed at the FY 2015 TWG meeting may be found on NIJ.gov and are intended to facilitate proposal development.

Research and Development in Forensic Science for Criminal Justice Purposes

Applications Due: February 28, 2017

Eligibility

In general, NIJ is authorized to make grants to, or enter into contracts or cooperative agreements with, states (including territories), units of local government, federally recognized Indian tribal governments that perform law enforcement functions (as determined by the Secretary of the Interior), nonprofit and for-profit organizations (including tribal nonprofit organizations), institutions of higher education (including tribal institutions of higher education), and certain qualified individuals. Federal agencies are eligible to apply. However, if the grant is made to a federal agency will be made as an interagency reimbursable agreement. Nonprofit organizations must agree to forgo any profit or management fee. Foreign governments, foreign organizations, and foreign colleges and universities are not eligible to apply.

NIJ
Forensic Science R&D: FY2011 to FY2016

Average Award Size: $445K

Forensic Science R&D Funding Levels

Forensic Science R&D Funding Rates

Average Funding Rate 22.8%

Applications Received*  
Applications Funded**
Distribution of Forensic Science R&D Funding by Discipline
2009-2016

- Forensic DNA
- Controlled Substances/Toxicology
- Impression & Pattern Evidence
- Trace Evidence
- Forensic Pathology
- Forensic Toxicology
- Anthropology
- Crime Scene Investigation
- Controlled Substances
- Digital Forensics/Biometrics
- General Forensics
- Forensic Entomology

Awards by Applicant Type

- Academic: 70%
- Nonprofit: 12%
- For-Profit: 9%
- FFRDC/Federal Lab: 5%
- Local Gov’t: 4%
Projects can be foundational, inside the box (improve existing workflows), or outside the box (new instruments and/or new paradigms).
Medicolegal Death Investigation/Crime Scene Investigation R&D
Genetic profiling

Cannabinoids/Cathinones

Novel/Emerging Instrumentation Samples

Dried Blood Spots

Hair

Cannabinoids/Cathinones

Opioids

??

Metabolites

Toxicity

Drug Interactions

Correlation with blood?

Incorporation?

Oral Fluid

Hair

Dried Blood Spots

Blood Protein Adduct

Statistical Analysis

Genetic profiling

Emerging Drugs

Novel/Emerging

Controlled Substances

Toxicology

Methods

Instrumentation

Samples

3D printed fluorometer

UHPSFC

Portable MS

Microfluidics

Aptamer-based sensor

NIJ
Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Forensic Laboratories

Eligibility

Eligible applicants are limited to States (including territories) and units of local government (including federally recognized Indian tribal governments as determined by the Secretary of the Interior). Applicants are limited to publicly funded forensic science laboratories that are currently accredited by an independent accrediting or certifying forensic science organization. Publicly funded forensic science laboratories include State, regional, county, municipal, and tribal agencies. This solicitation excludes federal agencies.

Postdoctoral Fellowship

To allow for the addition of this work to existing casework demands, and to foster collaboration between emerging forensic science researchers and forensic science laboratories, NIJ strongly encourages applicants to consider funding a postdoctoral fellowship through this award at their facility. This research model will encourage new research scientists to pursue careers in forensic science, allow the laboratory to benefit from the fellow’s research skills as they work on the proposed project, and decrease the amount of time which the forensic scientist must take away from their own casework to work on the proposed project.

A key component for a successful postdoctoral research experience is a robust mentorship program to prepare the researcher for future career activities. NIJ strongly encourages that laboratories submit a postdoctoral mentorship plan that describes the activities that will assist the fellow with career placement. Examples of postdoctoral mentoring activities can be found at the National Science Foundation (www.nsf.gov/pubs/policydocs/pappguide/nsf15001/index.jsp?org=EF) and the American Association for the Advancement of Science (myidp.sciencerecruiting.org/).
Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Forensic Laboratories

FY15 & FY16 Applications by Discipline

- Anthropology: 12
- DNA: 13
- Controlled Substances/Toxicology: 3
- Impression and Pattern Evidence: 3
- Multi-Discipline: 3
- Pathology: 2

Research the process, not necessarily the underlying science of the testing

Public Lab R&E Funding Rates

- 2015: 22
- 2016: 20

http://nij.gov/funding/Documents/solicitations - To be posted soon
**Recommendation #10 of the 2009 NAS report:**

“To attract students in the physical and life sciences to pursue graduate studies in multidisciplinary fields critical to forensic science...”

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**Benefits**
- $35,000 / yr. stipend
- $15,000 / yr. expenses
- Up to 3 years

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**GRF-STEM Funding Rates**

*2017 Estimated Number of Awards is 20*
Collaboration with Federal Agencies

NIST/NIJ Working Groups

NIST and the National Institute of Justice have convened multi-disciplinary working groups to take on specific challenges that impact the forensic science community. These technical working groups typically include experts from the forensic science community and other relevant fields. These groups study an issue over a period of time and often publish recommendations and guidelines as a result of their work. Find information on specific efforts through the links below.

- **Technical Working Group on Biological Evidence Preservation**: The Technical Working on Biological Evidence Preservation is charged to create best practices and guidance to ensure the integrity, prevent the loss, and reduce the premature destruction of biological evidence after collection through post-conviction proceedings. Biological evidence refers to samples of biological material — hair, tissue, bones, teeth, blood, semen, or other bodily fluids — or evidence items containing biological material.

- **Latent Print AFIS Interoperability Working Group**: As part of a National Institute of Justice (NIJ)/NIJ effort to address the lack of AFIS interoperability, OLES convened the Latent Print AFIS Interoperability Working Group. The mission of this Working Group is to improve latent print AFIS interoperability by developing a clear understanding of the issues and challenges at hand and to identify collaborative ways to actively address this national problem.

- **Expert Working Group on Human Factors in Latent Print Analysis**: This Working Group assessed the effects of human factors on forensic latent print analysis and recommended ways to reduce the likelihood and consequences of human error at various stages in the interpretation of latent print evidence. In February 2012, we published Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach.

- **Update from the Working Group on Presenting Forensic Science Evidence Using Quantitative and Qualitative Terms**: NIST has partnered with the Pennsylvania State University to establish a group that will propose generally applicable best practices for reporting relevant statistical information about forensic evidence (e.g., quantitative measurements, expressions of uncertainty or error probabilities in measurements or conclusions, and validation studies). To meet its charge, the working group will review studies related to the presentation of statistical information to lay individuals that have been published in forensic, legal, social science, and statistical literature. The group will also review how forensic-science evidence and other types of expert or scientific evidence (e.g., medical evidence) have been presented in court in the United States (and in the similar legal system in the United Kingdom).

NSF 14-066

Dear Colleague Letter - IUCRCs in Areas Relevant to the Forensic Sciences

May 7, 2014

Dear Colleagues,

The National Science Foundation (NSF) and the National Institute of Justice (NIJ) have partnered as co-sponsors to welcome proposals for establishment of Industry/University Cooperative Research Centers (IUCRCs; see NSF 13-594; http://www.nsf.gov/publications/pub_summ.jsp?pgn=ENG00s_keynum13594) in areas relevant to the forensic sciences. With permission from the Principal Investigator (PI), NIJ will share in evaluation of forensics-related IUCRC proposals, and may co-sponsor successful proposals.

We envision this mechanism as a means to convene experts with knowledge of the needs and challenges of forensics, vendors and developers of state-of-the-art tools, and academic researchers at the frontiers of disciplines with applicability to the forensic sciences, to address the broad challenges outlined in a recent Foundation-wide "Dear Colleague Letter" (NSF 13-120; http://www.nsf.gov/pubs/2013/nsf13120/nsf13120.jsp). This letter supplements the earlier one, which remains in effect. Current IUCRCs seeing potential forensics-related links to their research agendas may wish to discuss those with their cognizant NSF program officer.

The IUCRC program develops long-term partnerships among industry, academia, and government. The centers are catalyzed by a small investment from NSF; their research is primarily funded by center members, with NSF playing a supporting role in the development and evolution of the center. These sponsorship roles can be shared by NSF and NIJ for forensics-relevant IUCRCs, providing additional valuable perspective.

Industrial and other institutions, including local, state, and Federal agencies and private philanthropic foundations, may be members of IUCRCs. Each center is established to conduct pre-competitive research (i.e., research for which members agree a priori to share outcomes) that is of interest to both the members and the center faculty. An IUCRC contributes to the nation's research infrastructure base and enhances the intellectual capacity of the engineering and science workforce through the integration of research and education. As appropriate, an IUCRC can use international collaborations to advance these goals within the global context. Various spin-offs, including proprietary research collaborations, leverage center portfolios.
FY 2016 Federal Partnerships

• NIJ Awarded NIST $902,363 for a Forensic Firearms Research Database and Firearms Imaging Metrological Standards

• NIJ Awarded FBI $1.5M for the development of National Footwear Database

• NIJ Awarded DoD - Defense Forensic Science Center (DFSC) over $1.0M in the past three years
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