National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

NSF 13-120

Dear Colleague Letter: Forensic Science - Opportunity for Breakthroughs in Fundamental and Basic Research and Education

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The National Science Foundation (NSF) is interested in receiving proposals to existing programs in any directorate across the Foundation that address fundamental research questions which might simultaneously advance activities related to research and education in forensic sciences. Supplement requests to existing awards may also be submitted.

Background: In 2009 the National Academy of Sciences published "Strengthening Forensic Science in the United States: A Path Forward." While the report acknowledges that "the forensic science disciplines have produced valuable evidence that has contributed to the successful prosecution and conviction of criminals as well as to the exoneration of innocent people," it cites a need for systematic research to validate the various disciplines' underlying assumptions and methodologies, adding that the "forensic science... communities will be improved by opportunities to collaborate with the broader science and engineering communities." NSF is the only Federal agency whose mission is to support basic research at the forefront of all fields of fundamental science and engineering. It is therefore appropriate for the Foundation to support *basic* research that can inform research and education in forensic science.

Details: This Dear Colleague Letter is to alert all basic science and engineering communities, including education researchers, to the Foundation's interest in receiving proposals that, while investigating fundamental questions, seek to pose and test hypotheses that could inform research in forensic sciences. The interest spans both disciplinary and interdisciplinary research. Additionally, the wide public interest in forensics can provide an effective vehicle for basic research in science education. International partnerships, where appropriate, are encouraged, as are synergistic interactions with forensics and/or law enforcement agencies and organizations. Proposals for workshops to explore fundamental science drivers and their relevance to forensics are also welcome. Proposers may review reports of recent workshops that exemplify collaborative approaches:
Cognitive science:
http://www.law.northwestern.edu/faculty/conferences/workshops/cognitivebias/documents/NSFWorkshopReportFinal.pdf
and
Instrumentation research: http://www.chem.purdue.edu/docs/ForensicWorkshopFinalReport.pdf.

NSF also notes the importance of a well-educated forensics workforce and a science-literate public, and recognizes the potential benefits of outreach efforts, given the public interest in forensics. Research in forensics provides an opportunity for impact along lines emerging as priorities in STEM education at all levels through new approaches to effective integration of research with teaching. NSF seeks to contribute to future workforce preparation in this challenging and rapidly evolving technical area.

The Foundation would be particularly interested in proposals that engage forensic scientists and experts in a collaborative fashion with basic science researchers. Topics might include, but are by no means limited to, the following:

- The effect of cognitive bias on judgment and decision making within a forensic setting
- Discovery of new principles and approaches for remote and field-based chemical measurement and imaging, with enhanced reliability, resolution, and speed
- Acquisition of shared-use major instrumentation for researchers engaged in fundamental studies, including forensics-relevant research
- Conception and demonstration of improved methods for interpreting hyperdimensional spectroscopic data, including images
- New approaches to acquiring, storing, accessing, and interpreting large data sets, including biological data (as in genomics and proteomics)
- Pathways linking genotype to phenotype
- Factors influencing how jurors understand forensic evidence
- Generalizable algorithms and techniques for extracting legally binding evidence from computing systems

- Development of methods to determine provenance of forensic samples (e.g. sediments, human remains), including applications of geospatial analysis or measurement
- Design, implementation, and evaluation of the vertical integration of a forensic science conceptual approach throughout the sequence of courses within a traditional STEM discipline

Successful projects addressing foundational research on questions or issues in STEM learning related to forensics sciences, or specific challenges therein, will make clear contributions to synthesizing, expanding, or building the base of research knowledge and evidence needed to achieve excellence in forensics-related STEM education and/or workforce development. Also appropriate are interdisciplinary collaborations and partnerships for informal learning among academia, industry, and government that advance the development of a population and workforce well-informed about forensic science successes and challenges.

NSF recognizes the importance of enabling U.S. researchers and educators to advance their work through international partnerships, where the proposed collaboration can provide unique advantages of scope, scale, flexibility, or facilities, enabling advances that would not readily occur otherwise. In view of this, U.S. investigators may include international components in **new forensics proposals** submitted to **relevant NSF programs**, or request supplemental funding for projects already supported by NSF. Furthermore, strong, well-defined international collaborations may incorporate opportunities for U.S. students and early career researchers to participate in substantive international research experiences abroad.

As always, searching the NSF awards database (http://www.nsf.gov/awardsearch/) can provide illustrative examples of current projects. In all cases, interested prospective Principal Investigators (PIs) are urged to consult with relevant disciplinary program officers in advance of submission.

This is not a special competition or new program. Proposals and supplement requests in response to this Dear Colleague Letter must meet the requirements and deadlines of the program to which they are submitted. Questions concerning this Dear Colleague Letter should be directed to the e-mail alias forensic-science-inquiries@nsf.gov.