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# National Institute of Justice

S o l i c i t a t i o n

*June 2001*

## Solicitation for General Forensic Research and Development for FY 2001

**APPLICATION DEADLINE:**

August 27, 2001

**U.S. Department of Justice**  
**Office of Justice Programs**  
810 Seventh Street N.W.  
Washington, DC 20531

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For grant and funding information, contact:  
**Department of Justice Response Center**  
800-421-6770

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**Office of Justice Programs**  
**World Wide Web Site:**  
<http://www.ojp.usdoj.gov>

**National Institute of Justice**  
**World Wide Web Site:**  
<http://www.ojp.usdoj.gov/nij>

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# Solicitation for General Forensic Research and Development for FY 2001

## I. Introduction

This solicitation seeks proposals for research and development to improve the capacity, capability, applicability, and reliability of forensic technologies used in crime laboratories. Proposals that build or improve upon existing technologies, methods, or approaches as well as proposals based on new technologies, methods, or approaches are encouraged to meet the goal of maximizing the value of forensic evidence to the criminal justice system.

This solicitation is directed toward **Forensic Science Research and Development** in the following areas: questioned document examinations, all areas of impression evidence examinations, crime scene response and related examinations, energetic materials examinations, postmortem toxicology and human performance testing, transfer (trace) evidence evaluation, and controlled substance examinations.

**Please note that forensic DNA proposals will not be accepted under this solicitation.**

## II. Background

Forensic science is the application of established scientific techniques to the identification, collection and examination of criminal evidence, the interpretation of laboratory findings, and the presentation of reported findings in judicial proceedings. Forensic evidence has played a crucial role in the investigation and resolution of thousands of violent crimes over the past several decades, and its value as an investigative tool is likely to increase in the coming years.

The fields encompassing the forensic sciences have greatly benefitted from breakthroughs in broader areas of science and technology in recent years. As a

result, it is becoming possible to analyze criminal evidence with increased speed and accuracy, even if working with smaller amounts of evidence. However, the issues of high-throughput and customized case work analysis continue to be of concern to the forensic science community. To maximize the value of technology in examining crime scene samples that are often limited in quality and quantity, and to effectively transfer new technologies to public crime labs that often operate under limited resources, additional research and development must be performed.

In February 1999, NIJ published *Forensic Sciences: Review of Status and Needs* (available at <http://www.ojp.usdoj.gov/nij/pubs-sum/173412.htm>). This publication details the consensus of a group of forensic practitioners, researchers, and administrators representing several State, local, and Federal forensic science organizations, with the common goal of helping the forensic science professions. The group recognized the importance for research and development in several key areas, including:

- Validation of technologies prior to initial or enhanced forensic applications.
- Improvement of the resolution, sensitivity, and discriminatory capability of forensic techniques.
- Extension of current methodologies and technologies to new forensic applications.
- Identification of new analytes of forensic interest.
- Discrimination of potential sources of evidentiary materials.
- Elucidation of new characteristics and properties of materials having forensic importance.

- Reduction of the destructive steps included in the routine analysis of evidence.
- Enhancement of productivity, portability, and interoperability of forensic methods.
- Optimization of technology for transfer to, and incorporation in, forensic laboratories.

### III. Areas of Research Required

This solicitation is primarily directed towards forensic science research and development that falls into one of the disciplines listed below. The information following each heading illustrates some of the specific areas identified in the *Forensic Sciences: Review of Status and Needs* publication as areas that would benefit from further research. It is not intended to be inclusive of the concepts that would be considered for NIJ funding, but to be used for guidance in developing suitable research proposals. Applicants are encouraged to view information about previous and ongoing NIJ-funded projects in the investigative and forensic sciences, which is available on the NIJ Web page ([www.ojp.usdoj.gov/nij/sciencetech/invest.htm](http://www.ojp.usdoj.gov/nij/sciencetech/invest.htm)).

#### A. Questioned Document Examinations

- empirical and/or quantitative assessment of the discriminatory power of handwriting uniqueness
- harmonization of comparison criteria
- improved methods for determining characteristic features of documents
- image enhancement methods for writing or printing on visually complex matrices
- image enhancement methods for linking documents to machines

#### B. Impression Evidence Examinations

- empirical and/or quantitative assessment of the discriminatory power of impression evidence identifications

- development of portable, nondestructive analytical approaches for characterizing the elemental composition and other features of bullet impact areas
- incorporation of a “z-dimension” imaging component into pattern-recognition systems
- statistical analysis of performance of algorithms used in automated pattern recognition (search/retrieval) software
- improved recovery and visualization methods
- interoperability and improvement of search and retrieval systems
- detection of associative evidence in impressions

#### C. Crime Scene Response and Related Examinations

- small, rugged, chemical analysis instruments for onsite preliminary or confirmatory analysis in investigations involving drugs, explosives, and hazardous materials
- sample location, identification, capture and stabilization technology “in a kit”, suitable for recovery of trace particulate, liquid, chemical, and biological evidence, with immediate partitioning of samples for secondary testing
- portable and remote hazardous materials detectors for alerting/protecting crime scene personnel
- microrobotic platforms to support crime scene visualization, safety assessments, and sampling
- computerized crime scene mapping supported by global positioning systems (GPS) and multimedia capture technologies for three-dimensional crime scene visualization, memorialization, and location of evidence

#### D. Energetic Materials (Explosives and Fire Debris Examinations)

- improved methods for assessing the size, construction, and composition of improvised explosive devices from macro-effects at post-blast scenes
- enhanced clean-up techniques for post-blast debris

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- method development for recovery of explosive and ignitable liquid residues from a variety of matrices
- enhanced field detection capabilities and mapping technologies for bomb scene investigation assistance
- improved onsite materials science and metallurgical analytical capabilities to assess, discriminate, and validate the effects of improvised explosive devices versus alternative causes
- improved sensitivity in the detection of ignitable liquid residues in fire debris
- desorption advances for enhanced automation
- algorithms for interpretation of complex fire and bomb debris analytical data

## E. Postmortem Toxicology and Human Performance Testing

- nondestructive analytical techniques with reduced interferences from biological materials
- more accurate methods for determining time of death
- automated and inexpensive methods for extraction and detection of drugs and other toxins

## F. Transfer (Trace) Evidence Evaluation

- empirical and/or quantitative studies aimed at improving the discriminatory power of trace evidence analysis
- enhancements of nondestructive techniques for elemental and molecular analysis of materials
- development of portable and automated systems for improved detection of trace materials
- development and coordination of databases

## G. Controlled Substance Examinations

- inclusive automation of sampling and analytical methods to increase productivity
- remote sensing equipment for enhanced field testing and investigation applications

- non-disruptive (“through the packaging”) sampling
- enhanced understanding of canine detective mechanisms leading to instrumental approaches for field deployment

Issues of sensitivity, efficiency, precision, portability, and effectiveness may apply to each of the forensic disciplines. Applicants should have an appreciation of, and general familiarity with, the current methods employed in the relevant forensic discipline and should design proposals that succinctly articulate the potential of the proposed research for advancing the use of forensic evidence. Applicants should consider not only building upon existing technologies, but also developing new and innovative solutions that may be beneficial in the future. Applicants are encouraged to include preliminary data, if available, as well as appropriate scientific and legal citations that will help demonstrate the contribution of the project to the forensic science community. **Please note that applicants whose goal is to validate or implement an in-use system solely for their own laboratory or agency’s use will not be considered unless the model used to achieve the validation significantly improves current validation/ implementation methods and can be readily transferred to other laboratories.**

Applicants should also consider costs of the resulting technologies or tools. All areas of forensic science suffer from demand that is far greater than the available means. Cost factors can impede the timeliness in accepting new technologies. In forensic science, as in many other disciplines, cost-effectiveness and budgetary constraints are constant concerns. The technology therefore must be affordable as well as reliable and effective. Forensic validation, quality control, and quality assurance - the cornerstones for courtroom admissibility - should also be considered by applicants when developing proposals.

In order to facilitate appreciation of forensic issues, NIJ encourages partnerships between developers and members of the forensic community. Such

partnerships foster a greater understanding of the forensic needs and applications on the part of the applicant. Cooperative agreements between U.S.-based organizations and international organizations that result in advancing a technology in the U.S. that is currently employed elsewhere are also encouraged, however, NIJ is unable to fund foreign companies directly.

This solicitation focuses on near-term innovations which can be completed in a one- to four-year framework. It is open to a wide variety of proposals in order to achieve a balanced portfolio of product development, implementation and assessment projects. However, applicants are encouraged to focus on projects that directly pertain to the forensic sciences, as opposed to addressing broader basic research questions. By applying new tools to the analysis of forensic evidence, our ability to solve and prevent crimes and safeguard those falsely accused will become even greater than current abilities now afford.

The following questions can be used as guidelines to ensure that your proposal is framed appropriately to benefit forensic applications. As guidelines, the questions do not need to be explicitly addressed, but can be used as implicit themes to be considered by the applicant.

- What areas of forensics will the new technology/development you are proposing impact?
- How do you plan to market/make available your technology/development to the forensic community?
- How much will the technology/development cost to purchase and maintain?
- How will your proposed technology/development impact on the reliability, affordability and/or speed of forensic analysis?

- What kind and extent of training will be required for the forensic community to use your technology/development?
- How will your technology/development be validated for forensic use?
- What kinds of admissibility issues do you foresee for your technology/development in U.S. courts and how will those be addressed?

## IV. Selection Criteria

NIJ is firmly committed to the competitive process for awarding grants. All proposals are subjected to an independent, peer-review panel evaluation. The peer-review panel consists of members with academic, practitioner, technical, and operational expertise in the subject areas of the solicitation. Selection criteria used to evaluate proposals are as follows:

### 1. Quality and Technical Merit

- Soundness of methodology, analytic, or technical approach.
- Innovation and creativity.
- Feasibility of proposed project; awareness of pitfalls.
- Awareness of existing research and related applications.

### 2. Impact of the Project

- Understanding importance of the problem.
- Potential for significant advance in crime prevention, law enforcement, courts, corrections, or other practice or policy areas.
- Potential for advancement of scientific understanding of the problem area.
- Relevance to practice, including development and demonstration in application domains (if applicable).
- Affordable end products (if applicable).

### 3. Capabilities, Demonstrated Productivity, and Experience of Applicants

- Qualifications and experience of personnel as related to proposed project.

- Responsiveness to the goals of the solicitation.
- Demonstrated ability to manage proposed effort.
- Adequacy of proposed resources to perform effort.

#### 4. Budget Considerations

- Total cost relative to perceived benefit.
- Appropriate budgets and level of effort.
- Use of existing resources to conserve costs.
- Cost-effectiveness of program or product for application in the criminal justice system (if applicable).

After peer-review panelists' consideration, Institute staff make recommendations to NIJ's Director based on the results of the independent reviews and other factors, including NIJ funding availability and the existing NIJ portfolio. Final decisions are made by the NIJ Director following consultation with Institute staff.

## V. How to Apply

Those interested in submitting proposals in response to this solicitation must complete the required application forms and submit related required documents. (See below for how to obtain application forms and guides for completing proposals.) Applicants must include the following information/forms to qualify for consideration:

- Standard Form (SF) 424—application for Federal assistance
- Geographic Areas Affected Worksheet
- Assurances
- Certifications Regarding Lobbying, Debarment, Suspension, and Other Responsibility Matters; and Drug-Free Workplace Requirements (one form)
- Disclosure of Lobbying Activities
- Budget Detail Worksheet
- Budget Narrative

- Negotiated indirect rate agreement (if appropriate)
- Names and affiliations of all key persons from applicant and subcontractor(s), advisors, consultants, and advisory board members. Include name of principal investigator, title, organizational affiliation (if any), department (if institution of higher education), address, phone, and fax
- Proposal abstract
- Table of contents
- Program narrative or technical proposal
- Privacy certificate
- Form 310 (Protection of Human Subjects Assurance Identification/ Certification/ Declaration)
- Environmental Assessment (if required)
- References
- Letters of cooperation from organizations collaborating in the research project
- Résumés
- Appendixes, if any (e.g., list of previous NIJ awards, their status, and products [in NIJ or other publications])

#### **Confidentiality of information and human**

**subjects protection.** NIJ has adopted new policies and procedures regarding the confidentiality of information and human subjects protection. Please see the *Guidelines for Submitting Proposals for National Institute of Justice-Sponsored Research* for details on the new requirements.

**Proposal abstract.** The proposal abstract, when read separately from the rest of the application, is meant to serve as a succinct and accurate description of the proposed work. Applicants must concisely describe the research goals and objectives, research design, and methods for achieving the goals and objectives. Summaries of past accomplishments are to be avoided, and proprietary/confidential information is not to be included. Length is not to exceed 400 words. Use the following two headers:

**Project Goals and Objectives:**

**Proposed Research Design and Methodology:**

**Page limit.** The number of pages in the “Program Narrative” part of the proposal must not exceed 30

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(double-spaced pages), no matter the amount of funding requested.

**Due date.** Completed proposals **must be received** at the National Institute of Justice by the close of business on **August 27, 2001**. Extensions of this deadline will not be permitted.

**Award period.** In general, NIJ limits its grants and cooperative agreements to a maximum period of 12 or 24 months. However, longer budget periods may be considered.

**Number of awards.** NIJ anticipates supporting several grants under this solicitation.

**Award amount.** Awards totaling approximately \$1.4 million will be made available for this NIJ solicitation.

**Applying.** Two packets need to be obtained: (1) application forms (including a sample budget worksheet) and (2) guidelines for submitting proposals (including requirements for proposal writers and requirements for grant recipients). To receive them, applicants can:

- Access the Justice Information Center on the Web: <http://www.ncjrs.org/fedgrant.htm#nij> or the NIJ Web site: <http://www.ojp.usdoj.gov/nij/funding.htm>

These Web sites offer the NIJ application forms and guidelines as electronic files that may be downloaded to a personal computer.

- Request hard copies of the forms and guidelines by mail from the National Criminal Justice Reference Service at 800-851-3420 or from the Department of Justice Response Center at 800-421-6770 (in the Washington, D.C., area, at 202-307-1480).
- Request copies by fax. Call 800-851-3420 and select option 1, then option 1 again for NIJ. Code is 1023.

**Guidance and information.** Applicants who wish to receive additional guidance and information may contact the U.S. Department of Justice Response

Center at 800-421-6770. Center staff can provide assistance or refer applicants to an appropriate NIJ professional. Applicants may, for example, wish to discuss their prospective research topics with the NIJ professional staff.

## **Send completed forms to:**

Solicitation for General Forensic Research and Development for FY2001  
National Institute of Justice  
810 Seventh Street N.W.  
Washington, DC 20531  
[overnight courier ZIP code 20001]



For more information on the National Institute of Justice, please contact:

**National Criminal Justice Reference Service**

Box 6000

Rockville, MD 20849-6000

800-851-3420

e-mail: [askncjrs@ncjrs.org](mailto:askncjrs@ncjrs.org)

You can view or obtain an electronic version of this document from the NCJRS Justice Information Center web site (<http://www.ncjrs.org>) or the NIJ web site (<http://www.ojp.usdoj.gov/nij>).