



**Education and Research
Perspectives: Needs and
Opportunities in Trace Evidence
Examination**

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Office of Science and Technology

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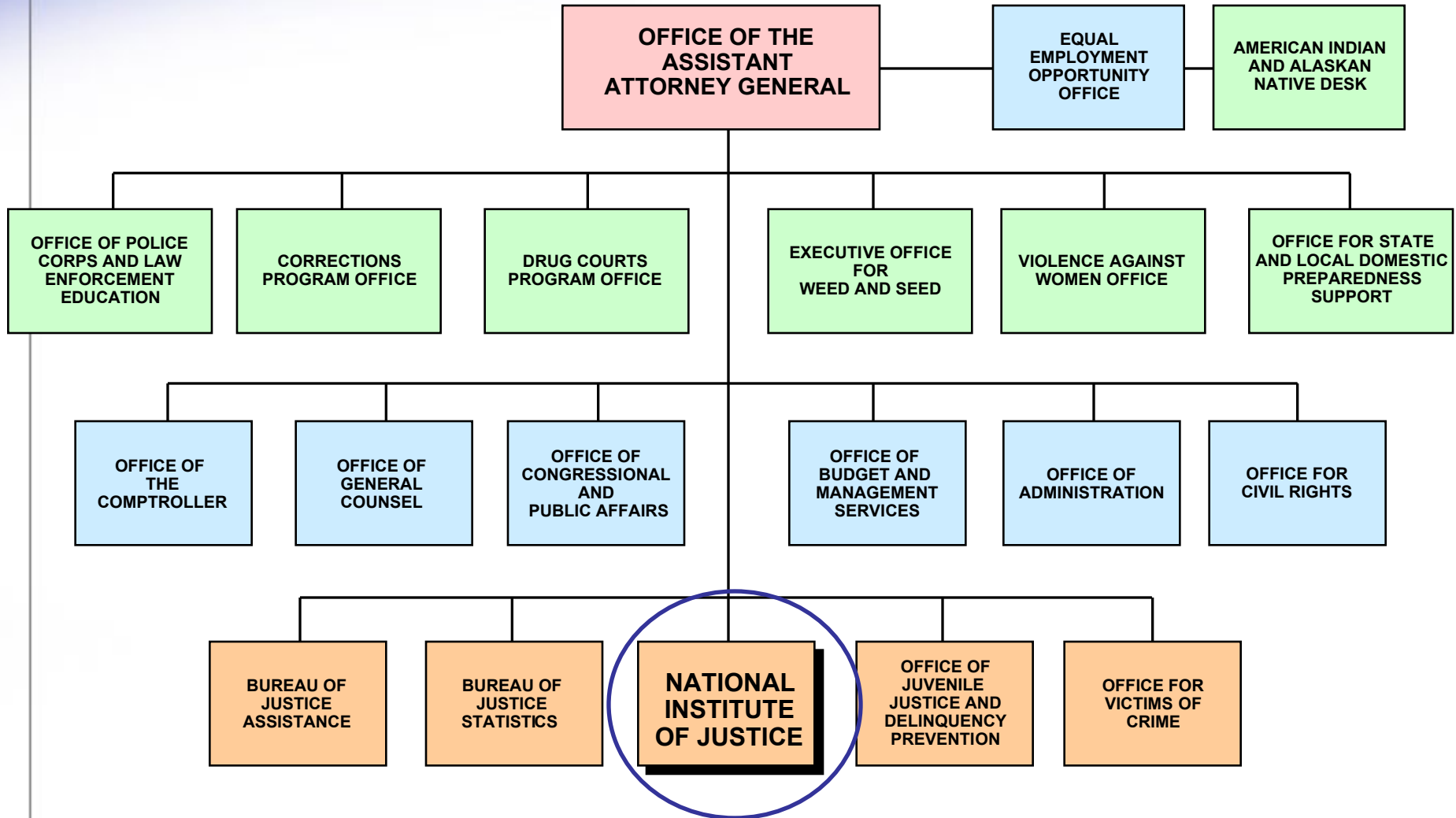
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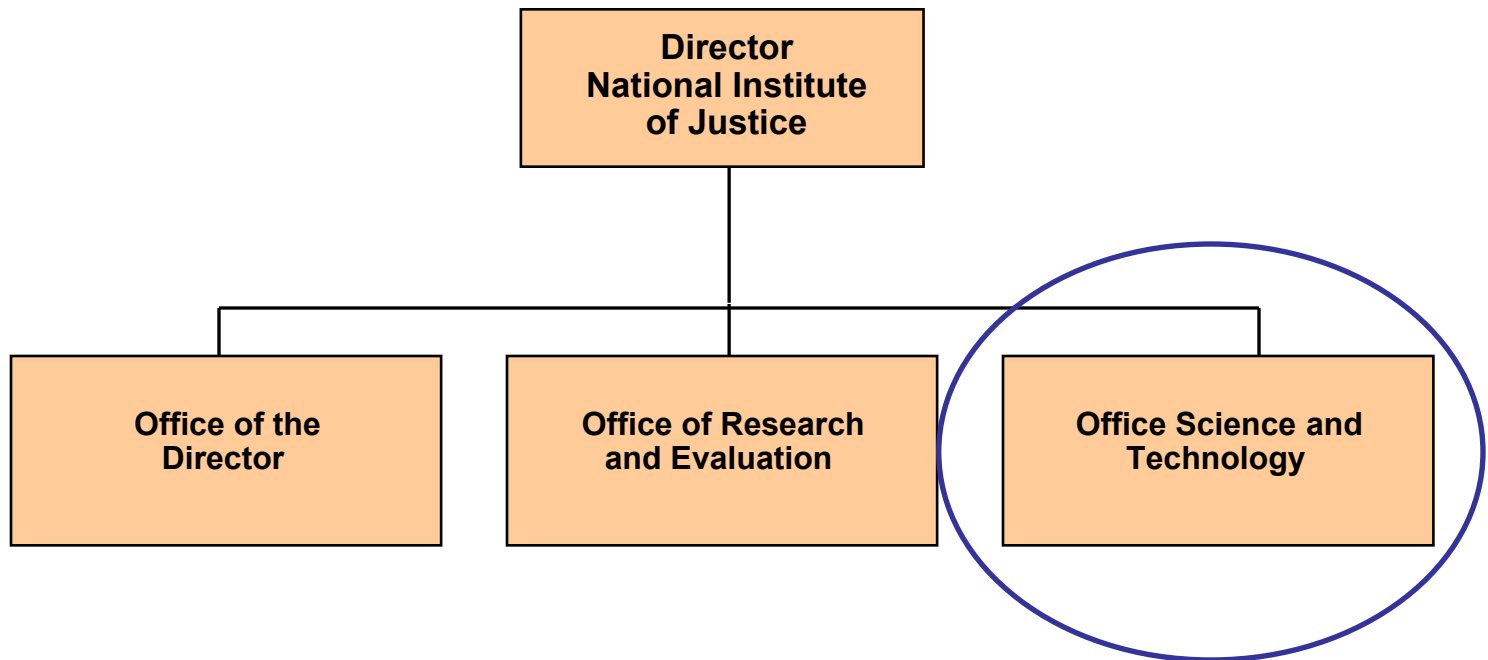


Office of Justice Programs Organization



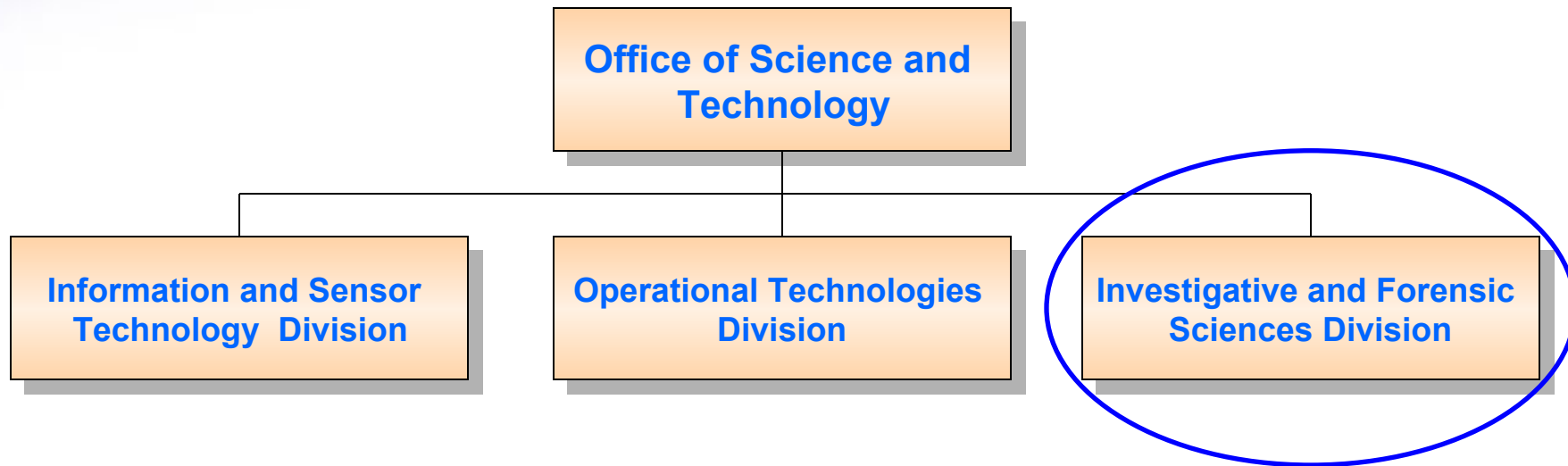


National Institute of Justice Organization





OST Organization





IFSD Program Areas

- **Research and Development**
 - Forensic DNA
 - General Forensics (non-DNA)
- **Capacity Building/ Backlog Reduction**
 - National Forensic Science Improvement Program (Coverdell)
 - DNA Backlog Reduction Programs (Convicted Offender, Casework)
 - DNA Capacity Enhancement
 - Missing Persons
 - Solving Cold Cases with DNA (2005)
 - Postconviction DNA Testing Assistance
- **Other**
 - Forensic Resource Network (FRN), DNA Training



Forensic Science Research & Development

GOAL

- Develop tools and technologies that can enhance or increase the capacity, capability, applicability, and/or reliability of analysis of crime scene evidence.



THINK “FASTER, BETTER CHEAPER”



NIJ's Technical Working Groups (TWGs)

- Technology Working Groups (TWGs) support the Research, Development, Test and Evaluation (RDT&E) process within NIJ's the Office of Science and Technology. Each TWG is comprised of approximately 10-20 members and is responsible for identifying technology needs and defining operational requirements for law enforcement and corrections technologies. These needs and requirements will help to validate NIJ's planned and ongoing research and development activities, and will help ensure that future technologies meet practitioner-driven needs.



Tasks performed by the TWGs

- Review and validate NIJ's planned and ongoing research and development activities and help ensure that future technologies meet practitioner-driven needs.
- Identify additional technology needs and define and document operational requirements.
- Evaluate research and development programs/projects.
- Identify host agencies to serve as testbeds or "first adopters" of newly developed technologies
- Act as focus group



Technical Working Groups

- **Biometrics**
- **Body Armor**
- **Commercialization**
- **Communications Technology**
- **Concealed Weapons**
- **Corrections**
- **Crime Mapping**
- **DNA Forensics**
- **General Forensics**
- **Information Led Policing**
- **Less Lethal Technologies**
- **Modeling and Simulation**
- **Personnel Protection**
- **Pursuit Management**
- **School Safety**
- **Sensors and Surveillance**



The President's DNA Initiative: *Forensic Research & Development Program*

Since 2003, DOJ has made grants in excess of \$26 million for new research on DNA and other forensics tools and techniques.

- Forensic DNA Research and Development
- General Forensics Research and Development



How NIJ manages research

- NIJ awards grants, cooperative agreements and contracts based on national competition
 - Quality and technical merit
 - Impact of project on the field
 - Capabilities of research team
 - Budget, cost effectiveness
 - Dissemination strategy
- Independent peer reviews by researchers & practitioners
- Managed by NIJ staff -- experienced project managers, scientists, and researchers
- Final decisions by the NIJ Director



The Goal of the Forensic DNA R&D Program...

...is to harness the tremendous growth in the broader scientific fields (such as molecular biology, genetics, and biotechnology) and direct it toward the development of highly discriminating, reliable, cost-effective, and rapid forensic DNA testing methods.



The Goal of the General Forensic R&D Program...

...is to support projects that add to the scientific basis of forensic science through the research and development of techniques, tools, and technologies that can increase the capacity, capability, applicability, and/or reliability of analysis of forensic evidence.

The General Forensic Program consists of disciplines, including:

Controlled Substances • Crime Scene • Firearms/ Toolmarks

Forensic Anthropology • Forensic Entomology

Forensic Pathology • Forensic Odontology • Impression Evidence

Friction Ridge Identification • Questioned Documents

Toxicology • Trace Evidence



Where do we focus our General Forensic research?

- Development of tools and technologies that will allow faster, more reliable, more robust, less costly, or less labor-intensive identification, collection, preservation, and/or analysis of forensic evidence.
- Tools that provide a quantitative measure or statistical evaluation of forensic comparisons.
- Identification or characterization of new analytes of forensic importance.



General Forensic R&D: Portfolio

Discipline	Active Projects
Biology	-
Controlled Substances	5
Crime Scene	4
Firearms/ Toolmarks	4
Forensic Anthropology	4
Forensic Engineering	-
Forensic Entomology	1
Forensic Odontology	2
Forensic Pathology	1
Forensic Psychiatry and Psychology	-
Friction Ridge Identification	9
Impression Evidence	1
Questioned Documents	1
Toxicology	5
Trace Evidence	15
Other (Scientific Working Group, Forensic education, Elder Forensics)	2
TOTALS	53



Trace Evidence

- **Forensic Glass Analysis by LA-ICP-MS: Assessing the Feasibility of Correlating Windshield Composition and Supplier** (Sacramento County)
- **Application of Laser-Induced Breakdown Spectroscopy to Forensic Science: Analysis of Paint and Glass Samples** (University of Central Florida)
- **Evaluation Of Ultraviolet Radiation Absorbing Compounds In Textile Fibers Utilizing High-Performance Liquid Chromatography And Atmospheric Pressure Ionization Mass Spectrometry (HPLC/MS)** (Sacramento County)
- **Instrumental Analysis Of Pigmented Inks** (Indiana University)



Trace Evidence (cont.)

- **Density of the Refractive Index Glass Standard Reference Material** (National Institute of Standards and Technology [NIST])
- **The Development of a Method for Objective Physical Matching: Meeting Daubert** (Israeli National Police through TSWG)
- **Laser-Induced Breakdown Spectroscopy Workshop** (Ames Laboratory [DOE])
- **Elemental Analysis of Glass and Paint Materials by Laser Ablation Inductively Coupled Plasma Mass Spectrometry Forensic Application** (Florida International University)
- **Elemental Analysis of Glass by SEM-EDS, XRF, EPMA, LIBS and LAICPMS** (Florida International University)



Trace Evidence (cont.)

- **Characterization of Triacetone Triperoxide (TATP) Synthetic By-Products for Source and Route Determination** (University of Central Florida)
- **Forensic Analysis of Inks Samples Using a Revolutionary Mass Spectrometry Method** (Iowa State University)
- **Application of Laser-Induced Breakdown Spectroscopy to Forensic Science: Analysis of Paint Samples** (University of Central Florida)
- **Development of Advanced Raman Spectroscopy Methods and Databases for the Evaluation of Trace Evidence and the Examination of Questioned Documents** (Research Foundation of CUNY)



Trace Evidence (cont.)

- **Application of Fluorescence Line Narrowing Spectroscopy to Forensic Fiber Examination** (University of Central Florida)
- **Fire Debris Research** (National Institute of Standards and Technology)



General Forensic R&D: FY 2007 Solicitations

- Research and Development on Crime Scene Tools, Techniques, and Technologies
- Research and Development on Impression Evidence
- Research and Development in the Forensic Analysis of Fire and Arson Evidence
- Forensic Toxicology Research and Development



General Forensic R&D: FY 2008 Solicitations

- **Graduate Research Fellowship (deadline 11/28/07)**
 - The Graduate Research Fellowship is an annual NIJ program that provides \$20,000 grants to universities for dissertation research support to outstanding doctoral students undertaking independent research on issues related to crime and justice. Students from any academic discipline may propose original research that has direct implications for criminal justice in the United States.
- **Research and Development – specific solicitations TBD**
 - Fall 2008 (October 2007 release)
 - Spring 2008 (April 2008 release)

<http://www.ojp.usdoj.gov/nij/funding.htm>

<http://www.grants.gov/search/subscribeAdvanced.do>