

National Institute of

Justice



NIJ

Forensic Science Technology Working Groups

Office of Investigative and Forensic Sciences



What is a Technology Working Group?



Technology Working Groups Defined

tech·nol·o·gy *noun* \tek-'nä-lə-jē\
1

1a : the practical application of knowledge especially in a particular area
b : a capability given by the practical application of knowledge

2 : a manner of accomplishing a task especially using technical processes, methods, or knowledge

work·ing *noun* \'wər-kiŋ\
1

1 : engaged in work

group *noun, often attributive* \'grüp\
1

2a : a number of individuals assembled together or having some unifying relationship

Technology Working Groups Described

- A **Technology Working Group** is also commonly referred to as a **TWG** \ 'twig\
- TWGs support the Research, Development, Test and Evaluation (RDT&E) process within NIJ.
- NIJ's Office of Investigative and Forensic Sciences manages two TWGs:
 - Forensic DNA
 - General Forensics
- Each NIJ TWG is comprised of ~20 members.
- Each TWG is responsible for identifying technology needs.
- More information can be found at: <http://www.ojp.usdoj.gov/nij/topics/technology/working-groups.htm>

Why Should You Care?



TWGs Involve Your Laboratories

- TWGs are predominantly comprised of forensic practitioners (many of which are from your laboratories)
- Forensic practitioners face increasing workloads, scrutiny from the courts and the public, and challenges resulting from both. They understand where the needs are in their laboratories that may be met with technology solutions.
- TWG members convene annually to discuss and identify the current challenges, needs and technology gaps existing in today's forensic laboratories.
- During these annual meetings, TWGs document the high, medium and low needs of the forensic science community they represent.

TWGs Affect Your Laboratories

- These documented TWG needs are used by NIJ to focus solicitations for R&D projects and also influence which proposed R&D projects receive funding.
- The end-goal of NIJ's R&D is to develop technologies that can enhance the capacity, capability, applicability, and/or reliability of analysis of crime scene evidence.
- These technologies can then be acquired by your laboratories using the Coverdell and Backlog Reduction awards you manage.
- The needs identified by the TWGs help to validate NIJ's planned and ongoing research and development activities, and will help ensure that future technologies meet the practitioner-driven needs of your laboratories.

Phase I: Determine technology needs

Technology Working Groups, LECTAC, others identify technology gaps.

Phase II: Develop technology program plans.

Define requirements and identify solutions.

NIJ Program Managers maintain multi-year program plans for portfolio RDT&E.

Phase IV: Demonstrate, test, evaluate and adopt into practice

Does it meet operational requirements?

No

Yes

NIJ assists first adopters of new technology.

Does the solution improve practice, cost, public safety?

No

Yes

NIJ tests and evaluates solutions.

Yes

Are there existing solutions?

No

Phase III: Develop solutions.

NIJ solicits applications to develop new solutions.

Independent peer review and selection of developer.

Research & Development

NIJ oversight and TWG review

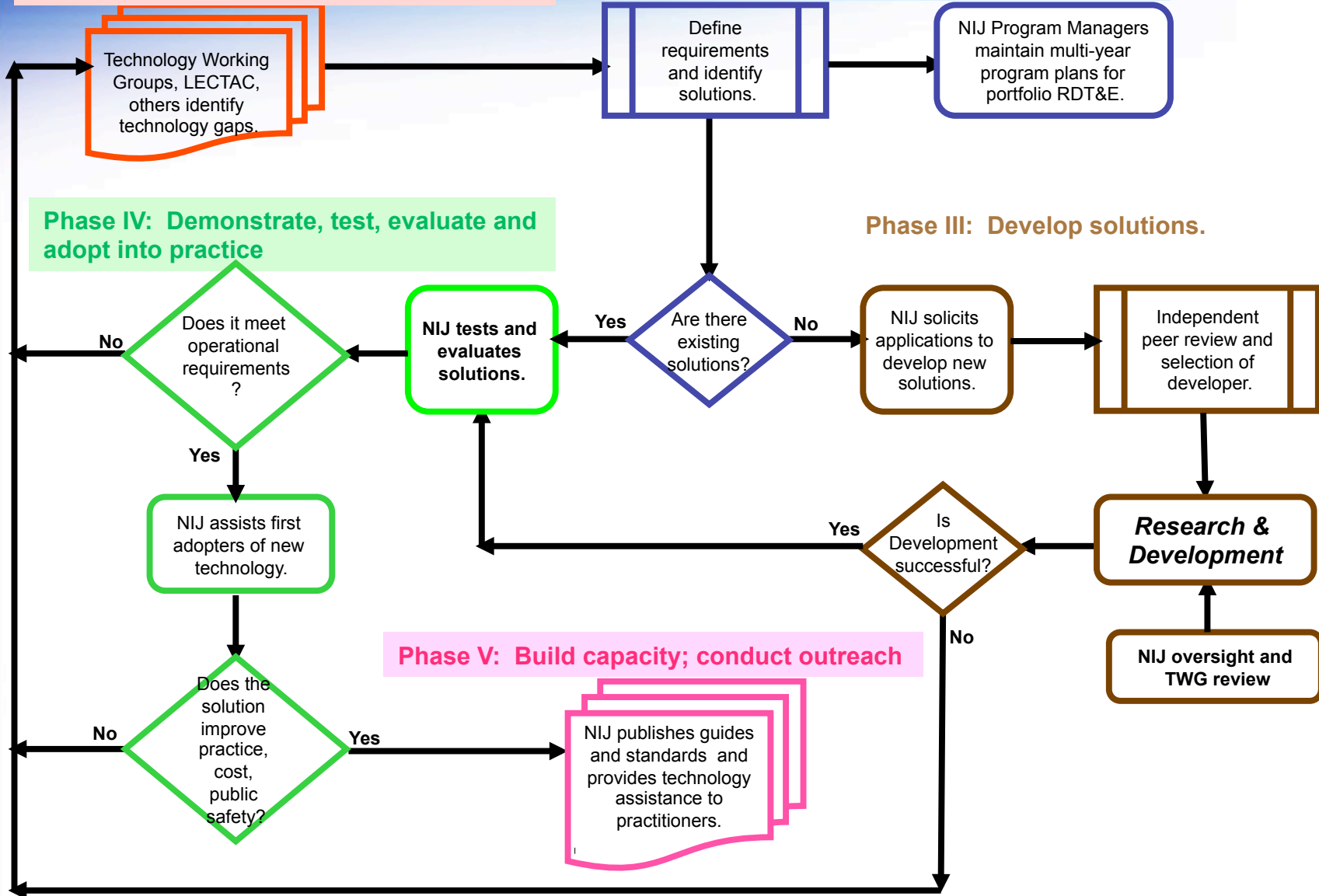
Is Development successful?

Yes

No

Phase V: Build capacity; conduct outreach

NIJ publishes guides and standards and provides technology assistance to practitioners.



Research, Development, Testing, Evaluation (RDT&E)

- **Phase 1:** Determination of technology needs (i.e., operational void that requires a technology solution) and definition of operational requirements (i.e., how a tool will be used in practice and the basic characteristics it must have).
- **Phase 2:** Develop technology program plans.
- **Phase 3:** Develop solutions.
- **Phase 4:** Demonstrate, test, evaluate, and adopt into practice.
- **Phase 5:** Build capacity; conduct outreach.

2010 TWG Updates



Forensic DNA TWG

- The 2010 Spring TWG was held on May 5th & 6th in Washington, DC.
- The group consisted of DNA practitioners from local, state, and federal agencies.
- TWG members participated in panels that identified and ranked DNA practitioner needs.
- The meeting produced a “Needs Document” that identified 13 High, 8 Medium, and 8 Low Priority needs of the forensic DNA community.

Forensic DNA TWG: High Priority Needs

- Tools for mixture interpretation of casework samples
- Physical separation of cells
- Body fluid / cell type identification
- Optimization of DNA evidence collection techniques
- Method to remove contaminants from commercial products
- Multiplex kits for mtDNA analysis
- Y-STR database coordination and management
- DNA repair (Identification of damaged DNA and repair mechanisms)
- Mitochondrial DNA (mtDNA) databases
- Physical characteristics (Genetic testing to reveal what a suspect / missing person may look like)
- Y-STR mixture interpretation and statistical analysis
- Development of simple SNP assay platforms
- Develop a panel of SNPs (Haploblocks) that will aid in missing person cases

Forensic DNA TWG: Medium Priority Needs

- Non-destructive method for DNA isolation
- Novel methods for DNA profiling (including Non-PCR based methods for performing forensic DNA analysis)
- Single Cell PCR Preliminary genetic differentiation
- Macro screening of biological materials found at crime scenes.
- DNA Inhibition: Studies of the mechanisms involved and development of methods for overcoming inhibition
- Age determination of stains
- Single nucleotide polymorphism (SNP) population database (autosomal)
- Increase the speed of forensic DNA analysis processes

Forensic DNA TWG: Low Priority Needs

- Twin differentiation
- X chromosome testing
- Develop software to perform familial searches
- Automated sperm searches
- Species determination
- Additional polymerases for use in PCR (Polymerase Chain Reaction) amplification
- Long Term Biological Evidence Storage
- Examining markers relevant to pharmacokinetics related to cause of death

General Forensics TWG

- The 2010 Spring TWG was held on March 15th and 16th in Alexandria, VA.
- The group consisted of practitioners from local, state, and federal agencies with various backgrounds.
- Due to the scope of disciplines within the General Forensics TWG, the TWG was restructured to include 3 sub-TWG groups
 - Crime Scene and Medicolegal Investigations
 - Instrumental Analysis
 - Pattern and Impression Evidence.
- TWG members participated in panels that identified and ranked practitioner needs.

Crime Scene and Medicolegal Death Investigation

TWG: High Priority Needs

- Improved technology to document crime scenes: 3D and 360 Degrees
- Studies in determination of cause of death in infants and children (Shaken Baby Syndrome; SIDS/SUID; Metabolic Disorders)
- Develop new technologies in toxicology analysis – better, faster, cheaper
- Basic research in recognition and differentiation between neglect, abuse and chronically disabled
- Development of ALS to enhance/detect blood only at crime scene, not other body fluids.
- Gap analysis and research into available tools and technologies for crime scene investigation – what exists? What doesn't?

Crime Scene and Medicolegal Death Investigation

TWG: Medium Priority Needs

- Study and evaluation of the utility of a resident forensic anthropologist. What is the impact on medicolegal investigations?
- Fundamental research in postmortem interval estimation (entomology, taphonomy, and botany)
- Validation research studies in bite mark analysis

Crime Scene and Medicolegal Death Investigation

TWG: Low Priority Needs

- Research of validity and usefulness of GSR – use it or lose it
- Study into the rates of error in NCIC, and study into the coding procedures of case information in NCIC

Instrumental Analysis TWG: High Priority Needs

- Development of a standards repository for new drugs
- Information data sharing of metabolites and new “designer” drugs – clinical data should be shared with forensic laboratories
- Improvement of sample prep or automation to increase throughput
- Further research into the statistical understanding of analyses using instrumentation, especially elemental analysis.
- Research into consecutive analyses – e.g. use of mtDNA on hair sample in concert with standard hair examination techniques to strengthen individuality

Instrumental Analysis TWG: Medium Priority Needs

- Research pertaining to new instrumentation and method development
- Increase the understanding and interpretation of the analysis of polymers and determine the significance of results
- Development and sharing of reference samples of paints and other manufactured items
- Research into human levels of tolerance and dependence of synthetic opiates and other drugs
- Improved identification and understanding of false-positives associated with hand held devices
- Develop new tools and techniques that enhance the visualization of trace evidence found at crime scene
- Development of methods to increase trace evidence analyses and lab throughput

Instrumental Analysis TWG: Low Priority Needs

- Improve the interpretation and understanding of GSR testing

Pattern and Impression Evidence TWG: High Priority Needs

- Research on the foundational aspects of “individualization” and the “significance of class characteristics”
 - Population studies on class characteristics
 - Reproducibility of characteristics
- Research on the Examination and Conclusions Process
 - Determination of “value” for comparison and identification/conclusion
 - Ranges of conclusions among examiners
- Research to determine accuracy in order to address error rate issues in Daubert
 - Error of individual examiner
 - Error related to processes, collection issues, verification, technical review

Pattern and Impression Evidence TWG: Medium Priority Needs

- Research into possible sources of bias during the examination process
- Comparative evaluation of the effectiveness of chemical reagents and processing methods on impression evidence
- Research to demonstrate the effectiveness of pattern and impression databases
 - Validation of the benefits and utility of databases
 - Clarification of the relationship between the database and conclusion process
- Novel and/or Improved Analytical Collection and Development Tools for Impression Evidence

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How NIJ Responds to These Technology Needs



NIJ Response to Technology Needs

- If there are no existing solutions to a TWG technology need:
NIJ solicits applications to develop new solutions
- If there are existing solutions to a TWG technology need:
NIJ tests and evaluates solutions

U.S. Department of Justice
Office of Justice Programs
National Institute of Justice

Insert OMB No.



The U.S. Department of Justice (DOJ), Office of Justice Programs (OJP), National Institute of Justice (NIJ) is pleased to announce that it is seeking applications for funding for research and development that can enhance the forensic uses of DNA technology in criminal justice settings. This solicitation focuses on development of technologies that result in faster, more robust, more informative, less costly, or less labor-intensive identification, collection, preservation, and/or analysis of biological evidence that has the potential for DNA analysis. This program furthers the Department's mission by sponsoring research to provide objective, independent, evidence-based knowledge and tools to meet the challenges of crime and justice, particularly at the State and local levels.

Solicitation: Forensic DNA Research and Development Eligibility

In general, NIJ is authorized to make grants to, or enter into contracts or cooperative agreements with, States (including territories), local governments (including federally-recognized Indian tribal governments as determined by the Secretary of the Interior and published in the Federal Register), nonprofit and profit organizations (including tribal nonprofit and profit organizations), institutions of higher education (including tribal institutions of higher education), and certain qualified individuals. Foreign governments, foreign organizations, and foreign institutions of higher education are not eligible to apply.

Deadline

Registration with [OJP's Grant Management System \(GMS\)](#) is required prior to application submission. (See "How to Apply," page 7.)

All applications are due by 11:45 p.m. eastern time on April 2, 2010.
(See "Deadlines: Registration and Application," page 3.)

Contact Information

For technical assistance with submitting the application, contact the Grants Management System Support Hotline at 1-888-549-9901, option 3 or via e-mail to GMSHelpDesk@usdoj.gov.

Note: The [GMS](#) Support Hotline hours of operation are Monday-Friday from 6:00 a.m. to midnight eastern time, except for Federal holidays.

For assistance with any other requirement of this solicitation, contact Minh Nguyen, Program Manager, Office of Investigative and Forensic Sciences, at 202-305-2664 or by e-mail to Minh.Nguyen@usdoj.gov.

SL# 000905

NIJ solicits applications for the development of new solutions to needs. The Forensic R&D solicitations are typically posted in the Spring and awards are announced in the Fall.

The solicitation details "Suggested Areas of Research" which are directly related to TWG determined needs.

http://www.nfstc.org/lab/online-technology-transition-workshops/

NFSTC » Online Technology Transition Workshops



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Online Technology Transition Workshops

NFSTC Images



Special Forces students learn to collect fingerprint records from detainees in custom-designed scenarios.

Making a Difference

"The team provided me with insightful ways that Carrboro PD might best make use of the Coverdell Grant in the future."

~John Lau, Lieutenant
Carrboro Police Department

Making the Leap from Concept to the Crime Lab

As the Forensic Technologies Center of Excellence (FTCoE), NFSTC works with several noted organizations and universities to evaluate emerging and mature technologies to determine whether these tools can be effectively applied in forensic investigations. Technology transition activities for NFSTC include technology evaluations, workshops to train users on new technology, and technology demonstrations at large training venues.

The following technology transition workshops are available online, including workshop agendas, online video of the presentations and the presentation files themselves.

These workshops are now available online:

- Field Investigation Drug Officer (FIDO) Program
- Latent Fingerprint Image Enhancement
- Mitochondrial and STR DNA Analysis by Mass Spectrometry Using the Ibis Biosciences Platform
- DART Mass Spectrometry
- Miniaturized Microfluidic Devices
- Capillary Electrophoresis Microfluidic Devices
- Cedar Fox Questioned Documents Workshop
- Laser Microdissection for Examiners
- Laser Microdissection for Technical Managers and Supervisors
- Liquid Chromatography/Dual Mass Spectrometry
- Polynomial Texture Mapping for Footwear/Tire Impressions
- Raman Spectrometry (in process)
- Near-Infrared Analysis (in process)

The [Technology Transition Workshops](#) poster that was presented at the 2010 National Institute of Justice conference provides an overview of the program.

If there are existing solutions to a TWG technology need: NIJ tests and evaluates solutions development of new solutions to needs.

This is done through the Forensic Technology Center of Excellence's

- *Technology Transition Workshops*
- *Technology Evaluations*

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Dissemination of Technology Needs & Solutions

- NIJ website: <http://www.ojp.usdoj.gov/nij/>
- DNA.gov: <http://www.dna.gov/research/>
- NCJRS: <http://www.ncjrs.gov/index.html>
- NIJ Conference (June 14 – 16) http://www.ojp.usdoj.gov/nij/events/nij_conference/

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