Information Does Exist Beyond the First Page of Your Google® Search!

Tools and Strategies for Forensic Science Literature Searching and Use

Chair: John M. Butler
Co-Chair: Matthew R. Wood
**Purpose of this Workshop**

We hope that participants:

- Gain a better understanding of the current approaches and tools for discovering, using, and analyzing the forensics literature
- See worked examples using both free resources available to any practitioner and specialized literature databases available to academic researchers and students
- Come away with ideas to improve accessibility and use of forensic science literature in your work

**Program Schedule**

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 – 8:35 a.m.</td>
<td>Matthew Wood</td>
<td>Introduction to Workshop and Presenters</td>
</tr>
<tr>
<td>8:35 – 9:15 a.m.</td>
<td>John Butler</td>
<td>Why Search and Read the Forensic Science Literature?</td>
</tr>
<tr>
<td>9:15 – 9:45 a.m.</td>
<td>Jeff Teitelbaum</td>
<td>Free Forensic Science Information Resources for the Practitioner</td>
</tr>
<tr>
<td>9:45 – 10:15 a.m.</td>
<td>Susan Makar &amp; Amanda Malanowski</td>
<td>Tools for Searching and Analyzing the Forensic Science Literature</td>
</tr>
<tr>
<td>10:15 – 10:30 a.m.</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>10:30 – 11:10 a.m.</td>
<td>Jeff Teitelbaum &amp; Susan Makar</td>
<td>Case Examples (latent prints, handwriting, DNA, specific authors)</td>
</tr>
<tr>
<td>11:40 – 11:50 a.m.</td>
<td>John Butler</td>
<td>Other Activities Regarding Forensic Literature: AAAS, NCFS, OSAC</td>
</tr>
<tr>
<td>11:50 – 12:00 p.m.</td>
<td>All</td>
<td>Discussion, Q&amp;A</td>
</tr>
</tbody>
</table>

**NIST Disclaimer**

Points of view are the presenters and do not necessarily represent the official position or policies of the National Institute of Standards and Technology.

Certain commercial equipment, instruments and materials are identified in order to specify experimental procedures as completely as possible. In no case does such identification imply a recommendation or endorsement by the National Institute of Standards and Technology nor does it imply that any of the materials, instruments or equipment identified are necessarily the best available for the purpose.

**Questions ???**

- Due to the volume of material we are trying to cover, we may not have time to stop and answer extensive questions during the presentations
- Please write your questions down
  - Written questions provided at the break will be addressed during the final Q&A at the end of the workshop
- Feel free to email us with your questions
- We will try to allow a few minutes at the end of each presentation, and we will be happy to stay afterwards and answer questions
Why Search and Read the Forensic Science Literature?

John M. Butler
NIST Fellow & Special Assistant to the Director for Forensic Science
National Institute of Standards and Technology

The CAC News – 2nd Quarter 2012 – p. 6
"Generalist vs. Specialist: a Philosophical Approach"

"If you want to be a technician, performing tests on requests, then just focus on the policies and procedures of your laboratory. If you want to be a scientist and a professional, learn the policies and procedures, but go much further and learn the philosophy of your profession. Understand the importance of why things are done the way they are done, the scientific method, the viewpoint of the critiques, the issues of bias and the importance of ethics.”

The Triad of Scientific Publishing

Read

Write

Review

Making full use of the scientific literature…

What I have written on this topic…

The triad of scientific publication: Reading, writing, and reviewing
John M. Butler

"An important purpose of scientific publication is to document work performed to aid the advancement of science. In short, writing enables history.”

"Reviewing manuscripts is a chance to influence the community for good and to provide service back to journals…”

My Qualifications on this Topic

Degrees in chemistry
– BYU B.S., 1992, University of Virginia (Ph.D., 1995)
– Undergraduate classes on scientific writing and public speaking

• Research focused career
  – Published >150 articles and invited book chapters
  – Given >300 presentations on scientific topics

• Love for teaching
  – More than 50 workshops on DNA topics
  – Written five books (so far) on forensic DNA typing

• Active reviewer and journal editor responsibilities
  – Associate editor of Forensic Science International: Genetics since 2007
  – Reviewed hundreds of articles for >20 different journals

• Avid lifelong reader of history and science
  – Read >2,000 books and thousands of articles

Named by ScienceWatch in July 2011, as the #1 world-wide high-impact author in legal medicine and forensic science over the previous decade.

Reading Scientific Articles: Why and How?

John M. Butler

Why Search and Read p. 1
Why Read the Literature?

• Reading the relevant literature is crucial to developing expertise in a scientific field

• You must keep reading to be familiar with advances that are regularly being made

• Your writing improves the more you read
  – Being widely read in your field helps you prepare relevant reference lists and insightful introductions to your manuscripts

• Your ability to review other’s work will improve…

**Benefits of Reading the Literature**

• You become familiar with authors and institutions

• You can improve as a writer and a presenter

• Your laboratory can improve its protocols

• Over time you will be building your knowledge
  – In graduate school, I read over 100 articles on PCR before I ever did a single experiment
  – I have gathered and cataloged ~9,000 articles over the last 20 years of work in the forensic DNA field
  – My books include reference lists that are as comprehensive as possible (because of this reference collection)

• Remember: You don’t have to master every paper…

**FBI Quality Assurance Standards**

*Requirement for Literature Review with DNA Labs*

Quality Assurance Standards for Forensic DNA Testing Laboratories (effective September 1, 2011)

5.1.3.2. The laboratory shall have a program approved by the technical leader for the annual review of scientific literature that documents the analysts’ ongoing reading of scientific literature. The laboratory shall maintain or have physical or electronic access to a collection of current books, reviewed journals, or other literature applicable to DNA analysis.


**My thoughts on how to read a scientific article**

• Skim the article first
  – Start with title and abstract (may consider authors as well)
  – Scan tables, figures and figure captions

• Examine results and conclusions
  – Do the data presented support the statements made?

• Do not worry about trying to comprehend the entire article at first
  – Most articles will be skimmed rather than read from start to finish

• Highlight key points and make notes on the paper itself so you can go back to them later to refresh your memory

**Francis Crick**

The Astonishing Hypothesis (1994), page xii

“There is no form of prose more difficult to understand and more tedious to read than the average scientific paper.”

**Journal Clubs**

• Do you have one in your laboratory?

• How often do you meet?

• Is it effective?
Workshop #1: Forensic Science Literature Searching and Use  

John M. Butler  

Why Search and Read p. 3
Storage & Retrieval

Creating a Reference Collection

- My forensic DNA reference collection began while I was in graduate school – Continued over the years with the help of student interns like Christian Ruitberg shown here
- Mostly printed copies of articles are stored – has increasing become digital (this part is not as well organized)

Reference Management Systems

- Article information storage and search retrieval
- Reference formatting for different journals

Strategies for Scientific Literature Collection and Curation

- Use electronic papers only
- Put everything into a single file (e.g., AllRef) – use keywords or authors to find specific articles
- Create separate files for individual projects – Classification problems can arise if an article could possible fit into multiple projects

Reference Manager Database

As of Aug 2013: 5115 references in AllRef and 3693 references in STR_Ref

Strategies for Scientific Literature Collection and Curation

- Use electronic papers only
- Put everything into a single file (e.g., AllRef) – use keywords or authors to find specific articles
- Create separate files for individual projects – Classification problems can arise if an article could possible fit into multiple projects
Fruits of a Good Literature Collection

Review Articles

Textbooks

Butler Books on Forensic DNA Typing

Fairly comprehensive reference citations are provided with each topic and chapter

Publication Year

- 2015
- 2012
- 2010
- 2005
- 2001

And a Useful Reference Website…

STRBase

Writing Scientific Articles

Why you need to write up your work

- Peer-review usually generates higher-quality information (but the quality control is not perfect)
- Talks are not held to the same standard as a written publication (that has been peer-reviewed)
- A written publication is also accessible to those who did not attend a presentation and is archived for future scientists to read

Why Publish Scientific Articles?

- To spread information and share new knowledge with others
- To gain recognition, success and prestige for the authors and their institutions
- To win promotion to higher positions, job security, and tenure within academia
- To enhance chances of obtaining grants and research funding
- To gain priority for making a discovery

From Prof. Wayne Jones presentation at 19th IAFS meeting (Madeira, Portugal), 15 Sept 2011

“Publishing in Forensic Sciences: Where and How to Publish and the Meaning of Numbers”
Thoughts on How to Write a Scientific Article

- **Outline the ideas first** with a purpose and plan
  - Decide on scope & audience and select target journal
- Write Materials and Methods section first
- Prepare all figures & tables
  - captions should be stand-alone
- Write Results and Discussion based on data shown in figures & tables
- Write Introduction to provide context to your work
- Prepare reference list according to journal format
- **Write abstract last and then finalize title**
  - Most critical pieces since they will be the most read!

Important Steps to Address in Writing a Scientific Article

- Select a journal based on desired audience
- Decide on the scope of information
  - How much data will be covered? Should the material be subdivided into more than one article?
- Decide on article category
  - Original article, technical report, case report, etc.
- Pay attention to the reference format

As an editor, one of the first things I examine is the reference list... if the authors are not consistent with their reference format or sloppy with details (e.g., missing volume or page numbers), then I may have concern with the quality of the work because **DETAILS MATTER IN SCIENCE!**

Some Decisions to Be Made

- How to subdivide information into digestible sections?
- What information is needed in Materials and Methods to permit someone to follow and repeat your experiments?
- What should be covered in a figure or table?
- What should be supplemental material versus material in the paper itself?

“Writing is thinking. **To write well is to think clearly.** That's why it's so hard.”

—David McCullough, Pulitzer Prize winner

(http://www.neh.gov/about/awards/jefferson-lecture/david-mccullough-interview)

My experience with writing

- **Focus**
  - Environment – I need a quiet place with no interruptions in order to get into the flow of writing
  - Time – I need **long blocks of time** (around 6 hours has been optimal for me, which typically means late at night)
- **Perspective**
  - Think from the readers' perspective (this will require learning to step outside of yourself and see what you have written with fresh eyes)
  - Work on **content flow and clarity** (this will require multiple re-writes to your manuscript)
  - Know your audience (you should select a journal from which you have read articles previously)

Training in Scientific Writing is Needed

“To expect scientists to produce readable work without any training, and without any reward for success or retribution for failure, is like expecting us to play violins without teachers or to observe speed limits without policemen. Some may do it, but most won’t or can’t.”

Some Recommendations to Improve Accessibility:
1) Put grammatical subjects close to their verbs
2) Put information intended to be emphasized towards the end of a sentence (the stress position)
3) Place the person or thing whose “story” a sentence is telling at the beginning of the sentence (the topic position)
4) Provide context for the reader before sharing anything new

http://www.ees.elsevier.com/fsigen/

The Elsevier Publishing Campus
https://www.publishingcampus.elsevier.com/

Free lectures, training and advice in:
• writing a journal article or book,
• learning how to conduct peer review,
• understanding research and publishing ethics
• preparing a successful grant application

Bibliometrics
efforts to measure scientific productivity in an academic world of “Publish or Perish”

• Impact factor (for journals) http://en.wikipedia.org/wiki/Impact_factor
  – a measure of the citations to science journals
  – can reflect relative importance of a journal to its field
  – devised by Eugene Garfield, the founder of the Institute for Scientific Information
  – calculated yearly starting from 1975 for those journals that are indexed in the Journal Citation Reports

• h-index (for authors) http://en.wikipedia.org/wiki/H-index
  – described in 2005 by Jorge Hirsch (Proc Natl Acad Sci 102: 16569-16572)
  – an attempt to measure an author’s productivity and impact
  – based on a list of an author’s publications ranked in descending order by the number of times each publication is cited
  – value of h is equal to the number of papers (N) in the list that have N or more citations

Impact Factor of a Journal
• Concept first described in 1955 and developed by Eugene Garfield
• Reflects the average number of citations to recent articles published in the journal
• An impact factor for 2012 (released in 2013)
The total number of “citable items” published in that journal in 2010 and 2011 were cited by articles in indexed journal during 2012


http://www.americanscientist.org/issues/pub/the-science-of-scientific-writing

My Overall Summary Thoughts

**READ**
- The best preparation to write well is to critically read a lot of papers

**WRITE**
- Writing well takes practice and is one of the most valuable skills you can develop
  - Effective communication benefits scientific advancement

**REVIEW**
- Help review the work of other scientists
  - As an editor, I appreciate your willingness to be a reviewer when you are asked to help
  - An important way to give back to the community

---

"Ecosystem" of Scientific Knowledge

A Question Raised or a Problem to Solve → Research Conducted → Results Written Up & Published

Information Resources Available

- Google Scholar or PubMed
- Web of Science or Other Database
- Non-Indexed Journals

Crucial Elements in Search
1. Resources evaluated
2. Keywords utilized

---

Thank you for your attention!

• Acknowledgments:
  - Funding from NIST Special Programs
    Office Forensic Science Program

Contact info:
john.butler@nist.gov
301-975-4049

A copy of this presentation will be made available at:
http://www.cstl.nist.gov/strbase/NISTpub.htm
W1: Information Does Exist Beyond the First Page of Your Google® Search!
American Academy of Forensic Sciences
Las Vegas, NV (February 22, 2016)

Free Forensic Science Information Resources for the Practitioner

Jeff Teitelbaum
Librarian, Forensic Laboratory Services Bureau
Washington State Patrol

What do we want?
- Journal articles
- Books
- Newspaper articles
- New research
- Government reports

Forensic Science Open Access Journals

Forensic Science newsletters

Jeff Teitelbaum
Free Resources p. 1
Workshop #1: Forensic Science Literature Searching and Use

PUBLIC LIBRARIES

- New York Public Library
- Seattle Public Library
- Denver Public Library
- San Francisco Public Library
- dallaspubliclibrary

PUBLIC LIBRARIES

- Library Card

PUBLIC LIBRARIES

- Document delivery
- Database access
- Electronic journals
- Books
- E-books

PUBLIC LIBRARIES

E-books – PUBLIC LIBRARY

Online databases – PUBLIC LIBRARIES

Online databases – PUBLIC LIBRARIES

Jeff Teitelbaum

Free Resources p. 2
Electronic journals – PUBLIC LIBRARY

- Full text electronic journal holdings

Search for journals and access full text articles online.

UNIVERSITY LIBRARY

- Complete access to book and journal collections
- Access to electronic databases
- State government employees can obtain library card to borrow books

US National Library of Medicine

25 million citations from the biomedical literature

PubMed identifies free full-text articles

- Set up your personal MyNCBI account
  - Create alerts/RSS feeds
  - Customized subject collections
Workshop #1: Forensic Science Literature Searching and Use

PubMed Alerts/RSS

RSS Readers

- Article “rental” service
- 12 million articles in current catalog
- Monthly plan includes:
  - Read unlimited articles (no downloading)
  - Print 20 pages per month

5 minutes free preview:
- Log in to your free account
- Locate your article

5 minute free full-text preview

Jeff Teitelbaum
Workshop #1: Forensic Science Literature Searching and Use

NCJRS

More than 220,000 records
Large percentage free PDF's
- Criminal justice
- Forensic sciences
- Substance abuse
- Journal indices

NCJRS search interface

Search the NCJRS Abstracts Database
The NCJRS Abstracts Database contains more than 220,000 records on criminal justice, juvenile justice, and substance abuse resources located in the NCJRS Virtual Library collection. This includes more than 60,000 online resources and all known Office of Justice Programs works.

Current research

Bloodstain Patterns on Textile Surfaces: A Fundamental Analysis

Exploitation of Very Small Particles to Enhance the Probative Value of Carpet Fibers
David A. Stoney, Ph.D., Paul L. Stoney, MBA, Cedric Neumann, Ph.D.; 2015

Human Hair Proteomics - Improved Evidence Discrimination
Robert H. Rice, Pei-Wen Wu, Selena M. Marz; 2015

Improved Detection of Synthetic Cathinones in Forensic Toxicology Samples: Thermal Degradation and Analytical Considerations
Sarah Kerrigan, Ph.D.; 2015

Low-Template DNA Mixture Interpretation: Determining the Number of Contributors
Catherine Grgicak, Ph.D.; 2015

Tools for Improving the Quality of Aged, Degraded, Damaged, or Otherwise Compromised DNA Evidence
Michael M. Cox, Ph.D., Evelyn M. Mercer; 2015

Older research

Flight characteristics and stain patterns of human blood
H.L. MacDonell; 1971

Methods for the Restoration of Obliterated Serial Numbers
R. S. Treptow; 1977

Footwear Identification
Michael J. Cassidy; 1980

Free to subscribe

FLSB Library email list
Jeff.Teitelbaum@wsp.wa.gov
Tools for Searching and Analyzing the Forensic Science Literature

Susan Makar & Amanda Malanowski
Research Librarian & Program Analyst, Information Services Office
National Institute of Standards and Technology

Overview
- Tools and search strategies for finding forensic publications
  - Web of Science – multidisciplinary sciences
  - SciFinder – chemistry and related areas
  - Compendex – engineering, computer science, etc.
  - LexisNexis – legal and news
- Impact assessment
- Data visualization tools

Database Search Tips – Getting Started
- Write down the key concepts you want to focus on
- Limit to past 5 years, English language articles, as an initial way to focus and narrow results
- As you search, write down synonyms, keywords, controlled vocabulary, classification codes
- Look at the number of search results – if too many, try to narrow
- Use abstract and assigned keywords to determine potential relevance

Web of Science
- An online subscription-based resource that indexes the science and technology literature, including citations and abstracts to peer-reviewed journal articles and some conference proceedings
- Fully covers over 8,300 journals across 150 scientific disciplines; 1900 to present
- Analyze the sci-tech literature using “Analyze Results” and “Create Citation Report” features

National Institute of Standards and Technology
- Non-regulatory federal agency made up of about 3,000 science and technology researchers
- NIST promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology
- The Information Services Office (ISO) supports and enhances research activities of the NIST scientific community through a comprehensive program of knowledge management
Web of Science – Begin Search

- Identify key concepts – forensics AND ballistics
- Identify synonyms – firearms and guns, in addition to ballistics
- Truncate terms to pick up word variations – gun* retrieves gunshot, gunpowder, gun, guns, etc.
- Select time span – how current do you want your papers?

Web of Science – Expand Search

- Scan article record for other keywords and search terms
- Check the paper’s references and “Related Records”

SciFinder

- A research discovery application that provides integrated access to references, substances, and reactions in chemistry and related sciences
  - Search for references by research topic, author, company, document identifier, journal, or patent
  - Search for chemical substances by chemical structure, molecular formula, property, or substance identifier
- Requires a username and password
- SciFinder training page offers tutorials and other materials

SciFinder – Welcome Screen

- Requires a username and password
- SciFinder training page offers tutorials and other materials
SciFinder – Natural Language Search

- Only option is to use "natural language" to conduct a search
- Complex searches are difficult to perform in SciFinder

SciFinder – Select Concept Relationship

- Exact phrase is too specific – yields only one record
- Two concepts present anywhere in the reference is too broad and not always on target
- Two concepts “closely associated with one another” is generally the best answer set

SciFinder – Analyze and Refine Results

- Analyze your search by Author, Company, Journal, etc.
- Refine by Research Topic, Author, Company Name, etc.

Compendex

- Indexes the engineering literature
- Strong in the applied sciences
- Scope
  - Broad literature database
  - 17+ million papers
  - 80,000 conference proceedings
  - 3,800 journals
- Controlled vocabulary enables you to find the most relevant articles with few false hits

Compendex – Use Thesaurus

- The Thesaurus Search helps to eliminate false hits since each article is indexed using a term or terms from a controlled vocabulary list
- Not all databases/resources have the valuable thesaurus search feature

Compendex – Use Thesaurus

- When to use Compendex
  - Computer forensics and related topics
  - Coverage beyond the peer-reviewed journal literature
    - Conference papers
    - Technical reports
- Topic areas
  - Computer forensics
  - Computer crime
  - Digital evidence

Susan Makar & Amanda Malanowski
Tools for Searching and Analyzing p. 3
Compendex – Select Thesaurus Terms

Thesaurus Search results for forensics are limited to computer and digital/data related papers.

Compendex – Search Results

- Results can be refined using the filters on the left
- Many filters are available – Author, Author Affiliation, etc.
- Note the source title “Digital investigation,” which is the source with the most papers on the topic.

LexisNexis

- Use Lexis to search across over 26,000 current and archived sources, including trusted news, company profiles, public records, industry information and social media content
- Lexis content includes Federal and State Cases, Statutes, Codes, and Regulations; Legislative Materials; Court Dockets; Court Materials; and more
- Subscription based – check with your library for access

LexisNexis

- When to use LexisNexis
  - Forensics topics related to industry/business
  - Litigation involving forensics
  - Coverage of the non-technical literature
    - Legal literature
    - News sources
    - Patent literature
  - Topic areas
    - Forensics experts and litigation
    - Global forensic technologies market
    - Cybercrime

Nexis – Begin Search

- Use the Natural Language search option to type in key concepts
- Various filters help to refine search

Nexis – Use Filters to Narrow Search

- Use filters on the left to refine search results
- Filter by Source Type, Subject, Industry, Company, etc.
Lessons Learned

- Forensic science crosses many disciplines from legal medicine and chemistry to computer science, food science technology, and materials science.
- It is virtually impossible to identify each and every paper on a forensics topic due to the interdisciplinary nature of forensics.
- There is no single resource that captures all the forensic literature, and most resources have only fair to good coverage of forensics.

Impact Assessment

- What is the impact of your work or research?
- How can assessing impact help?
  - Helps obtain funding
  - Demonstrates the value of your work to your stakeholders
- When would it be useful?
  - Investigating new research areas
  - Defending your research group in times of budget cuts
- Ask your librarian to help!

Web of Science Search String

WC="Medicine, Legal" AND ORGANIZATION-ENHANCED: (National Institute of Standards & Technology (NIST) - USA)

OR

TOPIC (Forensic* OR "legal medicine" OR medicolegal OR autopsy OR "blood stains" OR dermatoglyphics OR "DNA fingerprint*" OR exhumation OR ballistics OR "computer crime" OR "electronic crime" OR "electronic evidence" OR "cyber crime" OR "digital investigat*" OR "digital evidence" OR "intrusion analys*" OR "dna typing" OR "dna profiling") AND ORGANIZATION-ENHANCED: (National Institute of Standards & Technology (NIST) - USA)

Impact Assessment in the NIST Information Services Office

- What types of analyses do we do?
  - Citation analysis and publication assessment
  - Market research and analysis
  - Research impact measurement
  - Publication venue analysis
- Examples of the analyses we do related to forensics
  - Information on databases, books, and research groups in the area of forensic identification of fibers
  - What is the impact of NIST’s forensic publications?
Forensics@NIST 2014

Assessing the Impact of the National Institute of Standards and Technology’s Forensic Publications and Collaborations

Tableau

- Tableau Public – free version
- Drag and drop interface is intuitive and enables quick and iterative data manipulation and visualization
- Geospatial maps, heat maps, area graphs, bubble graphs, and dashboards

Science of Science Tool (Sci²)

- Created at Indiana University
- Temporal, geospatial, topical, and network analysis and visualization of scholarly datasets
- Data prep tool for:
  - Web of Science
  - Google Scholar

Gephi

- Interactive visualization and exploration platform for networks and complex systems, dynamic and hierarchical graphs
- Helps show patterns and isolate outliers

Questions?

Contact:
Susan Makar
susan.makar@nist.gov

Amanda Malanowski
amanda@malanowski@nist.gov
Question to Research
What are the effects of mouth alcohol on breathalyzer tests?

Recap of resources and techniques

- Google
- NCJRS
- PubMed
- Google
- WorldCat

Google operators:

- mouth alcohol
- mouth AND alcohol
- mouth OR alcohol
- “mouth alcohol”
- “mouth alcohol” ext:pdf
- “mouth alcohol” ext:ppt
- “mouth alcohol” -lawyers
- “mouth alcohol” site:.gov or site:.edu
- “mouth alcohol” site:nhtsa.gov

• To return specific file types:
  - ext:pdf
  - ext:ppt
  - impaired driving ext:pdf

• To search specific types of websites:
  - site:.gov
  - site:.edu
  - impaired driving site:nhtsa.gov
Using ext:pdf in Scholar will often retrieve different full-text articles than Google.

You must search for “Google Books Advanced Search” to access it!

Using PubMed to determine keywords

Lessons Learned

- Publicly accessible databases and search engines can be incredibly useful.
- Never rely on only one resource. Using multiple resources is essential to quality results.
- Using search operators can dramatically improve your search results.
- Spend time to learn about the advanced features and techniques for each resource.
- Work to find the specific terminology used in the scientific literature. Using PubMed search box prompts can be useful.

Free to subscribe

FLSB Library email list

Jeff.Teitelbaum@wsp.wa.gov
Case Examples 2

Susan Makar
NIST Information Services Office

Case Examples: Identifying Expert Witnesses

I need to identify an expert witness in fiber identification for an upcoming murder trial. Who are some possible candidates?

I was given Rob Ogden as a forensics wildlife expert. How can I verify his expertise and ensure that he can be used as an expert witness in a criminal case involving wildlife poaching?

Web of Science – Begin Search

- Determine key concepts – forensics AND fibers
- Truncate words to pick up variations, i.e., forensic, forensics
- Identify synonyms and combine using the “OR” connector

Web of Science – Analyze Results

Click on “Analyze Results” in the upper right

Web of Science – Analyze by Author

- Select “Authors” from the list of fields by which papers can be ranked
- Choose display options to limit the top results (top 10, top 50, etc.)
- Click “Analyze” to view the authors with the most publications on forensics and fibers

Web of Science – Select Author

Select the author(s) with the most papers
Scan search results to ensure papers are on target
Note the times cited for each paper
Select a paper to learn more about the authors’ affiliations

Web of Science – Check Address Field

Is this the address of a reputable organization?

Case Examples: Identifying Expert Witnesses

I was given Rob Ogden as a forensics wildlife expert. How can I verify his expertise and ensure that he can be used as an expert witness in a criminal case involving poaching?

Google Scholar

- Papers ranked by times cited (screen shot lists only 4 of 70 papers); scroll down the list to find current papers with fewer cites
- Citation data includes citation counts and h-index

Web of Science – Begin Search

- Truncate author’s name to pick up full name or first/middle initials
- Adding key concepts will limit search to the right R. Ogden

Web of Science – Search Results

- Note yellow highlighted search terms in search results
- Note citation counts of individual papers
- Only eight papers, are there more?
What if Ogden's papers do not include the words “wildlife” and “forensics”? An author search can demonstrate the breadth of his work and find additional papers.

Select Author Search from the drop-down box next to “Basic Search.” This will begin the process of identifying the correct author.

- Enter the full last name
- Abbreviate first name to pick up first and middle name variations, i.e., Robert, Rob, R, etc.
- Click on “Select Research Domain”

Several choices if organization is unknown:
- Use filters to exclude (or include) subject disciplines
- Scan 114 author record sets

Even with over 100 record sets it is easy to scan for the correct author
- Look for many clues – correct initials, research areas, publication years
- View sampling of author’s publications if still unsure

Questions?

Contact:
Susan Makar
susan.makar@nist.gov
ForSciPub: A Vision for the Future of Forensic Science Literature

Melissa Taylor
Forensic Science Research Manager, Special Programs Office
National Institute of Standards and Technology

Why do I care about this topic?

• NIJ
  – Technical Writer
  – General Forensic Program Manager
• Standardization II Committee Member
• SoFS Member
• Research Manager at NIST

“Science... has provided a record of ideas and has enabled man to manipulate and to make extracts from that record so that knowledge evolves and endures throughout the life of a race rather than that of an individual.”
- Vannevar Bush

Information is everywhere!

Forensic Science Information

• Journal articles
• Data
• Scientific Presentations
• Newsletters/Circulars
• Conference Proceedings
• Research Reports
• Standards and Best Practices
• Miscellaneous

Knowledge & Practice

• Gap Analysis
• Trends
• New Research Questions
• New Methods

Forensic Bibliographic Database
Compiled by scientists for scientists

LOST with FSS closure in 2012

• FORS® is a bibliographic database which contains almost 100,000 records featuring abstracts of scientific papers, conference proceedings, books, technical reports and government publications.
• FORS was started in 1969 by the UK Home Office Central Research Establishment.
• The FORS® database is multidisciplinary and covers literature relevant to the examination of evidential materials, analytical methods and the presentation of findings.
• The database routinely scans a core list of about 150 journals published worldwide, together with any references obtained to assist in Forensic casework are included in the database.

Explore the world of forensics ... all from one site

ARCHIVE. Keep a central archive of research publications and standards related to the forensic sciences, preserving vital forensic science research results and information for years to come.

PROVIDE ACCESS. Provide electronic access to this comprehensive compendium of literature related to the forensic sciences for to better inform forensic scientists, students, legal professionals, law enforcement, academics, and the general public.

ADVANCE SCIENCE. Create an information resource for scientists and technology developers to help advance knowledge and improve forensic science practice.

The ability to consult works of reference is the foundation of scholarship
Where do we begin?

We wanted to create a comprehensive list of fingerprint-related articles.

Outreach to Academic Institutions

Contacted the following academic institutions to access potential journals, department publications, professor resources, and library resources:

1. Albany State University
2. Acadian University
3. Boston University School of Medicine
4. California State University at Los Angeles
5. Cedar Crest College
6. Duquesne University
7. Eastern Kentucky University
8. Florida International University
9. George Washington University
10. Indiana University-Purdue University
11. Laurentian University
12. Loyola University at Chicago
13. Marshall University
14. Metropolitan State University
15. Michigan State University
16. Nebraska Wesleyan University
17. Ohio University
18. Oklahoma State University
19. San Juan State University
20. Stevenson University
21. Texas A&M University
22. Texas Tech University
23. The Pennsylvania State University
24. Towson University
25. University at Albany (SUNY)
26. Université de Lausanne*
27. University of Alabama at Birmingham
28. University of California at Davis
29. University of California-Berkeley
30. University of Central Florida
31. University of Illinois at Chicago
32. University of Mississippi
33. University of Nebraska-Lincoln
34. University of New Haven
35. University of North Texas
36. University of North Texas Health Science Center at Forth Worth
37. Virginia Commonwealth University
38. West Virginia University

* Provided 6000+ references across several forensic disciplines

Outreach to Topical Databases

Contacted the following topic-specific databases for bulk uploads or pulled resources from the database: Academic OneFile, Gale Cengage Learning

- Academic Search Complete, EBSCO
- Anglia Ruskin University database
- BioOne
- Catalog of U.S. Government Publications
- Defense Technical Information Center (DTIC), U.S. Department of Defense
- Federal Library and Information Network (FedLink), Library of Congress
- FORS, data held by the UK Home Office
- HighWire, Stanford University
- National Clearinghouse for Science, Technology and the Law (NCSTL), Stetson University
- National Institute of Justice Topical Collection: Forensic Science
- National Technical Information Service (NTIS), U.S. Department of Commerce
- Public Library of Science (PLOS)
- Web of Science, run by Thomson Reuters

Outreach to Publishers

Contacted the following publishers for bulk citation uploads or other resources:

- CRC Press
- Elsevier
- John Wiley & Sons
- Jones & Bartlett
- LawTech Custom
- National Academies Press
- Pearson
- Routledge
- Sage Publications
- Thomson Reuters

Taxonomy Development Process

See https://prezi.com/aqbluzefcw-copy-of-fsd-taxonomy/
Finding Hidden Gems

Fingertip Model for Blood Flow and Temperature

Ying He, Hongwei Shao, Yuanfang Jiang, Mia Miners, and Hongdi Zhang

Progress to date

• Collected more than 7,000 citations related to fingerprint analysis
  – Journal articles, guidance and advice, circulars, reports, conference proceedings, research reports, standards, and codes of practice from worldwide sources
• Developed robust taxonomy for fingerprint-related sources which consists of:
  – 325 standard vocabulary keywords
  – 182 synonyms
• Established Taxonomy Working Group of forensic subject-matter experts, web developers, and forensic students to review and contribute to the draft taxonomy
• Developed automatic tagging of citations with standard vocabulary keywords
• Created a module for SMEs to approve content and tag new keywords

Was it worth it?

Comparing ForSciPubs collection of fingerprint articles to PMC, NCJRS, and ScienceDirect

ForSciPubs collection included more relevant journals

Comparing ForSciPubs to Google Scholar

Found when searched for title in quotes

24% Yes
76% No

Comparing ForSciPubs to Google Scholar

Found when searched for author(s) name and title

28% Yes
72% No
The Community would benefit from a National Center for Forensic Science Information

where ForSciPubs concept could be a part of the solution...

My Overall Summary Thoughts

ARCHIVE. Keep a central archive of research publications and standards related to the forensic sciences, preserving vital forensic science research results and information for years to come.

PROVIDE ACCESS. Provide electronic access to this comprehensive compendium of literature related to the forensic sciences for to better inform forensic scientists, students, legal professionals, law enforcement, academics, and the general public.

ADVANCE SCIENCE. Create an information resource for scientists and technology developers to help advance knowledge and improve forensic science practice.

The ability to consult works of reference is the foundation of scholarship

Thank you for your attention!

• Acknowledgments:
  – Funding from NIST Special Programs
  Office Forensic Science Program

Contact info: melissa.taylor@nist.gov
301-975-6363

A copy of this presentation will be made available at:
http://www.cstl.nist.gov/strbase/NISTpub.htm
Other Activities Regarding Forensic Literature: AAAS, NCFS, OSAC

John M. Butler
NIST Fellow & Special Assistant to the Director for Forensic Science
National Institute of Standards and Technology

Interpol Literature Summaries

- Interpol holds a forensic science symposium every three years that involves a review of literature in multiple forensic disciplines
- With the last cycle of reviews in 2013, 18 topics are reviewed by authors from countries around the world that cover a total of 4968 reference citations

Application Reviews on Forensic Science
appeared every other year in June 15 issue of Analytical Chemistry from 1983 to 2011

These reviews are methods-focused with brief descriptions provided of hundreds of forensic science publications from the two previous years. No attempt is made to prioritize the publications listed or to assess the quality of the work.

### Application Reviews on Forensic Science published in the journal Analytical Chemistry

<table>
<thead>
<tr>
<th>Year</th>
<th>Reviewed</th>
<th>Published</th>
<th>Articles Reviewed</th>
<th>% DNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>1984</td>
<td>1985</td>
<td>1986</td>
<td>0</td>
</tr>
<tr>
<td>1987</td>
<td>1988</td>
<td>1989</td>
<td>1990</td>
<td>0.0%</td>
</tr>
<tr>
<td>1991</td>
<td>1992</td>
<td>1993</td>
<td>1994</td>
<td>0.5%</td>
</tr>
<tr>
<td>1995</td>
<td>1996</td>
<td>1997</td>
<td>1998</td>
<td>7.6%</td>
</tr>
<tr>
<td>1999</td>
<td>2000</td>
<td>2001</td>
<td>2002</td>
<td>12.0%</td>
</tr>
<tr>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>2006</td>
<td>14.0%</td>
</tr>
<tr>
<td>2007</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>16.5%</td>
</tr>
<tr>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
<td>18.9%</td>
</tr>
</tbody>
</table>

A summary of information reviewed as part of the most recent Interpol Triennial International Forensic Science Managers Symposium covering literature and activities from 2010 to 2013

### Topics to Cover

- Review Articles & Literature Listings:
  - Analytical Chemistry Application Review Articles by Tom Brettell and colleagues (1983-2011)
  - Interpol Literature Reviews (only 2013 is online)
  - SWG Bibliographies Provided to SoF
- NCFS Views Document on Scientific Literature
- AAAS Forensic Science Literature Evaluation
- OSAC Activities in Literature/Research

928 page pdf file available for download

# Forensic Science

Interpol International Forensic Science Managers Symposium
8th – 10th October 2013

Review Papers
Edited by Prof. Mark D. Cooling
Centre for Forensic Science, University of Warwick, UK

John M. Butler
AAFS 2016
SWG Annotated Bibliographies

- During its operation from 2009-2012, the White House Subcommittee on Forensic Science (SoFS) requested annotated bibliographies from the then appropriate Scientific Working Groups (SWGs) or other professional organizations.
- Responses from 10 forensic disciplines were submitted to address specific questions raised by SoFS.
- SoFS was disbanded before these bibliographies were reviewed or analyzed – AAAS plans to do this function.
- The original bibliographies are available at http://www.nist.gov/forensics/workgroups.cfm#B

National Commission on Forensic Science (NCFS) Activities Regarding Forensic Literature

- NCFS Scientific Inquiry & Research Subcommittee has been discussing issues with the forensic science literature.

"A cursory review of the literature citations raised concerns within the NCFS that extend beyond these specific [SWG] bibliographies [provided to the SoFS]:

1. In some cases, it was unclear which literature citations are crucial to support the foundation of a particular forensic science discipline.

2. Some of the cited literature had not undergone a rigorous peer-review process.

It is the position of the NCFS that foundational, scientific literature supportive of forensic practice should meet criteria such as the following:

- Peer-reviewed in the form of original research, substantive reviews of the original research, clinical trial reports, or reports of consensus development conferences.
- Published in a journal or book that has an International Standard Number (ISSN for journals; ISBN for books) and recognized expert(s) as authors (for books) or on its Editorial Board (for journals).
- Published in a journal that maintains a clear and publicly available statement of purpose that encourages ethical conduct such as disclosure of potential conflicts of interest integral to the peer review process.
- Published in a journal that utilizes rigorous peer review with independent external reviewers to validate the accuracy in its publications and their overall consistency with scientific norms of practice.
- Published in a journal that is searchable using free, publicly available search engines (e.g., PubMed, Google Scholar, National Criminal Justice Reference Service) that search major databases of scientific literature (e.g., Medline, National Criminal Justice Reference Service Abstracts Database, and Xplore).
- Published in a journal that is indexed in databases that are available through academic libraries and other services (e.g., JSTOR, Web of Science, Academic Search Complete, and Scilf Inder Scholar).

AAAS Forensic Science Assessments

- The American Association for the Advancement of Science http://www.aaas.org
- With funding from the Laura and John Arnold Foundation, AAAS plans to conduct an analysis of the underlying scientific bases for the forensic tools and methods currently used in the criminal justice system.
- This project will evaluate the quality of the studies the forensic community relies on to support its practices and, where the scientific underpinning of these practices falls short, recommend a research agenda for the field.

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"
Forensic Disciplines Planned for Evaluation by AAAS

1. Latent Fingerprints – Working Group (WG) members
   (meeting date: July 09, 2015)
2. Fire Investigation – WG members
   (meeting date: July 20, 2015)
3. Firearms and Toolmarks/Ballistics – WG members
   (meeting date: August 20, 2015)
4. Bloodstain Pattern Analysis
5. Digital Evidence
6. Footwear and Tire Tracks
7. Forensic Odontology- Bitemark Analysis
8. Trace Evidence- Fibers
9. Trace Evidence- Hair
10. Trace Evidence- Paint & Other coatings

http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis

Advisory Committee to AAAS Assessment

- Martha Bashford, J.D.
  Chief, Sex Crimes Unit
  New York County District Attorney
- Shari Seidman Diamond, J.D., PhD
  Professor of Law and Psychology
  Northwestern University School of Law
  Research Professor, American Bar Foundation
- Gilbert S. Omenn, MD, PhD
  Director, Center for Computational Medicine and Bioinformatics
  University of Michigan
- Hal Stern, PhD
  Professor of Statistics
  University of California, Irvine
- Jeff Salyards, PhD, MFS
  Director, Defense Forensic Science Center
  Defense Forensics & Biometrics Agency
- Barbara Hervey, JD
  Judge, Texas Court of Criminal Appeals
- Jules Epstein, JD
  Professor of Law
  Temple University School of Law
- Itiel Dror, PhD
  University College of London & Cognitive Consultants International Ltd.

NCFS Commissioners or Subcommittee Members

http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis

Latent Fingerprint Analysis Working Group

- William Thompson, J.D., Ph.D. (Chair)
  – (Human Factors) University of California, Irvine
- Anil Jain, Ph.D.
  – (Biometric Engineering) Michigan State University
- Jay Kadane, Ph.D.
  – (Statistics) Carnegie Mellon University
- John Black
  – (Forensic Science) Black & White Forensics, LLC.

http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis

Fire Investigations Working Group

- Jose Almirall, Ph.D. (Chair)
  – (Chemistry) Florida International University
- Hal Arkes, Ph.D.
  – (Cognitive Psychology/Human Factors) Ohio State University
- Frederick Mowrer, Ph.D.
  – (Fire Protection Engineering/Fire Science) Cal Poly State University
- Janusz Pawliszyn, Ph.D.
  – (Analytical Chemistry) University of Waterloo
- John Lentini, CFI, D-ABC
  – (Forensic Science) Scientific Fire Analysis, LLC.

http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis
Workshop #1: Forensic Science Literature Searching and Use

AAFS 2016

Firearms and Tool Marks Working Group

- Tom Busey, Ph.D. (Chair)
  - (Cognitive Psychology/Human Factors) Indiana University
- Bruce Craig, Ph.D.
  - (Statistics) Purdue University
- Chittaranj Sahay, Ph.D.
  - (Manufacturing Engineering/Metrology) University of Hartford
- Christopher Schuh, Ph.D.
  - (Materials Engineering) MIT
- Robert Thompson
  - (Forensic Science) NIST

http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis

AAAS Reports to Be Issued Soon...

First reports expected in early 2016

Recent NSF/NIJ-Funded Workshop

- Meeting was held at the AAAS headquarters (Washington, DC) on May 26-27, 2015: proceedings are forthcoming
- Some relevant articles:
  - "Impact of forensic literature on the admissibility process" (Michael T. Ambrosino)
  - "Policy implications of inadequate literature" (Ronald N. Kostoff)
  - "A quality and gap analysis: an AAAS forensic science literature project" (Deborah Runkle)
  - "How do we trust the scientific literature?" (Simon A. Cole)

Organization of Scientific Area Committees (OSAC) Activities

- OSAC is focused on aiding development of standards and best practices for the forensic science community and is not currently planning on performing evaluation of scientific literature
- However, practitioner feedback that arises during research gap analysis as part of the OSAC standards development activities will be documented, consolidated, and shared with the broader community. This research list will encompass inputs from the all of the 24 subcommittees and five Scientific Area Committees (SACs).
- For more information, see http://www.nist.gov/forensics/osac/osac-research-needs-assessments.cfm

Thank you for your attention!

- Acknowledgments:
  - Funding from NIST Special Programs
  - Office Forensic Science Program

Contact info:
john.butler@nist.gov
301-975-4049

John M. Butler

Other Activities p. 4