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

Introduction
The Information Services Office (ISO) at NIST analyzed the impact of NIST’s peer-reviewed forensic journal literature through citation analysis and network visualizations. ISO’s study informs the forensic research community where NIST has had some of the greatest impact.

Overview of NIST Research Publications
This analysis, based on a Web of Science (WoS) search, yielded 196 NIST forensic publications in 24 different research areas and 51 journal venues since 1978.

Methodology
A WoS database search identified NIST forensic publications for the years 1978-2014. ISO’s complex WoS search strategy used a variety of forensics-related keywords and included all NIST-authored articles in the WoS subject category Legal Medicine. The search included publications in the peer-reviewed literature (journals) while excluding most conference proceedings papers.

The network graph was created using Sci2 to extract the co-author network from the WoS search results. The network was then visualized using CiteSpace. Subdisciplines for the co-author network were assigned manually by studying the underlying papers for each author and identifying their predominant research field.

The colors represent different forensic subdisciplines. The most prevalent subdisciplines are population genetics (43%) and DNA fingerprinting (26%). This diagram shows the close relationship and frequent collaborations of authors in the fields of population genetics, DNA fingerprinting, and Standard Reference Materials (SRM). Authors in ballistics, nuclear forensics, and gunshot residue (GSR)/explosives co-author within their own field.

Collaborations within Forensic Disciplines
This co-author network shows the collaboration between authors who have published two or more papers together and their research fields. Each node represents an author, NIST or non-NIST, who has co-authored with a NIST scientist, and is sized to represent the number of citations the author has received. The largest node represents John Butler from NIST with 60 authored works and 2,276 citations.

Publication Impacts
NIST forensic publications have been cited 3,751 times since 1978. The most highly cited paper is “The development of reduced sized STR amplicons as tools for analysis of degraded DNA” by John M. Butler, Yin Shen, and Bruce R. McCord in 2003.

International Impacts
NIST forensic publications have been cited by authors from 113 different countries. They are cited most frequently by authors in China (224 papers), Germany (218 papers), and the United Kingdom (215 papers).

Conclusions and Recommendations
Forensics at NIST crosses many disciplines from legal medicine and chemistry to computer science and food science technology. This research and the resulting publications by NIST scientists have proven impact on the forensic research community as demonstrated through ISO’s study and findings.

While this study captured the majority of NIST’s forensics-related journal articles, it was not possible to identify each and every NIST paper due to the interdisciplinary nature of forensics.

In future studies ISO will further develop and refine its search strategy for identifying NIST forensic publications to broaden the scope of the search while carefully maintaining its accuracy. ISO also intends to study the forensic field as a whole to identify trends that will assist NIST in identifying future areas of research.

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