

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

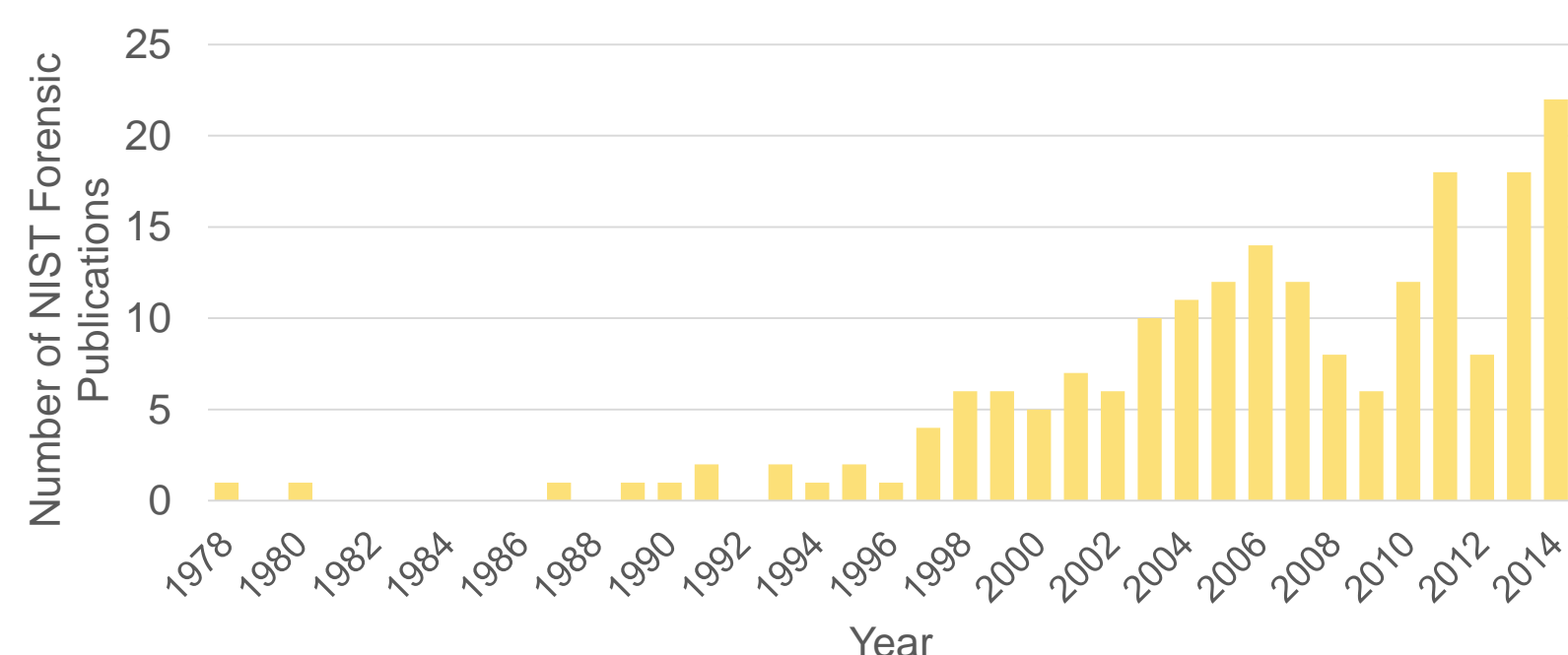
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Introduction

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 198 NIST forensic publications in 24 different research areas and 51 journal venues since 1978.



Methodology

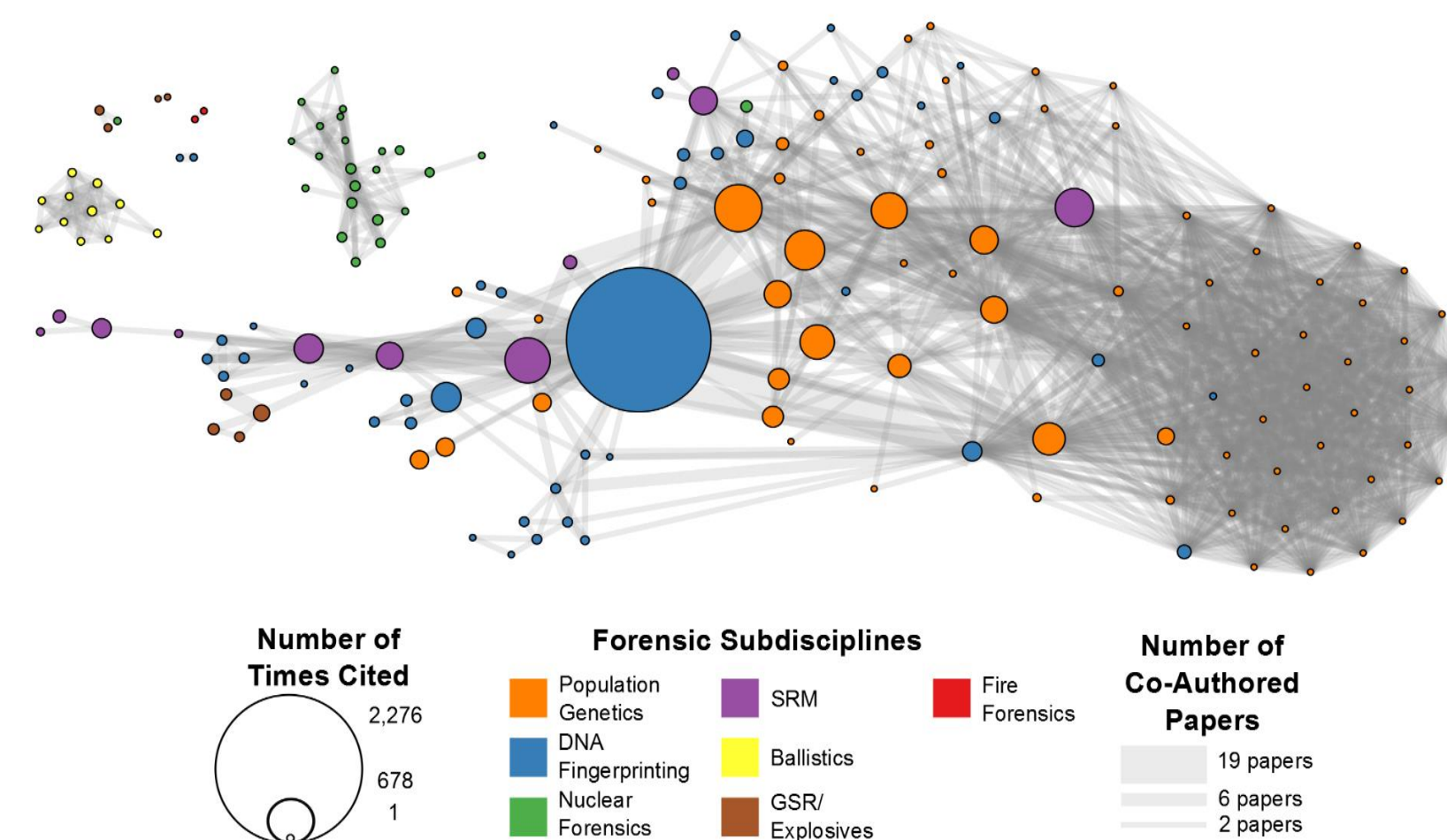
A *WoS* database search identified NIST forensic publications for the years 1978-2014. ISO's complex *WoS* search strategy used a variety of forensics-related keywords and included all NIST-authored articles in the *WoS* subject category Legal Medicine. The search included publications in the peer-reviewed 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 *Gephi*. Subdisciplines for the co-author network were assigned manually by studying the underlying papers for each author and identifying their predominant research field.

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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.



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.

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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.

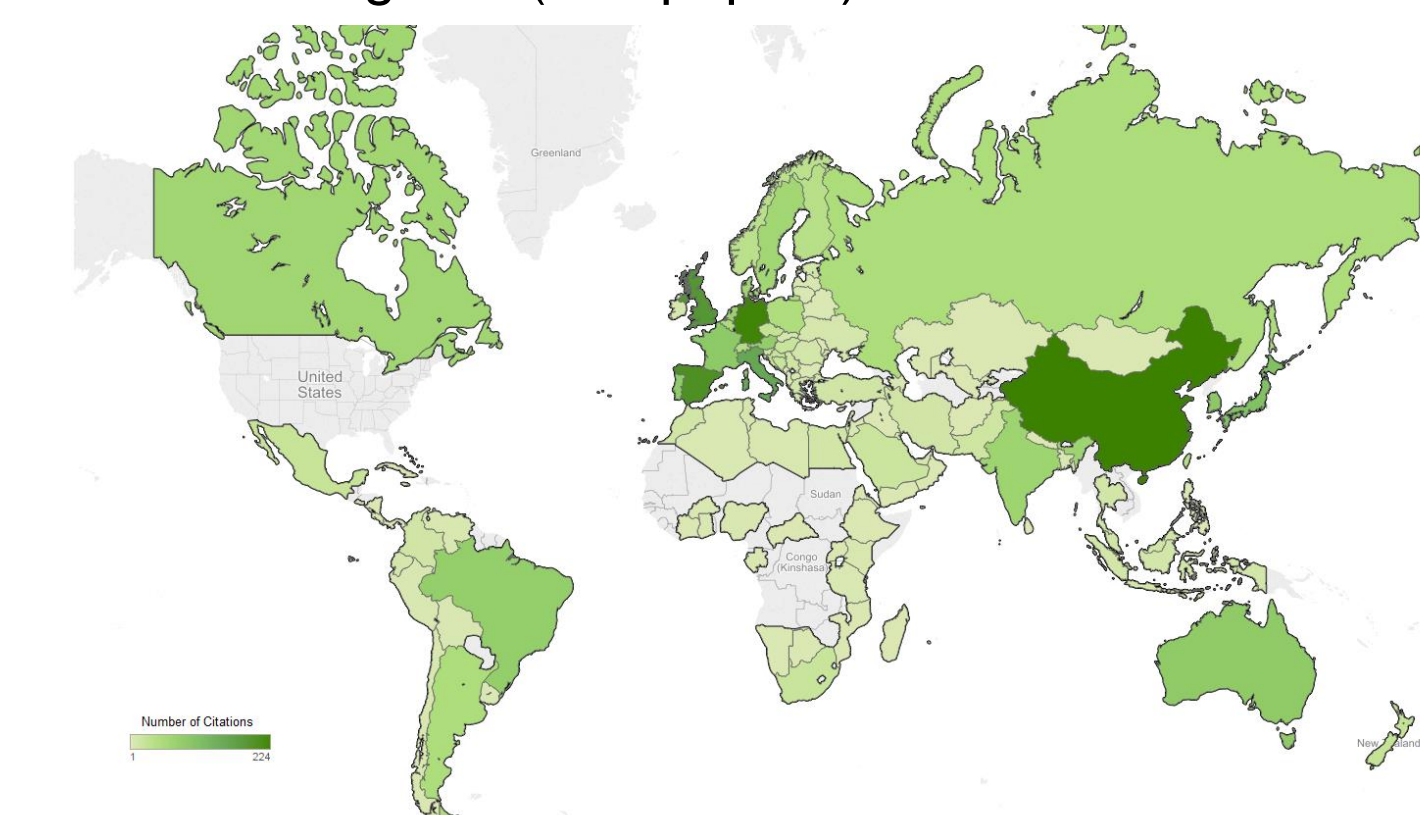
Journal Article Title	Times Cited
The development of reduced size STR amplicons as tools for analysis of degraded DNA, <i>Journal of Forensic Sciences</i> (2003)	189
DNA Commission of the International Society of Forensic Genetics (ISFG): An update of the recommendations on the use of Y-STRs in forensic analysis, <i>Forensic Science International</i> (2006)	176
Genetics and genomics of core short tandem repeat loci used in human identity testing, <i>Journal of Forensic Sciences</i> (2006)	169
Publication of population data for forensic purposes, <i>Forensic Science International: Genetics</i> (2010)	151
Characterization of new MiniSTR loci to aid analysis of degraded DNA, <i>Journal of Forensic Sciences</i> (2005)	127
A novel multiplex for simultaneous amplification of 20 Y chromosome STR markers, <i>Forensic Science International</i> (2002)	112
Forensic value of 14 novel STRs on the human Y chromosome, <i>Forensic Science International</i> (2002)	90
STRBase: a short tandem repeat DNA database for the human identity testing community, <i>Nucleic Acids Research</i> (2001)	86
A multiplex allele-specific primer extension assay for forensically informative SNPs distributed throughout the mitochondrial genome, <i>International Journal of Legal Medicine</i> (2004)	83
A sensitive denaturing gradient-gel electrophoresis assay reveals a high frequency of heteroplasmy in hypervariable region 1 of the human mtDNA control region, <i>American Journal of Human Genetics</i> (2000)	80

NIST forensic publications are cited by authors from 2,496 institutions and in 632 unique journals. They are cited most often by articles in *Forensic Science International: Genetics* with 408 citations and *Journal of Forensic Sciences* with 170 citations.

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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.