For High-Impact Forensics, The Clues Point to Europe

Featured Analyses, July/August 2011

Human genetic material is stored at a laboratory in Munich, May 2011. REUTERS/Michael Dald.

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by Christopher King

In the 16 years since *Science Watch* last surveyed the field of forensic science (January 1995), the technical and procedural intricacies of crime-scene investigation have become the basis of uncountable dramatic series on television. Now, albeit without the requisite TV trappings of rakish sunglasses, flashy editing, or a thudding rock soundtrack, we return for a look at the real of world of forensics as a scientific and academic discipline.

The table below in Tab 1 lists high-impact institutions in legal medicine and forensic science, according to total citations (left column) as well as citations per paper (or impact, at right), based on papers published and cited since 2001. High-impact authors are listed in Tab 2 below.

To identify these key players, *Science Watch* turned to the "legal medicine" journal-classification category employed in Thomson Reuters *Web of Knowledge*®. Papers published in the category's 11 specialty journals were augmented by pertinent reports that appeared in *Science*, *Nature*, the *New England Journal of Medicine*, and other multidisciplinary and general-medicine journals. In all, some 15,000 papers published between 2001 and early 2011 were culled.

One striking bit of evidence is immediately discernible in the table of institutions: a preponderance of entities situated in Western Europe. Germany's representation is particularly notable, with the universities of Münster, Hamburg, Bonn, Freiburg, Leipzig, Magdeburg, Mainz, and Kiel figuring prominently, along with the Institute of Legal Medicine and Forensic Sciences, representing the joint efforts of the Humboldt University of Berlin and the Free University of Berlin.

The Iberian Peninsula also has its champions: the University of Santiago de Compostela in Spain, and the University of Porto in Portugal.

The showing by the United States, meanwhile, is mostly confined to larger government institutions: the FBI (Federal Bureau of Investigation), the National Institute of Standards and Technology (NIST), the Armed Forces Institute of Pathology, and a municipal agency, the Office of Chief Medical Examiner (OCME) of the City of New York. Only Harvard University stands as a private academic institution.

A woman works with human genetic material at a laboratory in Munich, May 2011. REUTERS/Michael Dald.

Despite the dominance of European institutions, a couple of U.S.-based authors make a respectable showing atop the author listing (on the basis of citations per paper). The NIST's John M. Butler contributed to a 2003 report from the *Journal of Forensic Science*, "The development of reduced-size STR amplicons as tools for degraded DNA," 48: 1054-64, 2003; this paper has now been cited 100 times. ("STR," incidentally, stands for "short tandem repeat," denoting the patterns of repeating nucleotides that serve as the basis for much of the DNA profiling performed in forensics cases.)

Another U.S.-based author, Mechthild Prinz of the OCME in New York City, was among the coauthors on another highly cited report, "DNA Commission of the International Society of Forensic Genetics (ISFG): An update on the recommendations on the use of Y-STRs in forensic analysis" (*Forensic Sci. Int.*, 157: 187-97, 2006), now cited 94 times. This paper also boosted the impact scores for several of the researchers featured here, including the paper's first author, Leonor Gusmao, along with Manfred Kayser, Lutz Roewer, Niels Morling, and Peter M. Schneider.

All of those latter names, save for Morling, also contributed to another of the survey's blockbuster reports, "Online reference database of European Y-chromosomal short tandem repeat (STR) haplotypes," (*Forens. Sci. Int.*, 118: 106-13, 2001), now cited 112 times, with Cintia Alves, Angel Carracedo, Rudiger Lessig, Walther Parson, and Reinhard Szibor also among the coauthors.

Most cited of all is a 2003 report on "Virtopsy," an imaging method for "virtual autopsy" (M.J. Thali, *et al.*, *J. Forens. Sci.*, 48: 386-403, 2003), now cited 140 times. Kathrin Yen, Peter Vock, and Martin J. Sonnenschein were among the collaborators.

As a further evaluative metric, along with the authors' paper counts and cites-per-paper scores, the listing includes each researcher's "H-Index" for this specific selection of papers. The H-Index essentially represents a convergence of output and impact, conveying that the given author has *x* number of papers cited *x* or more times.

Among journals, *Forensic Science International* distinguishes itself as both the most prolific (4,258 reports during the roughly ten-year period) and the most cited (23,569). The *Journal of Forensic Sciences* is second in both categories, with 2,915 reports and 12,498 overall citations.

By the measure of impact (among journals publishing 25 or more papers), the *Journal of Legal Medicine* takes top honors, with 895 papers cited, on average, 8.61 times. And of the non-specialty journals whose pertinent papers were collected, the *British Medical Journal* was the most prolific in this regard, with 10 papers between 2001 and 2011.

And the ten most frequently occurring keywords, in descending order? "Forensic science," "identification," "DNA," "validation," "STR," "DNA typing," "urine," "drugs," "amplification," and, in a fitting conclusion, "death."

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Click tabs above to tables from article text.

Legal Medicine & Forensic Science, 2001 to 2011

(Left:listed by citations. Right: listed by citation impact)

Institution	Citations 2001-2011	Institution (>=35 papers)	Impact 2001-2011
Univ. Santiago de Compostela, Spain	1,954	University of Magdeburg	18.54
University of Münster	1,669	University of Vienna	18.03
Inst. Legal Medicine/Forensic Sci., Berlin	1,585	Natl. Inst. of Standards and Technology (U.S.)	17.83
FBI	1,309	Mainz University	14.51
Forensic Science Service (England, Wales)	1,283	University of Oslo	13.62
Innsbruck Medical University	1,261	Univ. Santiago de Compostela, Spain	13.20
Natl. Inst. of Standards and Technology (U.S.)	1,123	Inst. of Legal Medicine, Strasbourg	13.14
University of Porto, Portugal	1,120	University of Leipzig	12.85
University of Copenhagen	1,018	Inst. Legal Medicine/Forensic Sci., Berlin	12.78
University of Hamburg	995	Technical University of Dresden	12.70
University of Bern	939	University of Oxford	12.62
University of Bonn	850	Office of Chief Med. Examiner, NYC	12.60
University of Freiburg	849	Armed Forces Inst. of Pathology (U.S.)	12.25
University of Helsinki	830	Innsbruck Medical University	12.13
University of Leipzig	771	Ghent University	11.57
University of Lausanne	756	Forensic Science Service (England, Wales)	11.25
Harvard University	740	University of Copenhagen	10.83
University of Magdeburg	723	University of Cologne	10.67
Armed Forces Inst. of Pathology (U.S.)	686	Karolinska Institute	10.63
Inst. of Legal Medicine, Strasbourg	670	University of Porto, Portugal	10.37
Office of Chief Medical Examiner, NYC	668	University of Helsinki	10.12
University of Oslo	640	Linkoping University	9.70
University of Vienna	631	Kiel University	9.59
University of Technology, Sydney	628	University of Münster	9.48

Mainz University	624	University of Leicester	9.25

SOURCE: Thomson Reuters *Web of Knowledge*®

High-Impact Authors in Legal Medicine & Forensic Science, 2001 to 2011

(Listed by citations per paper, of authors who published >= 20 papers)

Name	Institution	Papers	H-Index	Cites per paper
John M. Butler	Nat. Inst. of Standards & Technology, U.S.	36	17	27.8
Mechthild Prinz	Office of Chief Medical Examiner, NYC	24	14	26.0
Manfred Kayser	Erasmus University, Rotterdam	23	11	25.2
Peter Gill	University of Strathclyde, U.K.	39	17	23.1
Peter Vock	University of Bern	26	13	21.5
Lutz Roewer	Inst. Legal Med. & Forensic Sci., Berlin	36	14	21.3
Kathrin Yen	Ludwig Boltzmann Inst., Graz, Austria	24	13	20.7
Martin J. Sonnenschein	University of Bern	23	13	20.1
Peter M. Schneider	University of Cologne	44	17	19.8
Thomas J. Parsons	Int'l. Comm. on Missing Persons	30	11	18.5
Sandra Hering	Technical University of Dresden	24	10	18.2
Olaf H. Drummer	Monash University, Australia	24	9	17.3
Reinhard Szibor	University of Magdeburg	40	15	16.9
Michael D. Coble	Nat. Inst. of Standards & Technology, U.S.	21	8	16.5
Jeanett Edelmann	University of Leipzig	33	13	15.9
Pascal Kintz	Inst. of Legal Medicine, Strasbourg	37	16	15.8
Niels Morling	University of Copenhagen	50	14	15.5
Harald Niederstätter	Innsbruck Medical University	23	10	15.4
Richard Dirnhofer	University of Bern	53	15	15.4
Cintia Alves	University of Porto, Portugal	34	14	15.2
Ángel Carracedo	Univ. Santiago de Compostela, Spain	104	21	14.8
Walther Parson	Innsbruck Medical University	85	20	14.0
Rüdiger Lessig	University of Leipzig	22	8	13.8
Leonor Gusmao	University of Porto	75	18	13.2
Maria V. Lareu	University of Santiago de Compostela	39	13	12.9

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