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Towards a Common Body of Knowledge for Forensic Genetics: the Most Valuable Publications List and the INTERPOL DNA Reviews

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Science is organized knowledge (Immanuel Kant)

Needs [1]

1. **An agreed upon, defined body of knowledge for DNA analysis and interpretation** and a means to update and remove outdated information as methods evolve
2. **Access to appropriate relevant literature** for DNA technical leaders and analysts
3. **Dedicated time in the workday to read the literature** so that DNA technical leaders and analysts can keep up-to-date with developments
4. **Uniformly documented knowledge assessment**
5. **A method to acknowledge competence in a specific area** to allow true expertise in testimony (e.g., DNA transfer and activity-level assessments)
6. **Additional training for DNA technical leaders in experimental design and data analysis** to assist with validation studies and protocol development

A common body of knowledge in forensic genetics is expected to benefit forensic scientists, students, and stakeholders. However, it is challenging to keep up with the thousands of publications in dozens of peer-reviewed journals that exist on the topic of forensic genetics. This ever-growing body of scientific literature becomes increasingly challenging to monitor, much less incorporate into forensic laboratory training programs. For case-working forensic scientists, understanding which research publications are most informative would be helpful. This is one of the reasons that the INTERPOL reviews are prepared and shared every few years (e.g., [2,3]). DNA technical leaders and analysts can benefit from receiving regular updates on useful articles and creation of lists of valuable articles in specific areas of interest to forensic DNA casework. An effort to identify and describe some of the most valuable publications (MVPs) in the field has also been made with the initial MVP list containing almost 500 informative publications across 26 topic categories. An evolving MVP list builds upon references cited in the July 2020 SWGDAM Training Guidelines [4] and has been revised in 2022 and 2024 so far [5].

References Cited

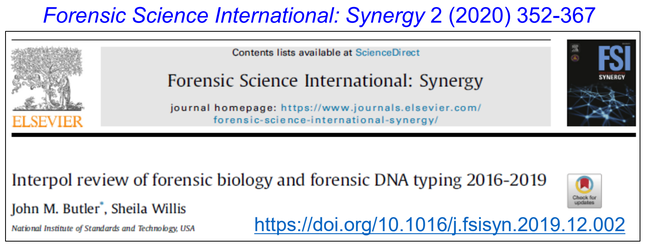
[1] Based on deliberations and discussions of NIST team members and Resource Group in connection with the scientific foundation review on DNA Mixture Interpretation (NISTIR 8351-draft, Appendix 2); see also *Forensic DNA Interpretation and Human Factors: Improving Practice Through a Systems Approach*, Chapter 9 "Education, Training, and Professional Credentialing", pp. 241-274. https://doi.org/10.6028/NIST.IR.8503
[2] Butler, J,M, and Willis, S. (2020) INTERPOL review of forensic biology and forensic DNA typing 2016-2019. *Forensic Sci. Int.: Synergy* 2:352-367. https://doi.org/10.1016/j.fsisyn.2019.12.002
[3] Butler, J.M. (2023) Recent advances in forensic biology and forensic DNA typing: INTERPOL review 2019-2022. *Forensic Sci. Int.: Synergy* 6:100311. https://doi.org/10.1016/j.fsisyn.2022.100311
[4] SWGDAM Training Guidelines (2020). Available at https://www.swgdam.org/publications
[5] See https://strbase.nist.gov/Information/Most_Valuable_Publications

INTERPOL
19th INTERPOL International Forensic Science Managers Symposium

2016 to 2019
12 topics covered
235 articles (FSIG=102)
35 journals
34 guidance documents

2019 to 2022
15 topics covered
773 articles (FSIG=240)
96 journals
70 guidance documents

Forensic Science International: Synergy 2 (2020) 352-367


Contents lists available at ScienceDirect
Forensic Science International: Synergy
journal homepage: https://www.journals.elsevier.com/forensic-science-international-synergy/
Interpol review of forensic biology and forensic DNA typing 2016-2019
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https://doi.org/10.1016/j.fsisyn.2019.12.002

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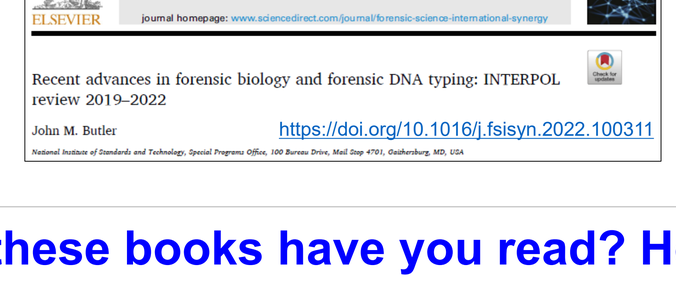
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Group	Most Valuable Publications Topic(s) Covered https://strbase.nist.gov/Information/Most_Valuable_Publications	# Articles 480 (2021)	85 (2022)	92 (2024)
A	Plain Language Guides to Forensic DNA Analysis	4	2	3
B	Serology and Body Fluid Identification	24	3	3
C	Collection and Storage of Biological Material	25	2	2
D	DNA Extraction/Purification, Differential Extraction	18	2	2
E	DNA Quantitation, Degraded DNA	10	2	2
F	PCR Amplification, Inhibition, and Artifacts	13	3	3
G	Capillary Electrophoresis Separation and Detection	12	2	2
H	Assessing Sample Suitability & Complexity, Low-Template	7	2	2
I	Estimating the Number of Contributors	12	4	4
J	Data Interpretation, Mixture Deconvolution, Interlaboratory Studies	12	4	5
K	Interpretation: Binary Approaches (CPI, RMP, LR)	11	5	5
L	Interpretation: Probabilistic Genotyping Software	44	4	6
M	Report Writing and Technical Review	8	4	4
N	Court Testimony, Communication, Juror Comprehension	22	5	5
O	Autosomal STR Markers and Kits	29	2	2
P	Mitochondrial DNA Testing	11	3	3
Q	Y-Chromosome and X-Chromosome Testing	17	4	4
R	DNA Databases and Investigative Genetic Genealogy	14	3	3
S	Statistical Analysis	11	2	2
T	Population Genetics	11	2	2
U	DNA Phenotyping (Ancestry, Appearance, Age)	24	2	2
V	New Technologies (Rapid DNA, Massively Parallel Sequencing)	35	5	5
W	DNA Transfer and Activity Level Reporting	57	8	10
X	Non-Human DNA Testing	15	2	2
Y	Method Validation, Quality Control, and Human Factors	23	5	5
Z	General Forensic Science Topics	11	3	4

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How many of these books have you read? How has this information advanced your understanding of the field?