

**XXIII CONGRESSO NACIONAL DE CRIMINALÍSTICA
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Armação dos Búzios
BRASIL**

<http://criminalistica2015.com.br/>

**Workshop on Bayesian reasoning for the evaluation of forensic evidence,
calculation of likelihood ratios as strength of evidence statements,
and testing of the validity and reliability of forensic analysis systems**

<http://forensic-evaluation.net/Brazil2015/>

PRESENTER:

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ABSTRACT:

In Europe there has been a great deal of concern about the logically correct way to evaluate the strength of forensic evidence. This year, 2015, the European Network of Forensic Science Institutes (ENFSI) has published the ENFSI Guideline for Evaluative Reporting in Forensic Science which recommends the use of the likelihood-ratio framework (aka the Bayesian framework). In the United States there has been a great deal of concern about the validity and reliability of forensic science, as stressed in the 2009 National Research Council Report to Congress. In England & Wales the Forensic Science Regulator is moving towards requiring validation of methods in all branches of forensic science – 2014 Codes of Practice. There is now increasing interest in these issues in Brazil and elsewhere in South America.

The presenter of this workshop promotes a paradigm for the evaluation of forensic evidence which addresses the concerns from both sides of the Atlantic, and which is applicable across all branches of forensic science. The paradigm includes: the calculation of likelihood ratios using relevant data, quantitative measurements, and statistical models; and empirical testing of the validity and reliability of forensic analysis systems under conditions reflecting those of the case under investigation. The presenter has previously presented workshops and tutorials on these topics in Asia, Australasia, Europe, and North America, at operational forensic laboratories and at academic venues, including at the 2012 European Academy of Forensic Science Conference.

The first part of the workshop at the XXIII NATIONAL CONGRESS ON CRIMINALISTICS will explain the logic of the likelihood-ratio framework in a way which is accessible to a broad audience and which does not require any prior knowledge about the framework. It uses intuitive examples and audience-participation exercises to gradually build a fuller understanding of the likelihood-ratio framework. The workshop also includes discussion of common logical fallacies. This part of the workshop should be of interest and accessible to lawyers as well as forensic scientists.

The second part will cover more advanced topics related to the calculation of likelihood ratios, calibration of likelihood ratios, and empirical testing of the validity and reliability of forensic analysis systems under conditions reflecting those of the case under investigation. The workshop is intended to be interactive, and so exactly which materials are covered and in what depth will be adjusted to suit the audience on the day. Participants are encouraged to ask questions and have discussions as the workshop goes along, and not to save questions to the end.

Participants will be provided with copies of the presentation slides in advance of the workshop, and will also be provided with copies of some of the presenter's publications. Participants are encouraged to read those publications before the workshop and come to the workshop with questions about what they have read and how they might be able to integrate the new paradigm into their own practice.

BIOGRAPHY:

Dr Morrison is an independent forensic consultant based in Vancouver, British Columbia, Canada. He is an Adjunct Associate Professor at the Department of Linguistics, University of Alberta. He has previously been Scientific Counsel, Office of Legal Affairs, INTERPOL General Secretariat; Director of the Forensic Voice Comparison Laboratory, School of Electrical Engineering, University of New South Wales; a Subject Editor for the journal *Speech Communication*; and Chair of the Forensic Acoustics Subcommittee of the Acoustical Society of America. He has authored 50 refereed and invited academic publications, and has conducted research in collaboration with police services in Australia and in Europe. He has worked on forensic casework in Australia and in the United States, and has worked at the behest of both the prosecution and the defence. Earlier this year, 2015, he advised defence council in a US Federal Court Daubert hearing on the admissibility of a forensic analysis proffered by the prosecution.

BIBLIOGRAPHY:

The following are recommended readings in recommended reading order. The readings are not required, but they should help increase your understanding of the topics of the workshop if you read them before or after the workshop, or both before and then again after the workshop. Different people have different learning styles, and different amounts of time available. Read as few or as many as you like.

Morrison, G. S. (2010). Forensic voice comparison. In I. Freckelton, & H. Selby (Eds.), *Expert Evidence* (Ch. 99). Sydney, Australia: Thomson Reuters. Stable URL: <http://expert-evidence.forensic-voice-comparison.net/>

Sections 99.10 through 99.400 provides an introduction to the likelihood ratio framework for the evaluation of evidence. It is intended for a broad audience, and is applicable across different branches of forensic science, not just forensic voice comparison. Unless you are interested in forensic voice comparison in particular, don't read the rest. This publication is somewhat dated, and there are things I would change in a revised version, but as yet I haven't had time to write one.

Morrison, G. S. (2012). The likelihood-ratio framework and forensic evidence in court: A response to R v T. *International Journal of Evidence and Proof*, 16, 1–29. doi:10.1350/ijep.2012.16.1.390

Morrison, G. S., & Stoel, R. D. (2014). Forensic strength of evidence statements should preferably be likelihood ratios calculated using relevant data, quantitative measurements, and statistical models – a response to Lennard (2013) Fingerprint identification: How far have we come? *Australian Journal of Forensic Sciences*, 46, 282–292. doi:10.1080/00450618.2013.833648

Morrison, G. S. (2011). Measuring the validity and reliability of forensic likelihood-ratio systems. *Science & Justice*, 51, 91–98. doi:10.1016/j.scijus.2011.03.002

Morrison, G. S. (2014). Distinguishing between forensic science and forensic pseudoscience: Testing of validity and reliability, and approaches to forensic voice comparison. *Science & Justice*, 54, 245–256. doi:10.1016/j.scijus.2013.07.004

The last one is mostly specific to forensic voice comparison, but the principles are applicable across different branches of forensic science.

Only if we have time and there is sufficient interest, the latter part of the workshop may include discussion of score based methods for calculating likelihood ratios. The following are relevant. The second one is long, don't read it in detail unless you are really interested in the topic.

Morrison, G. S. (2013). Tutorial on logistic-regression calibration and fusion: Converting a score to a likelihood ratio. *Australian Journal of Forensic Sciences*, 45, 173–197. doi:10.1080/00450618.2012.733025

Morrison, G. S. (2015). Calculation of forensic likelihood ratios: Use of Monte Carlo simulations to compare the output of score-based approaches with true likelihood-ratio values. *Research Report*. <http://geoff-morrison.net/#ICFIS2014>

If you are interested in forensic voice comparison:

Enzinger, E., Morrison, G. S., & Ochoa, F. (2015). A demonstration of the application of the new paradigm for the evaluation of forensic evidence under conditions reflecting those of a real forensic-voice-comparison case. *Science & Justice*. doi:10.1016/j.scijus.2015.06.005