Proposal to form a Forensic Acoustics Technical Speciality Group within the Acoustical Society of America

Introduction

The popularity of TV shows such as *Law & Order* and *CSI* has lead to much public interest in forensic science, but in the scientific community there is great concern over validity and reliability in many branches of forensic science. In February 2009 the National Research Council (NRC) *Report to Congress on Strengthening Forensic Science in the United States* http://www.nap.edu/catalog.php?record_id=12589 found that:

> "[S]ome forensic disciplines are supported by little rigorous systematic research to validate the discipline's basic premises and techniques. There is no evident reason why such research cannot be conducted" (p. 22).
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> "The development of scientific research, training, technology, and databases associated with DNA analysis have resulted from substantial and steady federal support for both academic research and programs employing techniques for DNA analysis. Similar support must be given to all credible forensic science disciplines if they are to achieve the degrees of reliability needed to serve the goals of justice." (p. 13)

The NRC Report also urged that procedures be adopted which include "quantifiable measures of the reliability and accuracy of forensic analyses" (p. 23), and "the conducting of validation studies of the performance of a forensic procedure" (p. 121).

To promote research of this sort within the field of forensic acoustics, we propose the formation of a ***Forensic Acoustics Technical Speciality Group*** within the Acoustical Society of America (ASA).

Proposed scope for the proposed Forensic Acoustics Group

The scope of the group includes (but is not restricted to):

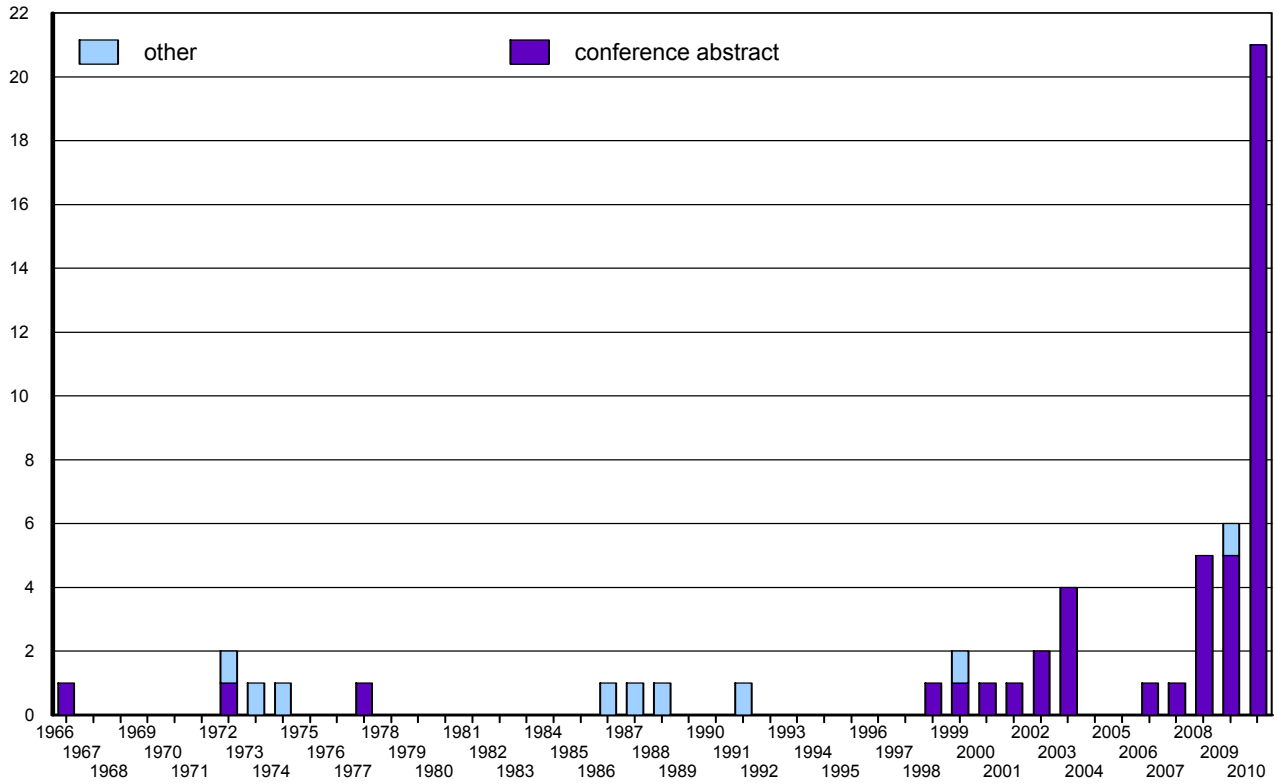
- Promotion of research on forensic analysis of audio recordings of acoustic events, e.g., voice recordings, gunshot recordings.
- Promotion of research on increasing the validity and reliability of forensic analysis of audio recordings including research on the extraction of information from the acoustic signal and on statistical modeling of acoustic data.
- Promotion of research on scientifically valid and transparent approaches to the evaluation and presentation of forensic-acoustics evidence.
- Promotion of research on audio clean-up for enhanced intelligibility and subsequent forensic processing.
- Promotion of research on authentication of audio recordings.
- Promotion of research on other issues related to forensic acoustics.
- Promotion of the collection of databases of audio recordings appropriate for forensic research and casework applications.
- Development of best-practice guidelines / standards for forensic acoustics.

Why form a Forensic Acoustics Group with in the ASA?

The proposed Forensic Acoustics Group would organize a special session on forensic acoustics at least once per year at an ASA Meeting. It would also encourage members to submit papers on forensic acoustics to the *Journal of the Acoustical Society of America* (JASA), and provide a pool of referees and potentially be able to provide an associate editor in this area. The proposed Forensic Acoustics Group could potentially attract new members to the ASA and raise the ASA's public profile.

There is increasing interest in forensic acoustics within the ASA: At the 146th Meeting of the ASA in November 2003 in Austin, Texas, a Special Session on Forensic Acoustics consisted of eleven oral papers. At the 2nd Pan-American/Iberian Meeting on Acoustics (160th Meeting of the ASA), November 2010, Cancún, Mexico, there was a Tutorial and a Special Session on Forensic Voice Comparison and Forensic Acoustics http://cancun2010.forensic-voice-comparison.net/. The special session consisted of eight lecture presentations and ten posters. 64 people attended the tutorial, approximately 50 attended the special-session lecture presentations and approximately 70 attended the special-session poster presentations.

The figure below provides a bar graph of counts of conference abstracts and other publications published between 1966 and 2010 in JASA, obtained via a search of the term "forensic*" in abstracts, titles, and keywords.



There are at least three other organizations whose areas of interest overlap with the proposed ASA Forensic Acoustics Group: The International Association for Forensic Phonetics and Acoustics (IAPFA) http://www.iafpa.net/ organizes an annual conference and has the *International Journal of Speech, Language and the Law* (IJSLL) as its official journal. The majority of its members are phoneticians based in Europe (17 of its 19 conferences so far have been held in Europe and it rejected a proposal to hold its 2011 conference outside Europe in favor of another European venue). The International Speech Communication Association (ISCA) http://www.isca-speech.org/ had a Tutorial, a Keynote Address, and a Special Session on Forensic Voice Comparison at its Interspeech Conference in Brisbane, Australia, in September 2008. Research on forensic voice comparison is otherwise occasionally presented at its annual Interspeech conference and its biannual Odyssey Speaker and Language Recognition Workshop. Most members of the association are signal-processing engineers and most research presented at the Interspeech conference and Odyssey workshops is not focused on forensic applications. The Audio Engineering Society (AES) http://www.aes.org/ held a conference on Audio Forensics in Denver, Colorado, in July 2005 and June 2008, and another in Hillerød, Denmark, in June 2010. None of these organizations offers the same opportunities as the proposed ASA Forensic Acoustics Group would in terms of a yearly usually North American meeting, a venue for exchange of ideas on acoustic-phonetic and signal-processing approaches to forensic acoustics (the ASA has well established Speech Communication and Signal Processing in Acoustics Technical Committees), and a top-ranked refereed publication venue (JASA).

Meeting to propose and organize the Forensic Acoustics Group / Proposed organizing committee

A meeting to propose and organize the Forensic Acoustics Group was held at 7:30 on Tuesday 16 November 2010 at the 2nd Pan-American/Iberian Meeting on Acoustics. There were approximately 20 people in attendance.

If approved, the group would plan to organize a special session at the San Diego Meeting, October–November 2011.

The following people were elected as the organizing committee of the proposed group (candidates statements are appended at the bottom of this document.

• Geoffrey Stewart Morrison, Chair (initial three-year term)

• James Douglas Harnsberger, Vice-Chair (initial two-year term)

• Joseph P. Campbell, Chair (initial one-year term)

Signatures

The establishment of the Forensic Acoustics Technical Speciality Group is a decision made by the ASA Executive Council. The petition to Council requires the signatures of 50 persons, at least 25 of whom are current members of the ASA (see Rules of the ASA, §18).

At time of writing (November 18, 2010, 08:15) we have collected at total of 70 signatures (36 from members and 34 from non-members).

As of 19 November 2010 the signature count was 74 (38 members and 36 non-members). The formation of the group was discussed at the Signal Processing Technical Committee meeting on 17 November, the Speech Communication Technical Committee meeting on 18 November, and the Technical Council meeting on 19 November. A recommendation was made to the Executive Council that the Forensic Acoustics Group be formed as a subcommittee of the Speech Communication Technical Committee while still maintaining its scope of covering forensic acoustics in general.

Statements of candidates for organizing committee

Geoffrey Stewart Morrison BSc MTS MA PhD

Director, Forensic Voice Comparison Laboratory, School of Electrical Engineering & Telecommunications, University of New South Wales, Sydney, New South Wales, Australia

Invited Lecturer, Judicial Phonetics Specialization, Master of Phonetics and Phonology Program, Consejo Superior de Investigaciones Científicas / Universidad Internacional Menéndez Pelayo, Madrid, Spain.

Adjunct Associate Professor, Department of Linguistics, University of Alberta, Edmonton, Alberta, Canada.

Dr. Morrison is lead investigator in a major research project aimed at making forensic voice comparison of demonstrable validity and reliability a practical everyday reality in Australia (funding from the Australian Research Council, Australian Federal Police, National Institute of Forensic Science Australia, and Australasian Speech Science and Technology Association). He is also involved in research projects based in the United States, Spain, and China. His publications include Morrison, G.S. (2009) Likelihood-ratio forensic voice comparison using parametric representations of the formant trajectories of diphthongs, *Journal of the Acoustical Society of America, 125*, 2387–2397; Morrison, G.S. (2009) Forensic voice comparison and the paradigm shift, *Science & Justice, 49*, 298–308; and Morrison, G.S. (2010) Forensic voice comparison, in I. Freckelton, & H. Selby (Eds.), *Expert Evidence* (Ch. 99), Sydney, Australia: Thomson Reuters. More information about his research can be found at http://geoff-morrison.net, http://forensic-voice-comparison.net, and http://forensic.unsw.edu.au.

In 2009–2010 he was Chair of the Subcommittee on the Scope of the ASA's Speech Communication Technical Committee. He is a Past President of the Association of Canadian Teachers in Japan. He organized a Tutorial and Special Session on Forensic Voice Comparison at Interspeech 2008, and is organizer of the Tutorial and a Special Session on Forensic Voice Comparison and Forensic Acoustics at the 2nd Pan-American/Iberian Meeting on Acoustics.

If elected a Chair of the organizing committee of the proposed ASA Forensic Acoustics Technical Speciality Group he will use the position to promote the adoption of the new paradigm for forensic science in forensic-voice-comparison research and practice. The new paradigm consists of objective quantitative data-based implementation of the likelihood-ratio framework (the same framework as is standard for DNA-profile comparison) and quantitative assessment of the validity and reliability of forensic-comparison systems under conditions reflecting those of the case at trial.

James Douglas Harnsberger PhD

Director, Speech Perception Laboratory, Department of Linguistics, University of Florida, Gainesville, FL

Assistant Professor, Department of Linguistics, University of Florida, Gainesville, FL.

Dr. Harnsberger's research concerns the perception and learning of the linguistic and indexical properties of speech, and the application of this knowledge for forensic purposes. In particular, his work with his colleague Prof. Harry Hollien on voice stress, deception, and commercial applications (funded by the Department of Defense) has been published in the Journal of Forensic Sciences and has been featured in the popular press (ABC News Primetime, Science News, BBC Radio). Dr. Harnsberger has several years experience in forensic phonetics, consulting on a wide range of cases, including speaker identification, tape

authentication, and a variety of voice analyses. At the University of Florida, he developed a senior undergraduate level course in "Forensic Applications of Speech Science" and has overseen/oversees five honors/graduate theses in forensic phonetics. He currently serves as president of the Florida Acoustical Society of America and has served in numerous leadership positions in local community organizations. If elected to the organizing committee of the proposed ASA Forensic Acoustics Technical Speciality Group he will promote the adoption of standards in forensic voice identification, analog and digital audio authentication, and in the analysis of nonspeech acoustic evidence.

Joseph P. Campbell BS MS PhD

Assistant Leader, Human Language Technology Group, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Massachusetts, United States of America

Dr. Campbell conducts speech-processing research and specializes in speaker recognition, evaluation and corpus design, biometrics, and forensics. Before joining Lincoln Laboratory as a senior member of the technical staff, he served 22 years at the National Security Agency (NSA). From 1979 to 1990, Dr. Campbell was a member of NSA's Narrowband Secure Voice Technology research group. He and his teammates developed the first DSP-chip software modem and LPC-10e, which enhanced the Federal Standard 1015 voice coder and improved US and NATO secure voice systems. He was the Principal Investigator and led the US Government's speech coding team in developing the CELP voice coder, which became Federal Standard 1016 and is the foundation of digital cellular and voice over the Internet telephony systems. From 1991 to 1998, Dr. Campbell was a senior scientist in NSA's Biometric Technology research group, where he led voice verification research. From 1994 to 1998, he chaired the Biometric Consortium, the US Government's focal point for research, development, test, evaluation, and application of biometric-based personal identification and verification technology. From 1998 to 2001, he led the Acoustics Section of NSA's Speech Research branch, conducting and coordinating research on and evaluation of speaker recognition, language identification, gender identification, and speech activity detection methods.

Dr. Campbell taught Speech Processing at The Johns Hopkins University (1991–2001) and was an Associate Editor of the *IEEE Transactions on Speech and Audio Processing* (1991–1999), an IEEE Signal Processing Society Distinguished Lecturer (2001–2002), a member of the IEEE Signal Processing Society's Board of Governors (2002–2004), and a coeditor of *Digital Signal Processing* journal (1998–2005). He is currently a Chair of the International Speech Communication Association's Speaker and Language Characterization Special Interest Group (ISCA SpLC SIG) and Vice President of Technical Activities of the IEEE Biometrics Council. Dr. Campbell is a member of the National Academy of Sciences' Whither Biometrics? Committee, the IEEE Jack S. Kilby Signal Processing Medal Committee, and the IEEE Information Forensics Security Technical Committee. He is a member of Sigma Xi, the International Speech Communication Association, the Boston Audio Society, and the Acoustical Society of America. Dr. Campbell was named a Fellow of the IEEE "for leadership in biometrics, speech systems, and government applications" in 2005.