BEK TEK LLC

Forensic Audio/Video/Image Consultants

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David J. Leviss, Esq.
O'Melveny & Myers LLP
1625 I Street, N.W.
Washington, D.C. 20006

Dear Attorney Leviss:

My name is Douglas S. Lacey, and I am the owner of BEK TEK LLC, a company specializing in the forensic analyses of audio recordings, video recordings, and digital still images. I have worked in these fields since September 1996, when I was hired as an Electronics Engineer/forensic audio examiner with the Federal Bureau of Investigation's forensic audio/video/image unit located in Quantico, Virginia. In June 2003, I left the FBI and began working full-time in the private sector as an associate of BEK TEK LLC, then owned by my colleague Mr. Bruce Koenig. In my career, I have conducted forensic examinations of over 3,250 separate audio and video recordings in over 900 criminal, civil, and administrative matters, and have testified in the fields of audio intelligibility enhancement, video enhancement, audio and video authenticity, and signal analysis. I have authored/co-authored 21 peer-reviewed publications related to various research topics and case reports. Attached is my curriculum vitae, setting forth more details about my qualifications and professional experience.

I have been asked to elaborate on what materials and information would need to be provided to a forensic video/audio examiner in order for him/her to conduct proper forensic video authenticity examinations of video/audio recordings, and to provide information or clarification regarding what constitutes "source footage" from one or more undercover recording devices.

In order to obtain meaningful, scientific results from forensic authenticity examinations of video/audio recordings, it is required that all alleged original recordings, particularly those made contemporaneously, and all alleged recording device(s) and peripheral devices (e.g., external microphones) used for the original recording processes be provided for examination. An original recording is one that was made simultaneously with the occurrences of the visual and aural information which it depicts, and that exists in the native format of the recording device.

Production of the alleged recording device(s) is especially important in the situation where the alleged original recordings are digital video/audio files (and not analog or digital tapes) and still reside on internal, non-removable storage of the recording

device(s). Furthermore, the alleged recording device(s) and peripheral devices, and/or ones of identical make(s)/model(s)/configurations, must be used for the production of test recordings for purposes of comparison with the alleged original recordings.

If the alleged original recordings were made directly to removable digital media (e.g., memory cards) and not stored on the internal memory of the alleged recording device(s), then the all of actual removable digital media which contain alleged original recordings must be provided for analysis.

If the alleged original recordings are no longer present on the recording devices or removable media, then verifiable, bit-for-bit copies of the original video/audio files must be provided. These verifications are typically conducted through the use of mathematical hash values which uniquely identify the contents of a file; changing a single "bit" (a 1 or a 0) in a digital file will result in a completely different hash value, meaning that the source file and the copied file are no longer bit-for-bit identical.

Whatever the case may be, converted copies of the alleged original recordings to other file formats, video encoding schemes, and/or audio encoding schemes are not acceptable for forensic authenticity examinations. No scientifically meaningful results can be reached through the analyses of converted copies. This is a widely-held tenet in the fields of forensic audio and video, and would be akin to attempting to authenticate a paper document based on a faxed copy, or an original Microsoft Word document file based a PDF conversion of that file.

Generally speaking, "source footage" would be comprised of all of the alleged original recordings, as defined above. These recordings should be provided in one of the following ways:

(1) On the alleged original recording devices' internal storage onto which they were originally recorded and stored in their native file format;

(2) On the removable digital media onto which they were originally recorded and stored in their native file format;

(3) On separate digital media as part of complete, verifiable forensic images of each of the recording devices' internal storage and/or removable digital media, with complete logs of the forensic imaging processes to include, but not limited to, the mathematical hash values of the source media prior to and following the imaging processes (a forensic image is a bit-for-bit copy of the entire data contents of a piece of digital media); and/or

(4) On separate digital media as bit-for-bit copies of the individual, alleged original recordings in their native format, with complete logs or written explanations of how the bit-for-bit copying processes were conducted from the alleged original recording devices/removable digital media/other digital media to the

provided separate digital media, to include, but not limited to, the mathematical hash values of the individual files prior to and following the imaging processes.

To reiterate, converted copies of recordings in their entirety or as compilations/montages of segments edited together from one or more original recordings do not constitute "source footage". These types of converted files cannot be scientifically authenticated, because conversion of the file format and video/audio encoding schemes almost always result in the removal of file metadata information crucial to the forensic authentication examination, the addition of file metadata information unrelated to the original recording, and the degradation and/or modification of the recorded video and audio information. All of these artifacts hinder a forensic examiner's ability to render scientific conclusions.

If you have any questions regarding the above or the attachment, please do not hesitate to contact my office. Thank you for your attention in this matter.

Sincerely yours,

Douglas S. Lacey

Douglas S. Lacey

Attachment (1)

BEK TEK LLC

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Bruce E. Koenig
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CURRICULUM VITAE OF DOUGLAS S. LACEY

Professional Positions

August 2014 – Present BEK TEK LLC, Stafford, Virginia. Owner, private consultant, examiner, and researcher. Conducts forensic examinations of audio and video media (analog and digital) and digital images, including authentication of recordings/images, intelligibility/visual enhancement, identification/classification of non-voice signals, voice comparison, digital data retrieval/analysis, metadata analysis, and other related examinations. Presents expert testimony and assists attorneys with preparing for cross-examination of opposing experts. Evaluates appropriate recording and analysis equipment. Conducts research in forensic audio/video/image analysis related fields and authors/co-authors peer-reviewed papers and other publications.

October 1999 – July 2014 DL Technology LLC, Fredericksburg, Virginia. Private consultant, examiner, and researcher for BEK TEK LLC (Clifton, Virginia). Conducted forensic examinations of audio and video media (analog and digital) and digital images, including authentication of recordings/images, intelligibility/visual enhancement, identification/classification of non-voice signals, voice comparison, digital data retrieval/analysis, metadata analysis, and other related examinations. Presented expert testimony and assisted attorneys with preparing for cross-examination of opposing experts. Evaluated appropriate recording and analysis equipment. Conducted research in forensic audio/video/image analysis related fields and authored/co-authored peer-reviewed papers and other publications.

September 1996 – June 2003 Federal Bureau of Investigation (FBI), Quantico, Virginia. Electronics Engineer / Forensic Examiner. Conducted examinations of audio recordings produced or collected by federal, state, local, and foreign law enforcement and judicial agencies. These examinations included authentication of recordings, intelligibility enhancement, identification and classification of non-voice signals, digital data retrieval/analysis, and other related examinations. Additional duties included the presentation of expert testimony in criminal matters, support to FBI field offices and other law enforcement agencies regarding technical assistance pertaining to audio recordings, and training of FBI personnel in the analysis of proprietary digital recording devices. Held a full-field, TOP SECRET clearance for the entirety of the employment.

Certifications

Certified Forensic Video Examiner (IAI, August 2014 to August 2019)

Certified Cyber Forensics Professional (CCFP℠) [(ISC)², July 2013 to July 2016]

Formal Education

Bachelor of Science Degree, University of Miami, major of Electrical Engineering (Audio Engineering Program)

Additional undergraduate courses at the University of Florida

Work and Testimony Experience

Have conducted examinations on over 3,250 separate audio and video recordings in over 900 criminal, civil, and administrative matters, which include submissions from 45 states, the District of Columbia, Canada, Chile, Colombia, Croatia, Indonesia, Italy, the Netherlands, Puerto Rico, Romania, Singapore, Turkey, and the United Kingdom.

Have testified as an expert in the fields of audio intelligibility enhancement, video enhancement, audio and video authenticity, and signal analysis in federal and state courts and depositions in Arizona, California, Delaware, Illinois, Maryland, Minnesota, Mississippi, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, Washington, D.C., West Virginia, and in front of the Ukrainian Parliament.

Have conducted forensic examinations in numerous significant investigations/cases, including: the data recovery and intelligibility enhancement of the cockpit voice recording from United Airlines Flight 93, which crashed in Shanksville, PA on September 11, 2001; the authenticity analysis of the Linda Tripp/Monica Lewinsky telephone recordings involving the investigation of President William J. Clinton; the analysis of digital recordings related to the Washington D.C.-area sniper shootings; the authenticity examination of digital audio recordings from the office of former Ukrainian President Leonid Kuchma; the audio and image enhancement analyses plus transcription preparation in the Duke University Lacrosse Team case; the authenticity analysis of audio microcassette recordings in the Canadian Prime Minister Stephen Harper vs. The Liberal Party of Canada civil case; the authenticity examination of recordings surrounding the Texaco obstruction of justice investigation; and the authenticity examination of a recording related to the Abner Louima police brutality investigation.

Specialized Short Courses and Professional Training

ABCs of Video & Digital Technology, presented by the Sony Training Institute, in Lanham, MD

Advanced Forensic Audio Processing Techniques, presented by Digital Audio Corporation, Inc., in Raleigh, NC

FBIRD Training, presented by Adaptive Digital Systems, Inc., in Quantico, VA

FBIRD Training (Personalized Instruction), presented by Adaptive Digital Systems Inc., in Irvine, CA

Specialized Short Courses and Professional Training (continued)

Fast Fourier Analysis, presented by Signal Processing Systems, in San Diego, CA

File Systems Revealed, presented by X-Ways Software Technology AG, in Seattle, WA

Forensic Audio Filtering and Tape Enhancement, presented by Digital Audio Corporation, Inc., in Quantico, VA

Forensic Authentication of Digital Audio workshop, presented by the National Center for Media Forensics, University of Colorado, Denver, CO

Forensic Authentication of Digital Images, presented by the National Center for Media Forensics, University of Colorado, Denver, CO

Forensic Image and Video Processing, presented at the American Academy of Forensic Sciences, in San Antonio, TX

Image and Video Processing Using MATLAB, presented by MathWorks, in Vienna, VA

Innovation in Forensic Image and Video Analysis, presented at the American Academy of Forensic Sciences, in Atlanta, GA

New Professional Core Curriculum Training Program, *Phases I and II*, presented by the Federal Bureau of Investigation, in Quantico, VA

Principles of Acoustics and the Measurement of Sound, presented by Brüel & Kjær, in Livonia, MI

Principles of Vibration Measurement and Analysis, presented by Brüel & Kjær, in Livonia, MI

R-DAT Format Training, presented by Sony Corporation, in Quantico, VA

Signal and Image Processing and Analysis for Scientists and Engineers, presented by Applied Technology Institute, in Laurel, MD

Spectrum Analysis of Sound & Vibration, presented by Brüel & Kjær, in Livonia, MI

Technical Recovery of Electronic Evidence, presented by Computer Security Institute, in Rancho Cucamonga, CA

Video Analyst System Training, presented by Intergraph, in Huntsville, AL

Video Capture, Enhancement and Analysis, presented by The Institute for Forensic Imaging (in association with Indiana University and Purdue University), Indianapolis, IN
X-Ways Forensics, presented by X-ways Software Technology AG, in Seattle, WA

Peer-Reviewed Publications

Koenig, Bruce E.; Lacey, Douglas S. Forensic Authentication of Digital Audio and Video Files, which will be a chapter in the book tentatively entitled *Handbook of Digital Forensics of Multimedia Data and Devices*. Peer reviewed and accepted for inclusion in the book, with an expected publication date of September/October **2015**.

1. Koenig, Bruce E.; Lacey, Douglas S. The Average Direct Current Offset Values for Small Digital Audio Recorders in an Acoustically Consistent Environment. *Journal of Forensic Sciences* **2014**, 59(4), pp 960-966.

2. Lacey, Douglas S; Koenig, Bruce E. The Effect of Sample Length on Cross-Correlation Comparisons of Recorded Gunshot Sounds. *The Proceedings of the AES 54th International Conference* **2014**, pp 122-129.

3. Koenig, Bruce E.; Lacey, Douglas S. Forensic Authenticity Analyses of the Metadata in Re-Encoded WAV Files. *The Proceedings of the AES 54th International Conference* **2014**, pp 77-84.

4. Koenig, Bruce E.; Lacey, Douglas S.; Reimond, Christina E. Selected Characteristics of MP3 Files Re-Encoded With Audio Editing Software. *Journal of Forensic Identification* **2014**, 64(3), pp 304-321.

5. Koenig, Bruce E.; Lacey, Douglas S.; Grigoras, Catalin; Price, Suzana Galić; Smith, Jeff M. Evaluation of the Average DC Offset Values for Nine Small Digital Audio Recorders. *Journal of the Audio Engineering Society* **2013**, 61(6), pp 439-448.

6. Koenig, Bruce E.; Lacey, Douglas S. Forensic Authenticity Analyses of the Header Data in Re-Encoded WMA Files From Small Olympus Audio Recorders. *Journal of the Audio Engineering Society* **2012**, 60(4), pp 255-265.

7. Koenig, Bruce E.; Lacey, Douglas S.; Richards, Gerald B. Video Frame Comparisons in Digital Video Authenticity Analyses. *Journal of Forensic Identification* **2012**, 62(2), pp 165-182; 62(3), p 89.

8. Lacey, Douglas S.; Koenig, Bruce E. Identification of Identical and Nearly-Identical Frames from a Lawmate PV-500 Digital Video-Audio Recorder. *Journal of Forensic Identification* **2012**, 62(1), pp 36-46.

9. Koenig, Bruce E.; Lacey, Douglas S. An Inconclusive Digital Audio Authenticity Examination: A Unique Case. *Journal of Forensic Sciences* **2012**, 57(1), pp 239-245.

10. Lacey, Douglas S.; Koenig, Bruce E. Audio Extraction from Silicor Technologies' Digital Video Recorder File Format. *Journal of Forensic Identification* **2010**, 60(5), pp 573-588.

11. Koenig, Bruce E.; Lacey, Douglas S. Evaluation of Clipped-Sample Restoration Software. *Forensic Science Communications* **2010**, 12(2). LINK

12. Koenig, Bruce E.; Lacey, Douglas S. Forensic Authentication of Digital Audio Recordings. *Journal of the Audio Engineering Society* **2009**, 57(9), pp 662-695.

Peer-Reviewed Publications (continued)

13. Koenig, Bruce E.; Lacey, Douglas S. Distinctiveness of Non-Standard VHS Head Parameters. *Journal of Forensic Identification* **2009**, 59(1), pp 97-126.

14. Lacey, Douglas S.; Koenig, Bruce E. Identification of an Eccentricity in the Date/Time Metadata of a PAL MiniDV Recording. *Journal of Forensic Sciences* **2008**, 53(6), pp 1417-1423.

15. Koenig, Bruce E.; Lacey, Douglas S.; Killion, Steven A. A Digital System for Imaging Bitter Patterns. *Journal of Forensic Identification* **2008**, 58(2), pp 238-264; 58(3), pp 281-282.

16. Koenig, Bruce E.; Lacey, Douglas S. Audio Record and Playback Characteristics of Small Solid-State Recorders. *Journal of Forensic Identification* **2007**, 57(4), pp 582-598.

17. Koenig, Bruce E.; Lacey, Douglas S.; Killion, Steven A. Forensic Enhancement of Digital Audio Recordings. *Journal of the Audio Engineering Society* **2007**, 55(5), pp 352-371.

18. Koenig, Bruce E.; Lacey, Douglas S.; Herold, N. Video and Audio Characteristics in VHS Over-Recordings. *Forensic Science Communications* **2006**, 8(3). LINK

19. Lacey, D. S. Burning Digital Audio Files to Standard Audio Compact Discs: More Than Drag and Drop. *NATIA News*. Summer 2005.

20. Koenig, Bruce E.; Lacey, Douglas S.; Killion, S. A. Analysis of the Radio Shack Micro-30 and the Olympus Pearlcorder S950 Time Code. *Journal of Forensic Identification* **2004**, 54(4), pp 442-451. Authors' Response to Letter. *Journal of Forensic Identification* **2004**, 54(6), pp 629-632.

21. Koenig, Bruce E.; Lacey, Douglas S.; Herold, Noel. Equipping the Modern Audio-Video Forensic Laboratory. *Forensic Science Communications* **2003**, 5(2). LINK

Other Publication

Baker, David W.; Brothers, Samuel I.; Geradts, Zeno J.; Lacey, Douglas S.; Nance, Kara L.; Ryan, Daniel J.; et al. Digital evolution: history, challenges and future directions for the digital and multimedia sciences section. In: Ubelaker, Douglas H.; editor. Forensic Science: Current Issues, Future Directions. West Sussex, UK: Wiley-Blackwell, **2013**, pp 252-91. [Contributing author]

Professional Associations, Seminars, & Activities

Organization of Scientific Area Committees (OSAC)

- Member of the Video/Imaging Technology and Analysis Subcommittee within the Digital/Multimedia Scientific Area Committee (SAC)
- Member of the Audio Forensics Task Group within the Digital Evidence Subcommittee of the Digital/Multimedia SAC

Professional Associations, Seminars, & Activities (continued)

American Academy of Forensic Sciences (AAFS) [Fellow]

- Chair of the Digital & Multimedia Sciences section (2012 – 2014)
- Secretary of the Digital & Multimedia Sciences section (2010 – 2012)
- Digital & Multimedia Sciences section Program Committee member (2013 – 2014)
- Digital & Multimedia Sciences section By-Laws Committee member (2009 – 2010)
- AAFS Nominating Committee (2014 – 2015)
- AAFS Membership Committee member (2010 – 2014)
- AAFS Continuing Education Committee member (2010 – 2014)
- Member of the Editorial Board for the *Journal of Forensic Sciences* (2015 – 2020)
- Guest Reviewer for the *Journal of Forensic Sciences* (2008 – 2010)

Audio Engineering Society (AES) [Member]

- Member of the Technical Committee on Audio Forensics

International Association for Identification (IAI) [Active Member]

- Member of the Editorial Board for the *Journal of Forensic Identification* (2011 – present)
- Former member of the IAI's Forensic Video Analysis Certification Study Committee]

National Technical Investigators Association (NATIA) [Former member]

Have attended seminars and conferences of the AES, the IAI, the AAFS, NATIA, and a regional meeting of the Acoustical Society of America. Invited exam developer for the (ISC)² Certified Cyber Forensics Professional (CCFP℠) certification program.

Testimony

1. 08/04/2015; Stafford, VA; Civil Trial (audio & video authenticity) [Case # JA035448-01-00, et al.; Stafford County Juvenile and Domestic Relations District Court];
2. 08/19/2014; Hohenwald, TN; Criminal Trial (audio authenticity) [Case # 2012-CR-6; Circuit Court of Lewis County];
3. 07/22/2014; Franklin, TN; Criminal Hearing (audio authenticity) [Case # 2012-CR-6; Circuit Court of Lewis County];
4. 11/19/2013; Stafford, VA; Criminal Trial (miscellaneous video) [Case # GC13014487-0; General District Court];
5. 01/17/2013; Baltimore, MD; Civil Trial (video enhancement and miscellaneous video) [Case # 1:11-cv-01399-WMN; Federal District Court];
6. 01/11/2013; Richmond, VA; Civil Trial (videotaped testimony) (miscellaneous video and video enhancement) [Case # CL08-000389; Circuit Court of the County of Gloucester];
7. 12/19/2012; Richmond, VA; Deposition (miscellaneous video and video enhancement) [Case # CL08-000389; Circuit Court of the County of Gloucester];
8. 12/17/2012; St. Paul, MN (via telephone from Clifton, VA); Deposition (signal analysis) [Case # 3494960; State of Minnesota Office of Administrative Hearings, Workers' Compensation Division];

Testimony (continued)

9. 11/28/2012; Wilmington, DE; Criminal Hearing (audio authenticity) [Case # 0104015882, Superior Court of the State of Delaware In and For New Castle County];
10. 03/26/2012; Baltimore, MD; Criminal Hearing (miscellaneous video) [Case # 109317007 & 109317008, Circuit Court for Baltimore City];
11. 12/21/2011; Chicago, IL; Civil Trial (miscellaneous video) [Case # 08 L 4878, Circuit Court of Cook County];
12. 10/26/2011; Los Angeles, CA; Deposition (miscellaneous audio) [Case # BC363201, Superior Court of California (deposition in Washington, D.C.)];
13. 04/20/2011; Washington, D.C.; Criminal Trial (miscellaneous audio) [Case # 2010 DVM 002499; Superior Court of the District of Columbia];
14. 03/30/2011; Leesburg, VA; Civil Trial (video duplication and authenticity) [Case # CL00059123-00; Circuit Court of Loudon County];
15. 03/17/2011; Los Angeles, CA; Deposition (miscellaneous audio) [Case # BC363201, Superior Court of California (deposition in Naples, FL)];
16. 12/20/2010; Chicago, IL (via video teleconference from Herndon, VA); Deposition (video enhancement) [Case # 07L2399, Circuit Court of Cook County];
17. 12/13/2010; Charlotte, NC; Criminal Trial (audio enhancement and miscellaneous audio) [Case # 09CR260997, 09CR260999; Mecklenburg County District Court]
18. 12/03/2010; Minneapolis, MN; Criminal Hearing (miscellaneous video) [Case # 82-CR-09-7129; Hennepin County District Court];
19. 10/25-26/2010; Vicksburg, MS; Civil Hearing (audio authenticity) [Case # 05-0004; Chancery Court of Issaquena County];
20. 07/29/2010; Williamson, WV; Criminal Hearing (video authenticity) [Case # A10-F88, A10-F102; Circuit Court of Mingo County];
21. 11/02/2009; New York, NY; Criminal Trial (miscellaneous audio and voice comparison) [Case # 03-CR-987-DAB; Federal District Court];
22. 08/26/2009; Tucson, AZ; Criminal Trial (video enhancement) [Case # CR-20063636; Pima County Superior Court];
23. 05/20/2009; Staunton, VA; Civil Hearing (video authenticity and miscellaneous video) [Case # CL06-000002; Augusta County Circuit Court];
24. 01/27/2009; Providence, RI; Deposition (miscellaneous video) [Case # 06-5785; Providence County Superior Court];
25. 12/13/2007; Yorktown, VA; Criminal Hearing (audio authenticity) [Case # CR06R38229-01; York County-Poquoson Circuit Court];
26. 09/27/2007; Tucson, AZ (via telephone from Clifton, VA); Criminal Trial (video enhancement) [Case # CR-20063636; Pima County Superior Court];
27. 09/13/2007; New York, NY; Deposition (audio authenticity) [Case # 06-CV-1944, US District Court for the Eastern District of Pennsylvania];
28. 09/05/2007; Kingwood, WV; Criminal Trial (signal analysis and audio enhancement) [Case # 07-F-5; Preston County Circuit Court];
29. 01/08/2007; Washington, D.C.; Criminal Hearing (audio enhancement and signal analysis) [Case # 05-CR-00151; US District Court for the District of Columbia];
30. 09/15/2006; Kiev, Ukraine; Hearing in front of the Ukrainian Parliament (audio authenticity);
31. 11/04/2005; High Point, NC; Criminal Trial (audio enhancement) [Case # 05-CRS-23105; Guilford County Superior Court];

Testimony (continued)

32. 10/11/2005; Portland, OR; Criminal Trial (audio authenticity) [Case # 9906-34654; Multnomah County Circuit Court];
33. 02/23/2005; Roanoke, VA; Criminal Hearing (audio authenticity) [Case # 7:03CR00049-4; US District Court for the Western District of Virginia];
34. 02/04/2005; New York, NY; Deposition (audio enhancement) [Case # 99-CV-862-K(J), US District Court for the Northern District of Oklahoma];
35. 10/09/2001; Houston, TX; Criminal Trial (audio enhancement) [Case # 0845174; 176th District Court of Harris County];
36. 10/07/2001; Houston, TX; Criminal Hearing (audio enhancement) [Case # 0845174; 176th District Court of Harris County]; and
37. 05/13-14/2001; Philadelphia, PA; Criminal Hearing (audio enhancement) [Case # CR 01-88; US District Court for the Eastern District of Pennsylvania].

Presentations

American Academy of Forensic Sciences (AAFS):

- "Conversion of AVI 'txts' Stream Data to Adobe® Premiere Pro® Title Files" (2011) [awarded the Outstanding Case Study Award for the Digital & Multimedia Sciences section]
- "Considerations for the Forensic Authentication of Digital Audio Recordings" (2008)
- "Analysis of MiniDV Recording Date/Time Information" (2007)

Audio Engineering Society (AES):

- "The Effect of Sample Length on Cross-Correlation Comparisons of Recorded Gunshot Sounds" (AES 54th International Conference, 2014)
- "Forensic Digital Data Analysis" (AES 133rd Convention, 2012)
- "WinHex for Forensic Audio Analysis – Introduction, Applications, and Scripting" (AES 46th International Conference, 2012)
- "Considerations for the Forensic Authentication of Digital Audio Recordings" (Washington DC Section, 2007)
- Overview of the forensic audio field (University of Miami chapter)

International Association for Identification (IAI) – "Audio Extraction from Silicor Technologies, Inc.'s Digital Video Recorder Format" (2009)

National Technical Investigators Association (NATIA):

- "Bits and Bytes: Audio and Video File Analysis" (2013)
- "Authentication of Forensic Audio Recordings: Practices and Considerations" (2004)

Scientific Working Group on Digital Evidence (SWGDE) – overview of forensic audio enhancement tools

Various presentations to FBI and Department of Justice personnel