

AFFIDAVIT OF DANIEL HELLWIG

I, Daniel Hellwig, state and declare as follows:

1. My name is Daniel Hellwig. I am the Laboratory Director of Sorenson Forensics, a private forensic laboratory providing forensic DNA casework services for federal, state, and local crime laboratories, law enforcement agencies, and courts. Sorenson Forensics is an Internationally Accredited ASCLD/LAB (ISO/IEC 17025:2005) commercial forensic DNA laboratory.

**Education and Experience**

2. I earned a B.S. in biology and chemistry from Viterbo University in La Crosse, Wisconsin, in 1997 and a Master's degree in forensic science from Marshall University in Huntington, West Virginia, in 2003. I have twelve years of forensic DNA experience and have conducted DNA analysis in approximately 300 cases. I have also served as the Forensic DNA Technical Leader of Sorenson Forensics for two and a half years, supervising the technical operations of the DNA laboratory.
3. As the Laboratory Director of Sorenson Forensics, I direct the supervision of senior DNA staff members, overseeing a team of thirty-six people. Prior to joining Sorenson Forensics in 2009, I worked for several years as a forensic scientist performing DNA analysis for both the New Mexico Department of Public Safety and the Minnesota Bureau of Criminal Apprehension. I have also worked as an instructor of forensic science coursework at New Mexico Highlands University and at Santa Fe Community College.
4. I am a member of the American Academy of Forensic Sciences and the American Society of Crime Laboratory Directors. I also previously held membership with the International Association for Identification, and as a panel review member of the National DNA Identification System. I am certified as an FBI DNA Quality Assurance Auditor and as an ASCLD/LAB-International Assessor. I have

presented at numerous conferences and workshops on forensic DNA analysis throughout the United States.

5. I have been qualified to testify as an expert in forensic DNA analysis in Texas, New Mexico, and Utah.
6. My C.V. is attached to this affidavit.

#### **Involvement in Obel Cruz-Garcia's Case**

7. Sorenson Forensics was retained in November 2014 by the Office of Capital Writs to do a case review of the DNA testing performed by various laboratories, including the Houston Police Department (HPD) crime laboratory, Genetic Design, and Orchid Cellmark related to Obel Cruz-Garcia's capital trial. For this review, we were provided with case files regarding the testing done by the HPD crime lab, Genetic Design, and Orchid Cellmark, including reports, supporting documentation, and chain of custody documents.

#### **DNA Case Review Findings**

8. My review of the materials provided yielded several significant concerns about the DNA testing and analysis performed in this case. Had I been retained as an expert in forensic DNA analysis at Cruz-Garcia's 2013 capital murder trial, I could have provided testimony that would have assisted the judge and the jury in evaluating the integrity and significance of the DNA evidence presented at the suppression hearing and at trial.

#### **Chain of Custody Problems**

9. My review of chain of custody documentation raised concerns about the integrity of the probative pieces of evidence in this case. Based on my review of chain of custody documentation provided by Orchid Cellmark, it appears the evidence bag containing the sexual assault kit that housed the vaginal swabs tested in this case was unsealed prior to laboratory processing. The laboratory noted that the "FedEx Box" that contained the evidence was sealed, but the sexual assault kit housed

within that box was unsealed when received by the Orchid Cellmark laboratory. Given the extended timeframe between the original HPD/Genetic Design testing and the submission of this evidence to Orchid Cellmark—roughly fifteen years—the unsealed sexual assault kit raises serious concerns as to the integrity of this evidence.

10. I also noted that, although the manila envelope containing the cutting from the crotch of the red panties was identified as a sealed container, two integral pieces within that sealed package were noted as unsealed. The unsealed envelopes contained within this packaged housed the cutting from the crotch of the red panties and the liquid blood known sample from Arturo Rodriguez. An unsealed known sample housed with an unknown evidence sample is cause for concern and calls into question the integrity of this evidence.

**The Mixture DNA Profile Obtained from the Cutting of the Red Panties**

11. A mixture DNA profile was obtained from the sperm cell fraction from the cutting of the red panties. At trial, testimony was presented that Obel Cruz-Garcia was the major contributor to this mixture and that Arturo Rodriguez could not be excluded as the second contributor to the mixture.

12. In my review, I noted that no statistical evaluation was reported by Orchid Cellmark with respect to the inclusion of Arturo Rodriguez in the mixture DNA profile obtained from the cutting of the red panties. In 2010, the Scientific Working Group on DNA Analysis Methods (SWGDM) provided guidelines that specifically state that any inclusion (or non-exclusion) must be reported along with a statistical weight to aid the trier of fact in the strength of this inclusion. The laboratory did not do a statistical calculation on this DNA mixture and, thus, should not have included Arturo Rodriguez as a possible contributor to this mixture without an associated weight.



13. Additionally, the DNA mixture obtained from the cutting of the red panties is only detected in four of fifteen DNA loci and at a very low level. It is very unlikely that any of these would be deemed suitable for statistical analysis and, thus, impossible to obtain that statistical weight. It is thus my opinion that the comparison between this item and Arturo Rodriguez should have been deemed inconclusive.
14. Testimony at trial that Arturo Rodriguez was the second contributor to the mixture DNA profile obtained from the sperm cell fraction from the cutting of the red panties was, therefore, misleading. The second contributor to the mixture should correctly have been described as an unknown source. Based on the genetic material recovered, there is insufficient information for a laboratory to conclude that Arturo Rodriguez may have been the second contributor.

#### **The Vaginal Swabs**

15. Regarding the sperm cell fraction of the vaginal swab, I disagree with the statistical weight provided by the Orchid Cellmark report. When utilizing the statistical method used in this analysis, the Combined Probability of Inclusion (CPI), it is essential to evaluate the DNA profile obtained to ensure that no allelic dropout (DNA information that is "missing" from the profile due to minute amounts of input DNA or DNA degradation) has occurred, as this will invalidate the CPI statistic. With regards to the sperm cell fraction of the vaginal swab, there are several DNA loci (tested locations on the DNA) that appear to be at a low enough level that the laboratory should have precluded them from statistical analysis. There are even indications of missing allele (denoted by a \* in the laboratory notes) where the laboratory still improperly utilized this DNA locus for statistical analysis.
16. The SWGDAM guidelines recommend incorporation of a stochastic threshold to ensure that no allelic dropout is occurring, thus validating the CPI statistic. It does not appear that the laboratory utilized a stochastic threshold in this case. The

laboratory chose to preclude the use of only one DNA locus (FGA) from the statistical calculation when there are definite questions as to allelic dropout at several other DNA loci. Specifically, D21S11, D7S820, CSF1PO, vWA, TPOX, D18S51, D5S818 appear to have either possible alleles below analytical threshold or alleles that would fall under typical stochastic threshold for this amplification kit.

17. Additionally, the laboratory provided two separate statistical analyses for this item, one for the inclusion of Arturo Rodriguez and another for the inclusion of Obel Cruz-Garcia. It is essential that evaluation of the unknown, evidentiary DNA profile occur with no bias from the known samples that will be compared. Essentially, an unknown evidentiary profile should be evaluated for suitability for comparison as well as statistical analysis before introducing the known, potential suspect samples. That appears not to have been the case in this analysis, as the statistics were changed for the subsequent inclusion of Obel Cruz-Garcia. This is in violation of SWGDAM guidelines, and I disagree with this practice. It is a fundamental principle of forensic analysis to do all possible to remove interpretational bias toward any individual by analyzing the evidentiary DNA profiles previous to and blind to the analysis and subsequent comparison to the known sample. Orchid Cellmark's failure to do so calls into question the comparison as well as the statistics generated as a result of this comparison.

#### **The HPD Crime Lab's Reinterpretation of the Orchid Cellmark Data**

18. In this case, the HPD crime laboratory interpreted data/profiles that were generated by the Orchid Cellmark laboratory approximately three years prior to the issuing of the HPD report. This in itself is problematic, given that, as a best scientific practice, it is not recommended that a laboratory reanalyze the work of another forensic DNA laboratory. The analysis and interpretation of forensic DNA profiles should be done utilizing the procedures, protocols, and interpretation thresholds



(analytical, stochastic, etc.) of the laboratory that processed and created the profiles.

19. In addition to my concerns about Orchid Cellmark's initial interpretation and reporting of the DNA profile from the sperm cell fraction of the vaginal swab, I also disagree with the HPD reinterpretation of this profile. It is impossible for the HPD laboratory to evaluate for stochastic dropout when 1) the original Orchid Cellmark data did not appear to use a stochastic threshold in their original interpretation and 2) the HPD laboratory does not have a thorough understanding of the validation documentation, procedures, and thresholds specific to the Orchid Cellmark laboratory processing necessary to accurately reinterpret this profile, as it displays data that would likely be within a range of stochastic concerns. It is required by accreditation standards that every laboratory must validate the instruments, chemistries, and procedures before utilizing them within their laboratory. These lead to laboratory-specific thresholds, procedures, and specifications that are applicable to the laboratory itself. Thus, without intimate knowledge of and proper adherence to the validated procedures, thresholds, and specifications of the Orchid Cellmark laboratory at the time of their interpretation, the HPD laboratory would not be utilizing the interpretation that is unique to the laboratory that the data was created in and interpreted under.

20. Additionally, it appears that the HPD laboratory made the decision in its reinterpretation of this DNA mixture to exclude a DNA marker (D21S11) in its statistical calculations that was originally included by the Orchid Cellmark interpretation and included a DNA marker (D19S433) in its statistical calculation that was originally excluded by the Orchid Cellmark interpretation. There is no provided documentation that explains the reason behind this interpretation decision by the HPD laboratory. This is another example of the difficulties that stem from

HPD's reinterpreting data that was not generated at its own laboratory and, in my opinion, this was not an appropriate adjustment to the statistical interpretation.

21. Furthermore, while interpreting the two single source profiles (the cigar and the major component of the sperm cell fraction from the panties), the HPD laboratory increased the rarity of the profile by including two DNA loci (D2S1338 and D19S433) in its statistical calculation. These were previously not reported in the Orchid Cellmark laboratory report. While the inclusion of these two markers in the statistics is not necessarily cause for concern, it is still problematic that the original laboratory that created the profile did not denote these two markers as suitable for comparison (and thus suitable for statistical calculation) in any way. The only documentation that noted suitability for statistical calculation within the Orchid Cellmark report is the documentation of the statistics that the laboratory used, which, in both profiles, did not include these two markers. The HPD report assumes that there is no concern for utilizing these two markers in the statistical calculation. While this may be true, it is impossible to be absolutely certain as, again, the Orchid Cellmark laboratory interpreted the profiles in question and did not document the suitability of these markers for comparison sufficiently to remove any doubt. This illustrates the difficulties and concerns of HPD's interpreting data that was not generated by its own laboratory.

#### **Conclusions Regarding the DNA Testing Performed in This Case**

22. As stated previously, my review of the materials related to the DNA testing performed in this case yielded significant concerns regarding the reliability of the evidence tested and some of the conclusions drawn regarding this evidence.

23. First, the fact that certain chain-of-custody documents suggest that key pieces of evidence—including the sexual assault kit—were received unsealed by Orchid Cellmark calls into question the integrity of the physical evidence. It is furthermore problematic that this documentation shows that a known contributor



sample—the blood of Arturo Rodriguez—was housed together with an unsealed unknown sample. Such practices are against best scientific practice, and call into doubt the overall reliability of the evidence handling in this case.

24. Second, it is my opinion that no conclusion should have been drawn, or could have been drawn, about Arturo Rodriguez's inclusion as a contributor to the DNA mixture present on the crotch cutting from the red panties. Based on my review of the evidence, there is insufficient information to suggest that Arturo Rodriguez, rather than an unknown additional contributor, was the source of the additional male DNA sample present on this evidence.
25. Third, I find the manner in which Orchid Cellmark rendered statistical conclusions regarding the DNA sample on the vaginal swabs to be problematic and against best scientific practices. Furthermore, Orchid Cellmark acted in violation of SWGDAM guidelines in adjusting its DNA inclusion statistics based on the introduction of the known-suspect sample from Obel Cruz-Garcia.
26. Finally, a host of problems arise from the HPD crime laboratory's decision to reinterpret Orchid Cellmark's data, rather than conducting DNA testing anew prior to trial. Such a practice necessarily compromises the statistical and scientific validity of the conclusions drawn and presented regarding the DNA evidence in this case.
27. I was available to consult and testify as an expert in forensic DNA analysis at Cruz-Garcia's 2013 capital murder trial. Had I been retained, I would have told Cruz-Garcia's counsel what is contained in this affidavit and would have testified to the same had I been called as a witness.



28. I have read and reviewed this nine-page affidavit.

I declare under penalty of perjury under the laws of the State of Utah that the foregoing is true and correct to the best of my knowledge and that this affidavit was executed on the 24 of August, 2015 in Salt Lake City, UT.

  
Daniel Hellwig

Subscribed and sworn to before me on August 24, 2015.

  
Notary Public, State of Texas



## DANIEL S. HELLWIG

SORENSEN FORENSICS

2511 S. WEST TEMPLE, SALT LAKE CITY, UT 84115

801-462-1486 • 505-577-1459 (CELL) • DHELLWIG@SORENSENFORENSICS.COM

### EDUCATION

---

**Bachelor of Science Degree**, Viterbo University, La Crosse, Wisconsin, 1997

Major: Biology/Chemistry

**Masters of Science Degree**, Marshall University, Huntington, West Virginia, 2003

Major: Forensic Science

### WORK EXPERIENCE

---

#### July 2013 - Present

**Lab Director**, Sorenson Forensics, Salt Lake City, UT

- Direct supervision of senior DNA staff members
- Manage the evaluation, interview and hiring of potential employees
- Responsible for the operation and oversight of DNA casework operations and personnel
- Budget management and oversight for DNA casework operations
- Provide both in-house and offsite technical training
- Assist with laboratory development consulting projects (Lagos, Nigeria; Dakar, Senegal)
- Consult with law enforcement, prosecutors and other forensic laboratory staff on evidence submission, testing and DNA results, conclusions and statistics
- Planning and implementation of technology upgrades, process modification and lean/six sigma quality and efficiency projects
- Establishing and maintaining business development relationships with potential partners, vendors and collaborators within the forensic community
- Provide and report forensic DNA case reviews for the defense law community

#### January 2012 – July 2013

**Associate Lab Director – Operations**, Sorenson Forensics, Salt Lake City, UT

- Direct supervision of senior DNA staff members
- Manage the evaluation, interview and hiring of potential employees
- Responsible for the operation and oversight of DNA casework operations and personnel
- Provide both in-house and offsite technical training
- Assist with laboratory development consulting projects (Lagos, Nigeria; Dakar, Senegal)
- Consult with law enforcement, prosecutors and other forensic laboratory staff on evidence submission, testing and DNA results, conclusions and statistics
- Planning and implementation of technology upgrades, process modification and lean/six sigma quality and efficiency projects
- Establishing and maintaining business development relationships with potential partners, vendors and collaborators within the forensic community
- Provide and report forensic DNA case reviews for the defense law community

#### June 2009 – January 2012

**Forensic DNA Technical Leader**, Sorenson Forensics, Salt Lake City, UT

- Responsible for the technical operation and oversight of DNA analytical operations
- Developed and evaluated all laboratory methods and protocols for forensic DNA casework
- Ensured all technical staff is properly trained on existing and new technical procedures
- Oversaw, participated in and evaluated all in-house forensic validations
- Performed forensic DNA examinations on a variety of evidentiary items and write reports regarding the result of that testing
- Responsible for testifying as an expert witness in court
- Provided and reported forensic DNA case review for the defense law community
- Consulted with law enforcement, prosecutors and other forensic laboratory staff on evidence submission, testing and DNA results, conclusions and statistics
- Provide both in-house and offsite technical training



#### **December 2008 – June 2009**

**Professor**, New Mexico Highlands University, Las Vegas, New Mexico

- Instructed forensic science related coursework in the Chemistry department of the university
- Developed class curriculum for several forensic science classes
- Assisted the department in their pursuit of a Forensic Science Education Programs Accreditation Commission (FEPAC) accredited B.S. Forensic Science degree offering
- Provided forensic DNA case review for the New Mexico defense attorney community

#### **July 2003 - November 2006; October 2007 - September 2008**

**Forensic Scientist - Advanced**, New Mexico Department of Public Safety, Santa Fe, New Mexico

- Performed forensic serology and DNA examinations on a variety of evidentiary items and wrote reports regarding the results of that testing
- Responsible for testifying as an expert witness in court
- Assisted with validation, development of standard operating procedures and performance checks on various new technologies
- Quality assurance and quality control laboratory duties, including FBI DNA quality assurance internal auditing
- Instructed various law enforcement personnel on forensic science and crime scene investigation techniques
- Acted as safety officer of the DNA section

#### **November 2006 - October 2007**

**Forensic Scientist/Crime Scene Investigator**, Minnesota Bureau of Criminal Apprehension, Bemidji, Minnesota

- Performed forensic serology and DNA examinations on a variety of evidentiary items and wrote reports regarding the results of that testing
- Responsible for testifying as an expert witness in court
- Responded to and processed homicide crime scenes as a member of the Bemidji regional Crime Scene Team.
- Quality assurance and quality control laboratory duties
- Acted as the safety officer for the Bemidji regional laboratory

#### **January 2004-November 2006**

**Part-time Faculty**, Santa Fe Community College

- Instructed coursework for Forensic Science I and II
- Responsible for developing and instructing the forensic science curriculum in the Criminal Justice program of the college

#### **May 2002 - August 2002**

**Intern**, Armed Forces DNA Identification Laboratory, Rockville Maryland

- Assisted with validation and development of several Mitochondrial DNA extraction techniques
- Assisted AFDIL staff in the compilation and reporting of findings for future publication

### **COURT TESTIMONY**

---

- Qualified as an expert in Forensic Serology/DNA Analysis on multiple occasions in several different jurisdictions throughout the state of New Mexico (2004-2008)
- Qualified as an expert in Forensic DNA Analysis in the state of Texas (2010, 2014)
- Qualified as an expert in Forensic DNA Analysis in the state of Utah (2010-2011, 2014)

---

### **PROFESSIONAL ASSOCIATIONS**

**NDIS Panel Member**, National DNA Identification System (FBI), 2008

**Member**, American Academy of Forensic Sciences, 2001-present

**Member**, International Association for Identification, 2001-2003

### **CERTIFICATES**

---

**FBI DNA Quality Assurance Auditor**

March 3, 2006

**ASCLD/LAB-International Assessor**

March 17, 2006

**Lean Six Sigma Green Belt Certification**  
**Six Sigma Black Belt Certification**  
 US Synthetic Corp.

November 27, 2009  
 July 29, 2013  
 Orem, UT

## **TRAINING**

---

### **American Academy of Forensic Sciences Annual Meeting**

Chicago, Illinois	February, 2003
New Orleans, Louisiana	February, 2005
Seattle Washington	February, 2006
Seattle Washington	February, 2010
Chicago, Illinois	February, 2011
Washington, DC	February, 2013

### **Reflective Ultra Violet Imaging System (R.U.V.I.S)**

Sirchie Finger Print Laboratories	January 26, 2004
	Santa Fe, NM

### **Basic Forensic Serology**

Serological Research Institute	February 9-13, 2004
	Richmond, CA

### **ABI Prism 310 Genetic Analyzer/AmpFLSTR training**

Applied Biosystems Inc.	June 1-4, 2004
	Foster City, CA

### **Instructor Development**

Law Enforcement Academy	July 12-16, 2004
	Santa Fe, NM

### **ABI 3100 Capillary Electrophoresis, GeneMapper ID**

<b>Data Analysis and Real Time PCR Training Module</b>	June 12-17, 2005
Marshall University	Huntington, WV

### **DNA Auditor Training**

Federal Bureau of Investigation	February 20-21, 2006
	Seattle, WA

### **Decoding DNA: Train the Trainer**

Texas Regional Community Policing Institute	March 8-10, 2006
	Salt Lake City, UT

### **ASCLD/LAB Introduction to ISO/IEC 17025:2005**

Federal Bureau of Investigation	March 13, 2006
	Stafford, VA

### **ASCLD/LAB-International Assessor**

Federal Bureau of Investigation	March 13-17, 2006
	Stafford, VA

### **Court Room Testimony**

Minnesota Bureau of Criminal Apprehension	September 27-30, 2007
	St. Paul, MN

### **Bode Technologies Technical Workshop - East**

	May 19-22, 2008
	Captiva Island, FL

### **Lean Six Sigma Laboratory Efficiency Improvement**

Sorenson Forensics	August 2009-November 2009
Presenter: Dirk Hooiman (Lean Six Sigma Master Black Belt)	Salt Lake City, UT

### **SWGDM Mixture Interpretation Guidelines**

Utah State Bureau of Forensic Science	August 5, 2010
Presenter: Bruce Heidebrecht (SWGDM)	Salt Lake City, UT

### **Microsoft Excel: Beyond the Basics/Advanced Excel**

Fred Pryor Seminar	August 11-12, 2010
	Salt Lake City, UT



<b>Genemapper ID-X User Training</b> Sorenson Forensics Presenter: Catherine Caballero (Forensic Training Network)	November 3-4, 2010 Salt Lake City, UT
<b>National CODIS Conference</b>	November 15, 2010 Salt Lake City, UT
<b>California Association of Criminalists Spring Meeting</b> DNA Workshop	May 18, 2011 Long Beach, CA
<b>Promega Powerplex 18D System Workshop</b> Promega Campus	June 1-2, 2011 Madison, WI
<b>International Society for Applied Biological Sciences 2011 Meeting</b>	June 20-24, 2011 Bol, Croatia
<b>Green Mountain DNA Conference</b>	July 25-27, 2011 Burlington, VT
<b>Power to Solve Workshop</b> Sorenson Forensics Promega DNA IQ/Plexor HY/PP16HS/PP18D	August 8-9, 2011 Salt Lake City, UT
<b>Cold Case Conference</b> Vidocq Society/Unified Police Department	September 26-30, 2011 Salt Lake City, UT
<b>Bullet Proof Manager</b> <b>Crestcom Management Training</b> Time Management - The 70 Minute Hour Plan Management - Effective Planning: A 7 Step Formula Customer Loyalty - How to Exceed Customer Expectations Stress Management - How to Survive and Thrive Under Stress Negotiation - Negotiating to Win Creativity - Tap the Creativity of Your Team Motivation - Increasing Productivity through Motivated People Employee Recognition - Recognition: The Key to Higher Performance	Salt Lake City, UT November 18, 2010 December 16, 2010 January 20, 2011 February 17, 2011 March 17, 2011 April 21, 2011 June 16, 2011 July 21, 2011
<b>Louisiana Association of Forensic Sciences Annual Meeting</b> Louisiana State Crime Laboratory	April 18, 2012 Baton Rouge, LA
<b>International Symposium on Human Identification</b> Nashville, TN	October 15-17, 2012
<b>Mid-Atlantic Association of Forensic Scientists Annual Meeting</b> Roanoke, VA	May 6-7, 2013

## **PRESENTATIONS/POSTERS/PUBLICATIONS**

---

<b>Overview of Forensic DNA Techniques (presenter)</b> King County Prosecuting Attorney's Office	February 27, 2010 Seattle, WA
<b>Y-STR Interpretation and Statistics Workshop (presenter)</b> Onondaga County Crime Laboratory	April 27-28, 2010 Syracuse, NY
<b>Lean 6 Sigma Efficiency Improvement Project (team lead)</b> Monroe County Crime Laboratory – Forensic DNA Section	August 17-18, September 14-15, 2010 Rochester New York
<b>Y-Screening: An alternative to Microscopic Examination (presenter)</b> Michigan State Police Laboratory Conference, Traverse City, MI California Association of Criminalists Conference, Long Beach, CA	August 20, 2010 May 18, 2011

Green Mountain DNA Conference, Burlington VT	July 27, 2011
Genetic Identity Webinar – Promega @cademy	August 25, 2011
Louisiana Association of Forensic Sciences, Baton Rouge, LA	April 18, 2012
<b>STR Wars: A comparison of Powerplex 16HS and Identifiler Plus</b>	October 12, 2010
Promega International Symposium on Human Identification (poster)	San Antonio, TX
<b>Forensic Investigative Law Enforcement Ancestry Test (ILEAD) (presenter)</b>	
Cold Case Summit, Unified Police Department, Salt Lake City, UT	April 25, 2011
International Society for Applied Biological Sciences, Bol, Croatia	June 24, 2011
Green Mountain DNA Conference, Burlington VT	July 27, 2011
Louisiana Association of Forensic Sciences, Baton Rouge, LA	April 18, 2012
<b>Lean 6 Sigma: Efficiency and Quality Improvement (presenter)</b>	June 1, 2011
Promega Powerplex 18D Workshop	Madison, WI
<b>Basic Y-STR Interpretation and Statistics Workshop (presenter)</b>	
New York State Police Crime Laboratory, Albany, NY	September 20-22, 2011
Monroe & Erie County Crime Laboratories, Syracuse, NY	May 4, 2012
<b>SWGDAM Mixture Guidelines/Y-STR Interpretation (presenter)</b>	December 13-14, 2011
Massachusetts State Police Crime Laboratory	Maynard, MA
<b>Advanced Y-STR Interpretation Workshop (presenter)</b>	
New York State Police Crime Laboratory, Albany, NY	April 30, 2012
Massachusetts State Police Crime Laboratory, Maynard MA	June 25-28, 2012 (2 days, 2 classes)
Oregon State Police Forensic Lab, Clackamas OR	January 15, 2013
West Palm Beach County Sheriff's office	July 22-23, 2013
<b>Y-STR Interpretation and Statistics Workshop (presenter)</b>	May 2, 2012
OCME, Westchester, Suffolk County, Nassau County Laboratories	Westchester, NY
<b>Bringing Y-STRs into Your Laboratory (workshop chair/speaker)</b>	October 15, 2012
International Symposium on Human Identification	Nashville, TN
<b>Estimating Genetic Ancestry Using SNP Analysis (presenter)</b>	February 8, 2013
American Academy of Forensic Sciences Annual Meeting	Washington, DC
<b>Y-STR Workshop (presenter)</b>	May 7, 2013
Mid-Atlantic Association of Forensic Scientists Annual Meeting	Roanoke, VA
<b>Forensic DNA 101/Trends in Forensic DNA</b>	May 13, 2014
2014 Cold Case Summit, Unified Police Department	Salt Lake City, Utah
<b>Y-STR Workshop/SWGDAM Mixture Guidelines/Statistics</b>	Nov 4-6, 2014
Metropolitan Nashville Police Department	Nashville, TN