STEM DC Teacher Roundtable

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WASHINGTON, DC OFFICE OF THE CHIEF MEDICAL EXAMINER
Goals of Presentation

- My STEM journey
- What I do
- Challenges encountered along the way
- Advice for students to be prepared and successful in STEM fields
- Opportunities for students or teachers
My STEM Journey

- Bachelor of Arts in Psychology with a minor in Chemistry
- Master of Forensic Sciences in Crime Scene Investigation

Professional Organizations:
- Chesapeake Bay Division of the International Assoc. for Identification—1st VP
- International Assoc. for Identification
- American Academy of Forensic Sciences, Associate Member

Internships:
- Congressman Steve Israel, US House of Representatives
- Naval Criminal Investigative Service (NCIS)
- Prince George’s County PD, MD Evidence Unit
- Alexandria Police Department, VA Civilian Fingerprint Tech

Certified Diplomat through the American Board of Medicolegal Death Investigators

• High School Forensic Science class
• Lab Assistant for science teacher
What I do

Medicolegal Death Investigator for the Office of the Chief Medical Examiner in Washington, DC
**Office of the Chief Medical Examiner**

- **Investigators:** 8 Forensic Investigators (7 female), 3 Medicolegal Death Investigators (PA-C, all female), Interim Supervisor (PA-C, female)
- **Physicians:** Chief, Deputy Chief (female), 4 Assistant Chief Medical Examiner’s (2 female), 1 Forensic Anthropologist (female)
What does that mean?

- Act as eyes and ears for Forensic Pathologists (Medical Examiners) on a death scene
What is Forensic Science?

‘FORENSICS’

- The application of science to the law.
  - The application of a broad spectrum of sciences to answers questions of interest to a legal system.
What Forensic Science is NOT
Challenges

- Limited Personal Experience
- Challenges for the classroom:
  - The CSI Effect: Unrealistic expectation of science and skewed understanding of scientific methodology but also opportunity to advance understanding of the basic principles of science and critical thinking
Avoiding the “CSI Effect”

• 1. Make time to relate the project performed in class to one or more real cases, comparing and contrasting the quality of the evidence and its importance to the resolution of the case. It is especially illuminating if there are cases in which this evidence was used to exonerate the suspect... By placing the scientific evidence into a larger context, the students should get a more nuanced understanding of the realities of analytical work.

• 2. Develop activities where the suspect or suspects are innocent. Most exercises are compare-and-contrast activities with multiple “suspects” and conclude with a denunciation of the guilty. Students get used to the idea of having to pick one out of a set and will sometimes go to extraordinary lengths to make their data match something. An activity where none of the suspects is guilty would force students to re-think their approach and provide a good segue to a discussion of science fraud in the courtroom. There have been increasing numbers of examples of forensic data being manipulated for presentation in the courtroom, perhaps most infamously those of the FBI laboratory scandals (9) and the Oklahoma crime laboratory scandal involving Joyce Gilchrist (10). This type of activity can lead to a discussion of how important it is to maintain objectivity in any branch of science.

http://pubs.acs.org/doi/pdf/10.1021/ed083p690
3. Create activities where the evidence is contradictory or inconclusive. This forces students to confront a concept that many of them are uncomfortable with, that of uncertainty. Virtually all introductory level and even many intermediate-level laboratory exercises are geared towards getting the “correct answer”. This type of activity lies in stark contrast to the realities faced by forensic scientists, or in fact most scientists, who are usually working with limited resources, a limited data set, and a great number of unknowns. Television shows seem to be giving potential jurors the perception that physical evidence should be able to provide a conclusive, correct answer. Occasionally challenging students with an exercise in which there is no clear answer forces them to confront the idea that there are limits to what science can do, and will hopefully start to provide them with the intellectual tools to evaluate more complex scientific problems where there is no clear “right answer”.

4. Real forensic investigators have noted that one of the most unrealistic things about CSI is the almost omniscient database. Creating an exercise in which students are required to select portions of the material for analysis, or are only provided with a subset of the potential data set for comparison, makes them think critically about resource management, spend time planning their analytical approach, and defend their choices. This type of exercise could also introduce the concept of statistical relevance.
Opportunities for students or teachers

- Take advantage of local agencies and opportunities such as job fairs, conferences, and internships
- Internships with local police departments and federal agencies
  - Alexandria City, Arlington, Prince George’s County, Metropolitan Police Department, NCIS, FBI
- Professional Organizations
  - CBD-IAI
  - IAI
  - AAFS
“There’s something for everyone!”

- AAFS-American Academy of Forensic Sciences
- ASCLD- American Society of Crime Laboratory Directors
- IAI-International Association for Identification
- IAFN- International Association of Forensic Nurses
- NAME- National Association of Medical Examiners
- ABFT- American Board of Forensic Toxicology
- AFTE- Association of Firearm and Tool Mark Examiners
- IABPA- International Association of Bloodstain Pattern Analysis
- Association of Forensic DNA Analysts & Administrators
Williamsburg, VA Fall 2014

CBD-IAI Officer Induction 2015-2016
Ocean City, MD
Seattle, WA Spring 2014

American Academy of Forensic Sciences Conference.

Presentation regarding suicide trends in Northern Virginia from 2012-2013
Forensic Disciplines

- Crime Scene Investigation/Crime Scene Technician
  - Sworn Officers (as part of a Police Department)
  - Civilian Employees (such as with a Department of Forensic Science, or with Police Department)
- Bloodstain Pattern Analyst
- Latent Fingerprint Examiner
- Firearm and Toolmark Examiner
- Forensic Anthropologist
- Odontologist
- Entomologist
- Questioned Document Examiner
- Lawyer
- Forensic Nurse
- Forensic Photographer
- Forensic Accountant
- Forensic Toxicologist
- Forensic Chemist
- Forensic Psychologist
- Forensic Pathologist (Physician)
Choosing a forensic discipline: Questions to ask

- In a lab or in the field?
- Sitting at a desk using a microscope?
- Ability to get out of the office or needed at your desk?
- Essential Employee?

- Do research and take your time
## Undergraduate

- Albany State University (BS in Forensic Science)
- Buffalo State University (BS in Forensic Chemistry)
- Cedar Crest College, PA (BS in Forensic Science & BS in Genetic Engineering, Concentration in Forensic Science)
- Eastern Kentucky University (BS in Forensic Science, Chemistry Option)
- Florida International University (BS, Certificate in Forensic Science)
- Indiana University-Purdue University (BS in Forensic Science & Investigative Sciences)
- Laurentian University, Ontario, Canada (Honors BS in Forensic Science (Single Specialization) & Honors BS in Forensic Science & Chemistry (Combined Specialization))
- Loyola University at Chicago (BS in Forensic Science)
- Madonna University, MI (BS in Forensic Science)
- University of Mississippi (BS in Forensic Chemistry)
- University of New Haven, CT (BS in Forensic Science)
- University of North Texas (Certificate Programs in conjunction with the MS in Biochemistry, Biology, & Chemistry)
- The Ohio University (BS in Forensic Chemistry)
- University of Ontario Institute of Technology (BS (honors) in Forensic Science)
- The Pennsylvania State University (BS in Forensic Science)
- University of Tampa (BS in Forensic Science)
- Texas A&M University (BS in Forensic & Investigative Sciences)
- Towson University, MD (BS Forensic Chemistry)
- Virginia Commonwealth University (BS in Forensic Science)
- West Chester University of Pennsylvania (BS in Forensic & Toxicological Chemistry)
- West Virginia University (BS in Forensic & Investigative Sciences)

## Graduate

- University of Alabama at Birmingham (MS in Forensic Science)
- Arcadia University, PA (MS in Forensic Science—conditional through 2/2016)
- Boston University School of Medicine (MS in Biomedical Forensic Science)
- University of California at Davis (MS in Forensic Science)
- California State University, Los Angeles (MS in Criminalistics)
- Cedar Crest College, PA (MS in Forensic Science)
- Duquesne University (MS in Forensic Science)
- Florida International University (MS in Forensic Science)
- The George Washington University (MFS in Forensic Chemistry, Molecular Biology and Forensic Toxicology, MS in CSI and High Technology Crime Investigation)
- University of Illinois at Chicago (MS in Forensic Science)
- Indiana University-Purdue University (MS in Forensic Science)
- John Jay College of Criminal Justice, NY (MS in Forensic Science)
- Marshall University, WV (MFS, emphasis in digital evidence & MS in Forensic Science)
- Michigan State University (MS in Forensic Biology & Forensic Chemistry)
- University of New Haven, CT (MS in Forensic Science)
- University of North Texas Health Science Center at Fort Worth (MS in Forensic Genetics)
- Oklahoma State University (MS in Forensic Science, Forensic Toxicology & Forensic Biology)
- The Pennsylvania State University (Masters of Professional Studies in Forensic Science—conditional through 7/2015)
- Sam Houston State University, TX (MS in Forensic Science)
- Towson University, MD (MS in Forensic Science)
- Virginia Commonwealth University (MS in Forensic Science)
- West Virginia University (MS in Forensic & Investigative Sciences)

*These are only the FEPAC (Forensic Science Education Programs Accreditation Commission) accredited programs; Updated March 2, 2015*

http://fepac-edu.org/accredited-universities
Students have options

- 115 Colleges and Universities in the United States that offer a Forensic Science program; Certificate, Associate’s, Bachelor’s, Master’s, and sometimes all of the above
  - [http://www.aafs.org/students/programs-within-united-states](http://www.aafs.org/students/programs-within-united-states)
  - List last updated August 5, 2013
- 44 Colleges and Universities outside the US in the following Countries: England, Canada, Australia, China, Poland, India, Scotland, Wales, Germany, Turkey, Switzerland, United Kingdom, and Philippines
- There are even online undergraduate, graduate and certificate programs as well

[http://www.aafs.org/students/colleges-universities](http://www.aafs.org/students/colleges-universities)
Choosing a college/major

- Students shouldn’t feel pressured to get an undergraduate forensic science degree
- Most jobs require a Master’s degree in a forensic discipline, not a Bachelor’s
- Remind students to explore their interests and think outside the box
- Earn a degree that may give you unique skills your peers do not possess
  - Think about a public health, public policy or public administration degree if you are interested in management
Resume

- Work on your resume
  - Physical Resume
  - Activities to add to it
  - Keep it up to date
- Work on public speaking
- Network
  - Join professional organizations
  - Design a business card (even if it says “student”) and have them available to hand out
CSI-DC Summer Immersion Program

- Two week course offered by The George Washington University
- Rising Sophomores, Juniors, Seniors
- Non-Credit Bearing
- Field Trips to the Crime and Punishment Museum, and FBI Academy at Quantico
- Guest Lectures from by an NCIS Special Agent, GWU Professor, Forensic Anthropologist
Agenda

- Sketches/Diagramming
- Bloodstain Pattern Analysis
Agenda

- Anthropology
- Footwear Casting
- 2D Impressions
- Hair and Fiber Analysis
“Final” Mock Crime Scene
The Take Home

• Get involved!
  o Volunteer
  o Ask questions
  o Find a mentor and keep up with those in your network

• Stay involved
  o Don’t let memberships laps
  o Continue to attend conferences

• Invest in your future
  o A little money on the front end pays dividends on the back end
Local Opportunities

- Montgomery County Police—High School students accepted
- District Leadership Program through DC Dept. of Human Resources—202-442-9700 opt. 2 (undergraduate or graduate students)
- PG County Volunteer Internship Program—Virgil Walker, 301-883-6396 (trade school, community college, 4 year college/university, graduate program)
- Investigative Assistant Intern, Arlington County PD—Brianna Miller, 703-228-4337 (graduate level students preferred)
- Courts & Judicial Services
- Alexandria City—College level students only
- Benita Rouse—DC HR benita.rouse@dc.gov
- http://www.examiner.com/article/2015-summer-internships-for-high-school-students