Blueprint to Becoming a Forensic Scientist

Lawrence Quarino, Ph.D., D-ABC,
Dwight Adams, Ph.D.
Steve Lee, Ph.D.
Lawrence Quarino, Ph.D., D-ABC

- Director of B.S. and M.S. Forensic Science program at Cedar Crest College (Allentown, PA)
- FEPAC Commissioner (2006-2012)
- Fellow, AAFS
- Secretary, Criminalistics Section, AAFS
- President-Elect, Northeastern Association of Forensic Scientists
- New York City Medical Examiner’s Office, 1990-2002
Dwight Adams, Ph.D.

- Director of Forensic Science Institute at University of Central Oklahoma
- 23 year FBI career
- Part of original research team that developed forensic DNA technology
- Testified in more than 130 trials in DNA
- Retired as FBI lab director in 2006
Steve Lee, Ph.D.

- Director of B.S. Forensic Science program at San Jose State University
- BS Biology, minor in Chemistry, SUNY Binghamton; MS Molecular Biology and Population Genetics, NYU; Ph.D. Molecular Biology, UC Berkeley; Post-Doc, Molecular Evolution, U Georgia
- Technical Working Group on DNA Analysis and Methods, 1994-1999
- Director of Research and Development at CA Dept of Justice DNA Lab, 1994-2000
- Fellow, AAFS
- Member of California Association of Criminalists
- American Society of Crime Laboratory Director’s Laboratory Accreditation Board inspector
Three Questions

• What is Forensic Science?
CSI-MIAMI
CSI: New York
Forensic Science

The Application of Science to the Law
Three Questions

• What Is Forensic Science?
• What does a forensic scientist do?
All Sort of Things

• Forensic Medicine
• Forensic Odontology
• Forensic Anthropology
• Forensic Toxicology
• Criminalistics
Three Questions

• What Is Forensic Science?
• What does a forensic scientist do?
• What kind of background is needed in order to become a forensic scientist?
Qualifications for a Career in Forensic Science

• Model Candidate
  – Possesses personal integrity, holds a baccalaureate degree (at a minimum) in the natural sciences and has the following KSAs (knowledge, skills, and abilities).
    • Critical thinking
    • Decision making
    • Good laboratory practices
    • Awareness of laboratory safety
    • Observation and attention to detail
    • Computer proficiency
Model Candidate (cont.)

- Interpersonal skills
- Public speaking
- Oral and written communication
- Time management
- Prioritization of tasks
Academic Qualifications

• Strong background in all the natural science.
• **Minimum** B.S.
Curricular Standards

• Undergraduate Natural Science Core:
  – Biology with lab
  – Physics with lab
  – General Chemistry with lab
  – Organic Chemistry with lab
  – Calculus
  – Statistics
Curricular Standards

• Undergraduate
  – Specialized science courses
    • biochemistry, molecular biology, genetics, physical chemistry
  – Forensic science courses
    • Topics include courtroom testimony, introduction to law, quality assurance, ethics, professional practice, background requirements, evidence identification, collection, processing, and a survey of forensic science
    • forensic biology, forensic chemistry, physical methods, and microscopy with a laboratory component.
The Moral of the Story

First and foremost, you’re a scientist!
But Don’t Forget…..

You need to speak and write well, also
Conditions of Employment

• Drug tests
• Polygraph
• Medical and physical examination
• Background checks
Typical Background Checks

- History of drug use
- Criminal history
- Personal associations
- Driving record
- Past work performance
- Credit history
- History of community service and outside activities

Getting that First Job

• Where to look:
  – Websites from Professional Organizations
  – Human Resource page from local and state government
  – www.usajobs.gov for federal jobs

• Who can help?
  – Science job recruiters
    • www.labsupport.com
Getting that First Job

• The Keys:
  – Resume and Cover Letter
    • Accentuate the Positive
    • Key Words:
      – If job description says “DNA analysis” use the term in either resume or cover letter
    • Cover letter must be grammatically correct
      – State reasons why they should hire you
      – Concise and to the point!
Getting that first Job

• The Interview:
  – Confident but not overzealous
  – Be mindful of your social media
  – Be professional
Professionalism is what others think, not what you think.
First Impression

• Dress:
  – Suite (black, grey, navy blue)
  – Remove piercings (except lobe of ear for women)
  – Hide tattoos
  – No cologne or perfume

• Speech
  – Complete sentences
  – No lazy speech (for instance, losing the “g” in words ending in “ing”)
  – No filler words or colloquialisms
Getting that First Job

• Look for ways to practice interviewing.
1990’s Revolution

- 1990-2009 – Massive Growth
  - New State Labs in NY, NJ, MN, OR
  - Jobs increased
- DNA led the revolution
- CSI effect?
Forensic Science Today

• There are 389 publicly funded forensic science labs in US.
  – 210 state or regional labs
  – 84 county labs
  – 62 municipal labs
  – 33 federal labs

Bureau of Justice Statistics, 2005
Forensic Science Today

• 11,900 full-time personnel in forensic labs
  – 58% are scientists
  – 10% are technicians
  – 13% are managerial
  – 8% are clerical
  – 6% are crime scene technicians
• Median lab size is 16.
• 62% of labs send scientists to crime scenes.

Bureau of Justice Statistics, 2005
Forensic Laboratory Organization

• **Public**
  – Local (NYPD; Montgomery County, MD)
  – State (NJSP)
  – Federal (FBI, Customs)
  – 99% cases come from gov’t agencies (i.e., not the accused); taxes pay $$$

• **Private**
  – McCrone Associates
  – Cellmark
  – Individuals in Private Practice
    • Take cases from anyone who can pay $$$
Federal Forensic Laboratories

- FBI
- DEA
- Secret Service
- Customs
- IRS
- Department of Interior
- US Postal Service
U.S. Fish and Wildlife Forensic Lab
State Laboratories

Minnesota Bureau of Criminal Apprehension Laboratory

Oregon State Forensic Laboratory
Forensic Organizations

American Academy of Forensic Sciences (AAFS)

American Board of Criminalistics (ABC) – Professional Certification

International Association for Identification

Regional Forensic Science Societies
  Northeastern Association of Forensic Scientists
  Mid-Atlantic Association of Forensic Scientists
  Midwestern Association of Forensic Scientists
  Southern Association of Forensic Scientists
  Northwestern Association of Forensic Scientists
  California Association of Criminalists

Scientific Working Groups (SWGs)
Your Obligation as a Professional

• Be involved and have a stake in forensic science.
  – Join professional organizations
  – Know the history of forensic science

• Professional development
  – Continuing Education Training
    • NIJ Training (www.nij.gov/training/welcome.htm)
    • Professional Organizations
    • Academic Institutions
Ethics

• Professional Codes of Ethics as a guide for professional behavior.
### Survey of Forensic Science Ethics Documents

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[www.cacnews.org/ethics/concepts.pdf](http://www.cacnews.org/ethics/concepts.pdf)

Courtesy of Carolyn Gannett
### Survey of Forensic Science Ethics Documents

**Table: Be Objective**

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<th>Code</th>
<th>Description</th>
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<td>BEO</td>
<td>(in analyses and reporting, “be fair” is about interactions with others)</td>
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<tr>
<td>BEOC</td>
<td>Be objective (unbiased, impartial).</td>
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### Survey of Forensic Science Ethics Documents

| Item | AAFS | ABO | ABOF | ABC | ABCO | ACEDF | ACEDF | ACF | ACO | AGSO | AIA | AIL | AINA | AIN | AIABA | AIAP | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | AIAS | 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Bibliography/Webliography
Books: Forensic Science and Criminalistics (CSI)


Books: Forensic DNA Analysis


Weblinks

- American Academy of Forensic Sciences: www.aafs.org (employment pages)
- American Board of Criminalistics: www.criminalistics.com
- American Society of Crime Laboratory Directors/Laboratory Accreditation Board – Legacy: http://www.asclld-lab.org/legacy/indexlegacy.html
- American Society of Trace Evidence Examiners: www.asteetrace.org
- California Association of Criminalists: http://www.cacnews.org/ - Jobs, Salaries, Training etc
- Combined DNA Index System- DNA databases: http://www.fbi.gov/hq/lab/codis/index1.htm
- Criminal Justice Megalinks website: http://faculty.ncwc.edu/toconnor/linklist.htm
- Crime Scene Investigation: http://www.crime-scene-investigator.net/
- DNA and legal privacy issues: http://www.dnafiles.org/resources/res07.html#cat5
Weblinks

- Forensic Educational Accreditation Standards: http://www.fepac-edu.org
- Forensic meetings and conferences: http://www.fbi.gov/hq/lab/fsc/current/rapidmtg.htm
- Houston PD Crime Laboratory Investigation: hpdlabinvestigation.org
- Innocence Project- Uses of DNA in exonerating the innocent: http://www.innocenceproject.org/
- International Association of Bloodstain Pattern Analysis: http://www.iabpa.org/
- Microscopy; Molecular Expressions, Exploring the world of optics and microscopy, http://www.micro.magnet.fsu.edu/index.html
- Mid-Atlantic Association of Forensic Scientists: www.maafs.org
Weblinks

• Midwestern Association of Forensic Scientists: www.mafs.net

• Northwestern Association of Forensic Scientists: www.nwafs.org

• National Criminal Justice Reference Service: http://www.ncjrs.gov/

• NCJRS publications: http://www.ncjrs.org/forensic/publications.html

• Northeastern Association of Forensic Scientists: www.neafs.org

• Reddy’s Forensic Page: http://www.forensicpage.com/


• Southern Association of Forensic Scientists: www.southernforensic.org

• Special collection guidelines for Biological Evidence, Spear, T. http://www.cacnews.org/wordfiles/DNA%20SampleHandling.doc

• STR website: Introduction to STR markers and much more- www.cstl.nist.gov/biotech/strbase


• United States Department of Justice: http://www.ojp.usdoj.gov/nij/pubs-sum/178280.htm

• Zeno’s Forensic Page: http://forensic.to/forensic.html
From Crime Scene to Courtroom