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GRADUATE EDUCATION IN FORENSIC SCIENCE

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I. INTRODUCTION

The field of forensic science has been evolving over the past ten years for several reasons. First, since the O.J. Simpson trial with the non-stop real-time coverage on television of crime scene investigation and forensic testing, a large number of fictional and factual forensic programming has appeared on television. The appeal of these shows to the public is underscored by their numbers on both network and cable stations. In addition, there has been a rather dramatic increase in interest in this field as a career choice for students as reflected in applicant numbers to both undergraduate and graduate programs, and the appearance of new programs at both levels in universities. Secondly, over the past five to ten years there has been an increase in the scrutiny of the legal system concerning the validity of testimony from forensic disciplines, whose results were traditionally accepted as fact without question. This increased questioning of forensic science has revealed itself in the increased application of the *Frye* rule initially,[1] and later in the application of the *Daubert* standard.[2] Questions about the validity of a forensic lab procedure have been raised from time to time, as in the case of explosive residue testing in England using the *Greiss* test that was subsequently shown to be flawed.[3] However, DNA analysis during the late 1980s and 1990s received perhaps the most systematic and thorough examination by scientists, both within and outside the forensic discipline, of any testing methodology ever used to investigate crime.[4]

Consequences of this increased focus of the legal system on forensic science in recent years include: A call for certification of forensic analysts, accreditation of laboratories engaged in forensic testing, and ongoing continuing education for practitioners to ensure they are kept abreast of the most recent developments in their

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1. *See Frye v. U.S.*, 293 F. 1013 (D.C. App. 1923) (establishing the *Frye* rule).

2. *See Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993) (establishing the *Daubert* standard); *see generally* Stephen Mahle, *The Impact of* Daubert v. Merrell Dow Pharmaceuticals, Inc., *on Expert Testimony: With Applications to Securities Litigation*, 73 Fla. B.J. 36 (Mar. 1999).

3. Mick Hamer, *Forensic Science Goes on Trial*, 1794 New Scientist 30 (Nov. 9, 1991).

4. *See generally* Shannon Brownlee, *Courtroom Genetics*, 112 U.S. News & World Rep. 60 (Jan. 27, 1992); Daniel L. Hart & Richard C. Lewontin, *DNA Fingerprinting*, 266 Sci. 201 (Oct. 14, 1994); Eric S. Lander, *DNA Fingerprinting on Trial*, 39 Nat. 501 (June 15, 1989); Peter J. Neufeld & Neville Colman, *When Science Takes the Witness Stand*, 262 Sci. Am. 46 (May 1990).

field.[5] Indeed, the State of Oklahoma in 2003 passed legislation requiring forensic laboratories attached to law enforcement to be accredited by the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors (ASCLD-LAB) by July 1, 2005, as a requirement to testify in court.[6] Any public laboratory not accredited by that date would be barred from testifying, thus making any forensic testing inadmissible. Since 1999, there have been forty-two *Daubert* challenges to latent print evidence, although none has been successful in excluding evidence.[7] Gunshot residue evidence was successfully excluded for the first time in Minnesota in 2006, based on the judge's opinion that it lacked scientific backing;[8] however, no further exclusions of gunshot residue evidence have occurred to date. In a further development, the forensic science community is publishing documentation describing how forensic science techniques meet the Daubert requirements in advance of anticipated *Daubert* challenges.[9]

One important way to enhance the overall quality of technical expertise working in forensic laboratories is to enhance the quality and consistency of forensic science education available to students interested in this field as a career. In 1988, in a study by Higgins and Selavka,[10] a survey of crime laboratory directors indicated that Baccalaureate rather than Master's level graduates were desirable as candidates for entry-level positions in crime labs. This preference is likely to have contributed to the decline in graduate programs in forensic science during this period, with only nine active programs in the United States.[11] However, in a second survey of crime lab directors published in 1999, the hiring preferences had already begun to move increasingly to Master's level individuals.[12] In another publication from 1999, the National Institute of Justice further emphasized the needs of the forensic community, especially in terms of formal education and training, once in the laboratory. One recommendation included in that publication was a call for a formal accreditation program for both undergraduate and graduate programs in forensic science.[13] In response to that recommendation a working group devoted to forensic science education (known as the Technical Working Group on Education and Training in Forensic Science, or TWGED) was formed, accreditation standards were crafted, and in 2003 an on-site program review for the purpose of

5. *See generally* U.S. Dept. Just., *Special Report: Education and Training in Forensic Science: A Guide for Forensic Science Laboratories, Educational Institutions, and Students*, http://www.ncjrs.gov/pdffiles1/nij/203099.pdf (June 2004).

6. Okla. Stat. tit. 74 § 150.37 (2002).

7. *See* Simon A. Cole, Slide Presentation, *Law-Made Science? The Controversy over the Scientific Validity of Fingerprint Individualization* (Natl. Acad. Sci. Symposium, D.C., Apr. 25, 2006) (available at http://progressive.playstream.com/nas/progressive/2006am-forensic-cole/Cole_Simon.html).

8. Dave Orrick, *Anoka Judge Rejects Gunshot Residue Evidence—Ruling in Pool Hall Killings Appears to be a U.S. First*, 157 St. Paul Pioneer Press A1 (July 13, 2006).

9. *See generally* Pamela C. Reynolds, *Analysis of Bank Dye Evidence and the Challenges of* Daubert *Hearings*, 10 Forensic Sci. Commun. (2008).

10. K. M. Higgins & C. M. Selavka, *Do Forensic Science Graduate Programs Fulfill the Needs of the Forensic Science Community?* 33 J. Forensic Sci. 1015 (1988).

11. *Id.*

12. *See* Kenneth G. Furton et al., *What Educational Background Do Crime Laboratory Directors Require from Applicants?* 44 J. Forensic Sci. 128 (1999).

13. *See generally* U.S. Dept. Just., *Forensic Sciences: Review of Status and Needs*, http://www.ncjrs.gov/pdffiles1/173412.pdf (Feb. 1999).

accreditation was launched by a Commission within the American Academy of Forensic Sciences (known as Forensic Education Program Accreditation Commission, or FEPAC). Included among the FEPAC standards against which an undergraduate or graduate program is measured are requirements for faculty qualifications in forensic disciplines, curriculum, admission requirements, facilities, and commitment to the program by University administrators.[14] Ultimately, all of the standards represent quality assurance benchmarks that ensure the graduation of a workforce for forensic laboratories that comes to the job with a consistently acceptable body of knowledge. These individuals can more readily learn the particular procedures and policies operating in their new positions in a crime lab and thus more quickly assume their role as an independent analyst.

Also contributing to the enhanced need for an increase in educational programs in forensic science was the 2004 report from the Bureau of Justice Statistics of the United States Department of Justice containing the results of a survey taken by fifty of the largest crime laboratories in the nation.[15] The survey was administered primarily to assess the needs of forensic laboratories to process the casework currently pending as well as anticipate staffing needs to accommodate changes in the volume of casework predicted for the future. The clear message from the responses was that crime labs are currently drowning in casework due to inadequate resources including space, infrastructure, and especially a trained workforce to handle the volume of cases they are asked to process. For example, for every three requests for controlled substances analysis completed by the large labs, one request was outstanding and moved to the backlog.[16] For every two requests for latent print analysis completed, one request went incomplete, and for every one DNA analysis request completed, 1.7 requests were incomplete and moved to the backlog.[17] Statistics such as these underlie the large backlog of unexamined cases that the forensic community faces each year.

Although space, instrumentation, and materials contribute to the lack of efficient processing of forensic casework, perhaps the principal bottleneck to efficient turnaround of results appears to be workforce limitations—it is estimated to require about thirty percent more analysts to achieve a thirty-day average turnaround for laboratory analysis of evidence.[18] Responding to this stated need, new forensic science training programs at both the graduate and undergraduate levels have appeared over the past five to ten years hoping to provide appropriately trained individuals to fill the need stated in the survey. As of our last count, there were now twenty-seven graduate programs listed on the American Academy of Forensic Science website offering the Master's degree in forensic

14. Am. Acad. Forensic Sci., *Forensic Science Education Programs Accreditation Commission: Accreditation Standards*, http://www.aafs.org/pdf/FEPACStandards-05-02-07.pdf (May 20, 2007) (listing the FEPAC standards).

15. *See generally* Joseph L. Peterson & Matthew J. Hickman, *Bureau of Justice Statistics Bulletin: Census of Publicly Funded Forensic Crime Laboratories, 2002*, http://www.ojp.usdoj.gov/bjs/pub/pdf/cpffcl02.pdf (Feb. 2005).

16. *Id.*

17. *Id.*

18. *Id.*

science.[19] Of these, only eight graduate programs have passed peer review, which is the heart of the FEPAC accreditation program for educational institutions.

II. MEETING THE NEED: THE OKLAHOMA STATE UNIVERSITY EXPERIENCE

Prior to the documented need for more trained forensic scientists stated in the publication by Hickman and Peterson, earlier publications warned of the anticipated need for increased numbers of trained individuals to handle the ever-increasing volume of casework.[20] Responding to this need, the OSU College of Osteopathic Medicine developed a plan to create a graduate program in forensic science that would produce Master's level graduates competitive for jobs in the forensic sciences. Moreover, the strategy of the College was to exploit the use of distance learning in its curriculum to reach the greatest number of students possible. A curriculum was developed, faculty were recruited (most of whom were adjunct faculty active in their respective disciplines), and in the fall of 2001 the first class was admitted. At the heart of the OSU program were distance learning and scientific research in forensics. Students admitted to the program were able to remain at home and perhaps continue working while completing basic coursework requirements online. Before the start of the second year, students could relocate to campus and complete those courses with "face-to-face" instruction as well as begin their thesis research in the laboratory of their chosen mentor. Mentors for students include both full-time faculty on campus as well as adjunct faculty working in their particular forensic discipline. These rather close ties to active practitioners also benefit other students in the program through both formal and informal interactions.

In addition to formal education and training of graduate students in traditional forensic disciplines, the OSU program offers classes and training in forensic areas that are somewhat unique. One training track that was created to fill a void perceived to exist is in the forensic examination of questioned documents. Historically, questioned document examiners learned this field as apprentices working in crime laboratories under the direction of seasoned examiners. The time needed to acquire the requisite knowledge and experience varies depending upon the questioned document workload in the laboratory in which the apprentice works, as well as the kinds of cases the lab accepts. During 2003, OSU began to explore the need for formal coursework in questioned documents and concluded that there was a significant need. Conversations with the American Board of Forensic Questioned Examiners (ABFDE) concluded with the creation of a curriculum devoted to this discipline that was officially recognized by the ABFDE as meeting part of the requirements needed to sit for the certification exam they offer. The Graduate Program in Forensic Sciences offers two types of instruction in questioned documents. The first is a more extensive coursework track where students can complete thirty-nine hours of coursework (offered online), twelve hours of which is focused on questioned document subjects, which culminates in a Master's degree with emphasis in questioned documents. As an alternative, students can choose to just take

19. *See* Am. Acad. Forensic Sci., *Resources, Colleges & Universities*, http://www.aafs.org/default.asp?section_id=resources&page_id=colleges_and_universities (accessed Mar. 16, 2008).

20. *See* Higgins & Selavka, *supra* n. 10; Furton et al., *supra* n. 12.

the twelve hours of coursework, which culminates in the award of a Certificate in the Forensic Examination of Questioned Documents. In both cases, a student will have to serve an apprenticeship in the normal way to complete the requirements needed to sit for the certification exam. However, the curriculum available at OSU complements the hands on instruction and training in a host laboratory by providing the foundation knowledge in the discipline, taught by highly experienced practitioners who bring their experience to the classroom.

Among the many challenges the program faced was the challenge of how best to introduce our students to those aspects of the law pertaining to the use of scientific evidence in the court. An Advisory Board to the Graduate Program containing criminal prosecutors and defense attorneys suggested using practicing lawyers as faculty to teach the concepts needed and to participate in moot court experiences planned for the students. However, inasmuch as graduates would likely relocate after graduation to other states, we felt it wiser to teach the needed concepts using faculty from a law school that might be more familiar with universal aspects of the science-law interface. Furthermore, law school faculty would likely be more effective as teachers.

The Graduate Program in Forensic Science currently has two courses that involve faculty from The University of Tulsa College of Law. The first course offered is Scientific Evidence, which is normally offered in the second semester after entering the program. Scientific Evidence is designed to teach the rules surrounding the presentation of evidence in court and generally familiarizing students with courtroom proceedings. This course is a prerequisite for a second course in Advanced Criminalistics in which forensic students visit mock crime scenes each week and identify and collect evidence for laboratory analysis. Each year, one of the scenes is selected (depending upon the student mix in the course) for moot court. Students identify and collect relevant forensic evidence at the scene and transport it back to the laboratory. The evidence is actually processed in the lab and a case file is prepared as it would normally be in a real crime laboratory. Students from the law school are then recruited to play roles as prosecution and defense, and each is given the particulars of the case as well as the file prepared by the forensic students. The law students have time to prepare their prosecution and defense of the fictitious defendant and the forensic students serve as expert witnesses testifying to their contributions to the crime scene investigation and the analysis that ensued once the evidence was brought back to the laboratory. Presiding over the moot court is a sitting District Court Judge who volunteers her time for the proceeding.

Over the years, we have found the collaboration between the forensic science program and the law school to be beneficial to both programs. Although a challenging course, the Scientific Evidence course taken by our students is applauded as one that is effective in preparing our graduates for the common experience of testifying in court. In addition, the participation by law students in the moot court experience allows the law school to offer additional opportunities to their students to hone their skills in critical thinking and oration in the preparation and presentation of their arguments in front of a sitting judge. The students probably prepare better and certainly gain more from the experience than a practicing attorney would.

III. CLOSING REMARKS

The Graduate Program in Forensic Sciences at Oklahoma State University is now completing its seventh year. Our graduates are employed in public and private laboratories nationwide. Our partnering with local resources in the form of the Tulsa Police Department Forensic Laboratory and The University of Tulsa College of Law have benefited our students in the quality of the educational experience they received, and their preparedness for the workforce. It is also likely the interactions with the Graduate Program have benefited the partners as well through research, teaching, and participation with the process.

The OSU Graduate Program in Forensic Sciences was recently recognized by the American Academy of Forensic Sciences through the awarding of full accreditation of the program for a period of five years. This designation, as stated above, confirms that a thorough review of all elements of the Graduate Program meet the guidelines and standards acknowledged by FEPAC as representing the quality benchmarks for graduating students qualified to enter the workforce as effective forensic scientists. Our plan for the future is to continue to collaborate and cooperate with other entities that bring value to the educational experience for our students. Only through continued change for the better and in response to the changing landscape of forensic science can longevity of our program be assured.