U.S. Senate Committee on Commerce, Science and Transportation

Hearing
"Turning the Investigation on the Science of Forensics"

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Educating the next generation of forensic scientists

Chairman Senator Rockefeller

Ranking Member Senator Hutchison

Distinguished Senators

Thank you for the opportunity to present views of the faculty members of the Marshall University Forensic Science Center relative to academic programs in higher education.

Recommendation 10 in the National Academy of Sciences Report on the status and needs of forensic science focused on strengthening undergraduate and graduate education offered through our colleges and universities. Marshall University Forensic Science Program housed within the Forensic Science Center (MUFSC) has offered a two-year Master's degree in forensic science beginning in 1995 and achieved full accreditation of its program in 2005. Based on experiences of our program faculty and staff, I would like to offer our perspective about a path to strengthen forensic science academic programs. I will then review the role that MUFSC has played in supporting the criminal justice system through training, outreach and research activities.

The field of forensic science encompasses examination of diverse types of case evidence from a wide variety of crime scenes. Technologies and methodologies that arise out of chemistry, biology, physics, mathematics and engineering are employed to seek the truth and to provide scientific results that will withstand the scrutiny of our courts. A college level education is critical for the development of current and future forensic scientists, in order to meet the needs of the criminal justice system. In conjunction with a strong core curriculum in forensic science, it is imperative that students receive instruction in specific disciplines through extensive laboratory training, classroom instruction and discussions. Crime laboratories that employ entry level forensic scientists seek college graduates having the education and necessary skill sets that will reduce additional post-graduation training provided by a crime laboratory. A theme that has been expressed repeatedly by crime laboratory directors and laboratory technical staff is that graduates of some forensic science programs are not fully trained in scientific technologies, court testimony and legal issues, report writing and in other areas and that some university programs need to better prepare students to enter the workforce. Training deficits may be more significant for new hires who graduate from science programs that lack a forensic science component. Training offered by crime laboratories that supplements the academic education of the new hire may redirect laboratory scientists from other duties, including testing crime scene evidence. Academic programs that award a Master's degree in forensic science have added responsibilities in educating the next generation of laboratory technical leaders. Laboratory accreditation standards of DNA laboratories require that the technical leader have a Master's degree. To best prepare future technical leaders for management and

administrative responsibilities, Master's degree granting programs should include courses that feature instruction on laboratory, human resources and compliance management in their curriculum.

In an effort to better prepare forensic science students to meet the needs of the community, forensic science programs should be encouraged to become accredited and maintain accreditation. Through the efforts of the American Academy of Forensic Sciences and the Forensic Science Education Programs Accreditation Commission (FEPAC), academic programs that choose the accreditation path are being held to high standards that help assure a quality education and signal crime laboratories that program graduates are well-educated in a core body of knowledge and laboratory technologies. An accredited program provides yearly reports to FEPAC and every five years it undergoes a full accreditation audit. Failure to consistently meet standards can result in the program receiving probationary status or revocation of accreditation. Hesitancy to seek accreditation by some college and university programs may be the costs. Initial costs for equipment and facilities and salary for faculty and staff can be daunting. In addition, over a five year period total costs to maintain accreditation may reach $8,000, which may be prohibitive for some programs. From the perspective of MUFSC faculty, the financial costs and time investments by the university are well worth it, because many of prospective forensic science students realize the importance of graduating from an accredited program. The full support of the University through adequate program funding is crucial to achieve full accreditation. All stakeholders, including academic program administrators, representatives from federal granting agencies and advocates for forensic science must communicate with University administrations and make them aware of pressing issues and how universities can best serve the criminal justice system as well as their students.

The establishment of doctorate programs in forensic science should be an area of primary importance for universities. Many doctoral level faculty members that provide instruction and conduct research in forensic science programs were educated in scientific fields outside of forensic science and have entered into forensic science as a result of a career change. There is a paucity of doctorate granting programs in forensic science that have a major laboratory-based research underpinning in the United States and universities should be encouraged to build upon the 16 existing accredited Master's degree programs in forensic science in order to establish new doctorate programs.

Accredited forensic science programs require that at a minimum 50% of their faculty have appropriate doctorate degrees in science, preferably in forensic science, which suggests that as new forensic science programs develop and faculty retire from existing programs, there will be even a greater demand for doctorate level faculty.

As stated in the NAS report, certain disciplines in forensic science require basic research for the development of new technologies and methodologies. Members of crime laboratories are often inundated with casework and validation studies and laboratory personnel cannot be spared to perform basic science research studies. In scientific disciplines outside of forensic science, research projects are lead by doctorate level researchers within academe, federal institutes and laboratories in the private sector, such as biotechnology companies. It is the opinion of MUFSC faculty that research-based programs in forensic science are needed to serve the forensic science community, working closely with

federal and state crime laboratories to identify problems and to prioritize and chart the direction of research projects.

Certain forensic disciplines have been staffed by professionals who were trained under the mentor-apprentice system and who may not have advanced degrees. At the same time, forensic science programs often do not have qualified instructors to present formal classes and laboratories in some of the comparative sciences. Marshall University, for example, would like to develop an area of emphasis in firearms and toolmarks. Forensic experts in the field may lack the prerequisite Master's degree required to satisfy university requirements for full-time instructors or they may not be available as part-time instructors in a given geographic area. This impasse needs to be addressed to allow forensic science programs to hire instructors and researchers in the comparative sciences who my lack advanced degrees.

Grant funding needs to be available to help develop forensic science programs at all levels. Funding would support the development of academic infrastructure, including hiring necessary numbers of faculty who have a demonstrated background in the forensic sciences, purchasing equipment and chemical reagents, upgrading laboratory facilities and classrooms all in order to provide the best education experience.

Now turning to the **Marshall University Forensic Science Center**

Marshall University Forensic Science Center was established in 1994 and developed a Master's degree program in forensic science under the authority of the West Virginia Board of Trustees for Higher Education. Since spring of 1997, two-hundred and twenty three students have graduated from the program with Master's degrees. Graduates have been hired by federal, state and local crime laboratories, as well as laboratories in the private sector.

That same year the West Virginia legislature authorized MUFSC to perform DNA testing for the State's convicted offenders, under the authority of the West Virginia State Police. As a result of this legislation MUFSC was charged with DNA testing convicted offender samples, the results being uploaded into the West Virginia's Combined DNA Index System (CODIS database). Establishment of a CODIS laboratory at an academic institution is unique and points to services that can be offered by a university to support the forensic science community and other members of the criminal justice system. In addition, the development of MU Forensic Science Program in the early 90s required a close working relationship between MUFSC and the West Virginia State Police laboratory at several levels. The input of crime laboratory practitioners helped guide the development of courses and course content at a time when program accreditation bodies (FEPAC) in forensic science did not exist. Conversely, the MU Forensic Science program has offered services and support to benefit of the WV State Police. Over the years, five WVSP laboratory scientists have enrolled part-time in the MU forensic science program and graduated with Master's degrees. In addition, 12 graduates from the MUFSC program have been hired by the

WVSP crime laboratory as examiners. MUFSC has also served as a resource for continuing education for WVSP laboratory. Seminars are transmitted live via on-line communications to WVSP laboratory, which minimizes time spent and costs for continuing education for laboratory personnel.

The presence of both the accredited DNA testing laboratories and the academic program at MUFSC allowed the Center to develop training that is offered to practicing DNA analysts in several sub-disciplines of DNA analysis, including advanced DNA technologies, parentage/relationship testing, male DNA testing and the use of expert systems to analyze DNA results. Since 2005 over 1500 forensic analysts have traveled to MUFSC for training by highly qualified DNA analysts in its state-of the art training laboratories. Crime scene investigators have also been trained at MUFSC through a collaborative effort between FBI trainers and MUFSC staff. Also since 2005, 380 sexual assault nurse examiners (SANE) have been trained at MUFSC to meet the 40-hour requirement mandate by their certification body. Training of local police officers in collection and transport of digital devices and basic analysis of cell phones is also part of our training agenda. Instruction in the investigation of computer and digital device crimes and e-discovery has been presented to circuit court judges and attorneys during the last two years.

As stated previously, the focus of the MUFSC DNA testing laboratories has been and continues to be testing convicted offender samples in support of West Virginia CODIS. Over the last decade, however, the capabilities of the DNA laboratory have expanded to include testing evidence for criminal cases and for paternity/relationship testing as part of applied research projects. The MUFSC DNA laboratories are accredited for testing evidence samples from criminal cases and have participated in projects whereby case samples, submitted by law enforcement agencies, have been tested and project data analyzed. Projects included helping Los Angeles Sheriff's Department with DNA testing of samples from sexual assault kits, which helped reduce their backlog. A similar project is ongoing with the New Orleans Police Department. DNA testing of property crime evidence is also an ongoing project and involves testing case samples from three populations; a large demographic (Miami-Dade, Fl.), a medium size demographic (Charleston, S.C.) and a small city (Huntington, W.V.) Results from these projects are being analyzed and will be published.

A second working laboratory, in the area of digital forensics investigations, is located at the MU Forensic Science Center. This laboratory developed around a Memorandum of Understanding between the West Virginia State Police and MU Forensic Science Center. A law enforcement expert in digital device investigations is stationed full time at the MUFSC facility and, in conjunction with MUFSC examiners, is responsible for analyzing case evidence. The academic program benefits from this arrangement because digital forensic professionals are available to mentor interns in digital forensic projects.

Research laboratories, focusing on chemistry, DNA, digital devices/computers and microscopy are also part of the center's scope. Although only qualified analysts work with case evidence, students benefit from training offered by laboratory analysts and faculty researchers.

Through the joint efforts of the examiners/trainers from the DNA testing laboratories and the faculty from the forensic science program at MUFSC, an internship program has been developed to assist crime laboratories in performing validations and conducting research projects. During the summer months between the first and second year of the two-year program, MU forensic science students are required to perform research-based internships either in crime laboratories or research laboratories. Beginning five years ago the Forensic Science Center at Marshall University initiated the Technical Assistance Program (TAP). The goal of TAP is to make internship research projects more rewarding and productive for both the hosting crime laboratory and the student intern and to assist crime laboratory in validation of equipment and methodologies The Technical Assistance Program was developed in response to comments voiced by crime laboratory personnel, who perceive a lack of preparation of some students, who enter internships without proper prerequisite training and skill sets. That responsibility for intern training then falls on members of the host laboratory and the time required to prepare the student to perform worthwhile work is a burden on the laboratory. The TAP shifts the burden away from the host laboratory to the academic program. Approximately 8 months prior to the beginning of the internship, first-year students state their desire to participate in the TAP program. MUFSC maintains a list of laboratories that are willing to host a TAP student and each student is paired with host laboratories. The project for the next summer is identified early in the process and over the next 6-7 months the student is provided with intense laboratory and classroom instruction in preparation for the internship research project. When the student begins the summer internship he/she is fully prepared and little is required from laboratory staff. From the perspective of MUFSC faculty, this model can be expanded and has the potential to provide assistance to forensic laboratories nationwide. Recently, MUFSC has been approached about expanding the TAP programs to other forensic disciplines outside of DNA into areas including forensic chemistry and digital device forensics. Grant funding to provide summer stipends for TAP interns could help promote the further development of Technical Assistance Programs at MUFSC as well as initiate similar programs at other universities.

In sum, it is recommended that undergraduate and graduate program in forensic science should aspire to FEPAC accreditation. The programs need to be positioned to adjust their curricula if certification of laboratory personnel becomes a reality. It is further recommended that doctoral level programs in forensic science are needed to promote both research and to educate the next generation of forensic scientists. Funding mechanisms to strengthen existing forensic science programs and develop new ones should be developed through the state and federal grant funding agencies. A strong partnership between academic institutions and crime laboratories is essential to promote the development of college and university program to best support the criminal justice system.