Just Higher Education and the CSI Effect

Introduction [00:00:05] Now this is recording, RTI International Center for Forensic Science Presents Just Science.

Voiceover [00:00:18] Welcome to Just Science, a podcast for justice professionals and anyone interested in learning more about forensic science, innovative technology, current research, and actionable strategies to improve the criminal justice system. In episode two of our Strengthening the Forensic Workforce Season, Just Science sat down with Dr. Sarah Williams, a Research Associate Professor in Forensic Science at Virginia Commonwealth University, and Dr. Keith Morris, a Ming Hsieh Distinguished Teaching Professor of Forensic and Investigative Science at West Virginia University, to discuss undergraduate master's and doctorate programs in forensic science. This season, Just Science will explore a variety of forensic science programs and the growing need for more doctoral programs. Recent years have also presented unique challenges for hands on research with the COVID-19 pandemic and misconstrued expectations stemming from the CSI effect forcing universities and their students to adapt. Listen along as Dr. Morris and Dr. Williams discuss Ph.Ds. In forensic science and the role of NIJ and FEPAC in providing research and education opportunities for the next generation of forensic science professionals. This episode is funded by the National Institute of Justice's Forensic Technology Center of Excellence. Here's your host, Gabby DiEmma.

Gabby DiEmma [00:01:29] Hello and welcome to Just Science. I'm your host, Gabby DiEmma, with the Forensic Technology Center of Excellence, a program of the National Institute of Justice. This season, Just Science will focus on forensic science programs and NIJ funded research at universities accredited by the Forensic Science Education Programs Accreditation Commission or FEPAC. Here to guide us and our discussion is Dr. Sarah Williams, a Research Associate Professor in Forensic Science at Virginia Commonwealth University, and Dr. Keith Morris, a Ming Hsieh, Distinguished Teaching Professor of Forensic and Investigative Science at West Virginia University. Sarah, Keith, welcome to the podcast. It's great to see you.

Keith Morris [00:02:10] Thank you.

Sarah Williams [00:02:10] Thank you for inviting us.

Gabby DiEmma [00:02:12] So, Sarah, I know that you are a Research Associate Professor at Virginia Commonwealth University, or VCU, but can you tell us a little bit more about your professional background and current role?

Sarah Williams [00:02:24] So I am a Research Associate Professor as well as the Graduate Program Director for the Forensic Science Program at Virginia Commonwealth University. Prior to starting at VCU in 2007, I worked for four years at the Virginia Department of Forensic Science, where I was a forensic DNA analyst and so my research typically focuses on body fluid identification and kind of helping improve the upfront workflow of DNA analysis.

Gabby DiEmma [00:02:58] Excellent. And Keith, tell us a little bit about your background and current role as a Professor of Forensic and Investigative Science at West Virginia University.

Keith Morris [00:03:07] After I graduated college, I joined the South African Police Forensic Science Laboratory, and I spent 13 years in the lab. Ultimately, I was the the Director of the Forensic Lab System. After that, I got a position here at WVU, West Virginia University. I've been in the forensic program ever since 2004. During that time, I was the director of the program up until 2014, and after that, I went back to being a regular faculty member and was able to focus my attention more on my research.

Gabby DiEmma [00:03:42] What led both of you to decide to pursue forensic science, and more specifically, a career in academia?

Sarah Williams [00:03:49] I had come from a research background before I became a forensic scientist. I actually didn't even know what forensic science was when I enrolled in the master's program. Which is ridiculous, I know, but it worked out well. So when I was a forensic scientist and I was very happy in the crime lab, but I found myself still asking those questions about how I can improve this analysis and how I can make it better. And of course, when you're working on cases that are going to court and somebody's life is in the balance, you can't do those experiments. And so that's really what pushed me to come back to the university and teach and to be able to do those kind of research things that will help move the field forward.

Gabby DiEmma [00:04:36] Very interesting. I'm also a fan of research. And Keith, what made you decide to pursue a career in academia?

Keith Morris [00:04:44] Maybe I would start by my interest in crime, as it were. I probably got my first book on crime out of the school library when I was in fifth- sixth grade. Back then, we still had crime books in the libraries, and you know, it was typically a British one with the [indiscernible] and all this kind of stuff and I really found that interesting. Anyhow, I went to university and at that time we were still required to do compulsory national service and I found out by chance that I could actually go and do this at the forensic lab. And so I ended up going there and I stayed there for a long time. And it was in my mind from when I was a student that one day I'd like to teach. I was initially at university to become a schoolteacher, but once I got involved in what I was doing, I found it a lot more interesting. When I decided that it was time to make a move, there were no forensic science programs in South Africa at the time, and so I looked further afield and saw this opportunity and fought for it and got the position. So that's how I ended up where I am. And I think the importance of forensic science is a lot of people think about forensic sciences as an applied science, and in certain instances and certain aspects it is. But there's a lot more to it than just simply an applied science. We've got to understand forensic science for what it is, and that's the kind of thing that drives me. As Sarah said, the best place to actually follow that is in academia.

Gabby DiEmma [00:06:09] So diving a little bit into today's topic, I wanted to address the CSI effect. So CSI or Crime Scene Investigation has become a mainstream term as a result of many TV shows, and this has led to the CSI effect. Can you explain for our audience what is involved in crime scene investigation and reconstruction and how it differs from the dramatized version portrayed on TV?

Keith Morris [00:06:34] I think the idea of television and its role in what is perceived and what is real, I suppose, is an important factor. As a positive, it attracts students to want to get involved in this field. That's been true for many years over the centuries. When Sherlock Holmes first came out, I think lots of people wanted to do it then. And so each generation has got their own sort of story as to where they could relate to. I think the

challenge is, in reality is that a lot of people believe that you can just walk in and become a forensic scientist, crime scene investigator. And that is not obviously the reality. With FEPAC accreditation there's a lot of requirements in terms of having done chemistry, physics, calculus and organic chemistry, I guess. And a lot of students that is not their skill set. And so that might be disappointing to them. But on the other hand, we need to make sure that those who progress are clear about what is needed. Once you've done an analysis and go to court, there is partly an education responsibility on that analyst to demonstrate to the jury that it is not necessary the way they think it is. And I think the delusion I think that sometimes the best way is the idea is that the evidence that is presented is always more powerful than what it actually is from the CSI effect. And so it's how to mitigate these expectations amongst a jury.

Gabby DiEmma [00:08:01] Yeah, it's very interesting the two aspects. So it gets people into the field and then they might find out that they don't have that strong science background that they need. So both of your universities have FEPAC accredited forensic science programs. I'd be interested in hearing more about them. So, Sarah, what FEPAC accredited tracks and degrees does your university offer?

Sarah Williams [00:08:24] Yeah, so we have a bachelor's degree. We have about 350 undergraduate majors, and they're split across three different areas of concentration. So forensic biology, which really prepares them for a career in DNA analysis, but also contains all of the prerequisites for the professional skills like pre-med, pre vet, pre dental. And so we get a lot of students that think forensic science is cool, but really we're a molecular heavy biochemistry heavy kind of degree that covers their bases, too. And then our forensic chemistry program is essentially a double major with chemistry. They only have to take two additional classes to do that, and so that prepares them for most of the instrumental type of chemistry disciplines like drug chemistry, toxicology, trace evidence. And then we have a physical analysis concentration that's really very general. We have a big bucket of electives that they take. It includes things like crime scene and advanced crime scene, firearms, tool marks, fingerprints, anthropology, entomology, to kind of let them specialize however they want. So that's the undergraduate side. And then on the graduate side, we have our master's program, which I am the program director for. We have four concentrations. We have forensic biology, which also prepare students for DNA analysis type of positions, forensic chemistry with a concentration in drugs and toxicology, forensic chemistry with a concentration in trace evidence, and then physical analysis again, which is more of a general kind of take your own story type of program. And then finally, we have kind of an agreement with an integrated life sciences program in our department, in our university, that allows us to have Ph.D. Students that focus on forensic questions in our research laboratories.

Gabby DiEmma [00:10:30] Very cool. So it seems like well-rounded undergraduate and graduate programs are available. And Keith, so there are many bachelor's and master's levels degrees across the United States in forensic science, but there aren't as many doctoral programs. However, your university, West Virginia University, does have a Ph.D. in forensic science. Tell us more about this program.

Keith Morris [00:10:53] Yes, we started off a Ph.D. program some years ago. It was a long debate about whether this was appropriate and so on. Sort of alluding back to my previous comment about, you know, understanding forensic science plays a role. So the Ph.D. was sort of established to address that need. And in another sense, there is a lot of programs out there who are looking for faculty. And most programs, if you want to get a tenure track position, you need to have a Ph.D. So how do you address this demand,

given the situation. So that was the motivation for the program. The way it works is we have our master's degree, and ours is slightly different from VCUs in that we don't have really an area of emphasis. We put a set of courses which the students need to take. And that they will cover, you know, chemistry, biology, informatics, lab management, trace evidence, of course a case work practicum, statistics and so on. So those courses are part of the Ph.D. as well. So they have to complete all of those courses. We have an extra course of doing things like experimental design. But in both of those, the real focus would be on the research thesis or dissertation. You know, obviously that is dependent on our faculty. And we, we do, you know, the main sort of areas of trace evidence, chemistry, biology, impression evidence and some crime scene work as well. So those are our general sort of focuses. We're pretty fortunate. We have one graduate who is working at Novus and we have three others who have got faculty positions throughout the country. In the next couple of weeks, we're probably graduating another two Ph.D. Students. The thing with a Ph.D. is well obviously FEPAC doesn't accredit any Ph.D. programs and that's their sort of position statement, which is perfectly fine, and I think it's a great opportunity. We get reasonable interest internationally, but I think most of our students are still U.S. based students.

Gabby DiEmma [00:12:58] So I kind of wanted to follow up on something that you said. Since FEPAC requires professors in the FEPAC accredited programs to have Ph.Ds., and there aren't that many Ph.D. Programs that exist in forensic science specifically, what other specialties do they typically pursue Ph.Ds. in to then go on to teach in these FEPAC accredited programs?

Keith Morris [00:13:20] It depends. I mean, there are people who would have a degree in chemistry or biology and they certainly do that. But by the same token, there are also have a lot of positions that don't require a Ph.D. So, for instance, we have a number of teaching professors and the aim of that kind of position, we'd typically be looking for someone who would have a master's degree but would have some sort of extensive knowledge in the field. And so we've got people teaching crime scene, latent prints and this kind of thing. So they would have some sort of experience in those fields, which is very difficult to obtain. I think it's a question of the growth of the field. I mean, you know, we've got Sam Houston who has the Ph.D. program and I think as time goes by, the numbers of students applying to our program, at least, we are increasing at an alarming rate at the moment. There's a lot of opportunity.

Gabby DiEmma [00:14:13] So you alluded to how COVID has affected your programs, but how has the overall program evolved over the years and what are some of those pandemic factors that have changed the way your programs run and get your students to graduation.

Keith Morris [00:14:29] In terms of evolution, initially we had quite a large reliance on adjunct faculty. And we then sort of moved to a state where the university committed themselves to start funding our faculty. And so, you know, we became a department. We've got 12 faculty in our forensic department at the moment, which is a substantial amount. And then with COVID, I mean, when it was all online, I mean, there's a lot of challenges. I was teaching an advanced photography class, and I had to go online with this. And I mean it must be a fundamental change in the way that you provide this instruction and that went ok. We were we kind of survived. We also required undergraduate students to have an internship and that was a complete, you know, that was almost disastrous. But we made some interim measures and they were able to take some classes to endure that internship. But as soon as we were able to go back, we had

on-site labs and we had online lectures and until we transition back to full-time and so it's going pretty well. I mean, there have been challenges for the students, but there's also been, you know, their focus is quite different. And so that has like benefited them in a certain way. So, yeah, it was it was bad. But, you know, having hands on instruction, having, you know, a lot of labs, you know, you really need to have them in person. Challenging. I hope it stays the way it is at the moment.

Sarah Williams [00:16:25] I would agree with Keith. We, of course, the whole university had to shut down the first semester. But by the time summer hit, we were doing research in the laboratories, at least at the graduate level. And then the graduate students came back for in-person labs first, and then the undergraduates followed in another semester. So I agree that the focus has changed and there have been some really great things like the ubiquitousness of video conferencing has made things really easy to connect with prospective students and for them to interview from, you know, a country away. Like I have students interviewing for Idaho positions, you know, or Washington State. And so the just widespread adoption of teleconferencing has been very helpful. In addition, in our graduate seminar, we're now able to pull international speakers, whereas we were really limited to our local geography. Which, you know, Keith and I being right near D.C. is fabulous, but still, it's nice to be able to go even further afield and bring in experts from all over. So that's really one benefit of it, in my opinion.

Keith Morris [00:17:44] So another example, one of my colleagues was running our seminar and they were organizing a small symposium as part of the seminar activity and then, you know, we had to go online and so they reconstructed this thing. And an amazing thing was, you know, I think there was over 250 people who attended that, and there is no way that that would have happened. So I think that's taught us that accessibility and oftentimes accessibility to developments in forensic science, which folks in other countries would - might never have the opportunity to sort of participate on not given that opportunity. So I think that, you know, what Sarah says is absolutely true. It's like being so free and able to do it in this fashion is a fantastic advantage that's come out of this whole process.

Sarah Williams [00:18:45] We're almost to the point that we're flooded with information now, right? We get webinars from all over the place and we would love to attend all of them, but you only have so much time.

Gabby DiEmma [00:19:00] I'm interested in what an NIJ-funded research students have been doing in forensic science.

Sarah Williams [00:19:06] We have probably six or seven externally funded research faculty. Most of those are NIJ funded projects and so that's really given our students a fabulous opportunity not only to participate in real research that's going to directly impact the field, but also in terms of their career prospects. When they come out of this research project that they've been working on they have the skills and the instrumentation familiarity that they can walk right into a job, and sometimes they're working with instruments that are almost into a forensic laboratory and so they're snatched up by a laboratory because that laboratory is considering implementing that instrument and they want an expert. So in terms of career advantages, in terms of contributing to the research and then finally, we do our best to get students from all of our degrees, right? So we want undergraduate students working with master's students overseen by Ph.D. students. That's important to us, that everybody is kind of interacting and interfacing, but also that everybody's getting the

benefit of that funding and those opportunities that come with the funding and the research.

Gabby DiEmma [00:20:25] Keith, what research are you and your students working on right now?

Keith Morris [00:20:29] In general, I'd say that all of the research faculty in our department are all or have been funded by NIJ and so they obviously are our - one of our go to sources of funding. And the students, there are opportunities at both the graduate and undergraduate level. We do a lot of undergraduate research and this gives those students the opportunity to decide whether they would like to enter into graduate studies. I'm just finishing writing up a grant that I completed for NIJ on pressure factors for firearms, and so this plays a role and allows us to develop new ideas and see how they can be applied to the community, as well as taking those results out from the university to institutions or conferences like AAFS, IAI, AFTE, or one of these organizations and present those results. I think the other thing which is really good is that kind of research allowing for collaboration with practitioners so they can have ways of assessing themselves, being participants in new research projects and developing new ideas and hopefully for the practitioners to adopt those ideas. That's a big challenge, is bridging the gap between research and practice. It's easy to say we've come up with this breakthrough method and so on, but from the lab's perspective, they've got to make sure that when they use that, you know, you've got to go there the first time and hope to defend this this new methodology. That's a challenge. So I think integrating those kinds of ideas is one of the values of being able to do this kind of research.

Gabby DiEmma [00:22:05] Here's kind of a two-part question. What are some of the advantages, in your opinion, to both FEPAC accreditation of your university as well as the role of research and really helping your students get them able to start in the field of forensics?

Sarah Williams [00:22:23] I'm on the FEPAC Commission and this is, I think my fourth - fifth year, and so I've really enjoyed seeing both sides. I was an undergraduate program director and I went through accreditation through FEPAC and now as the graduate program director, I've gone through FEPAC accreditation site visits. I was a site visitor and then I've been on the commission for six years. So I really enjoy being a part of it because I think it's so important that programs really give a strong scientific foundation to their students if they're calling it a forensic science program. And that's really what FEPAC is all about, is making sure that this is going to prepare students for the jobs that are currently in forensic science. And so if we're talking about criminalistics, that's a strong science foundation. If we're talking about digital forensics, that's a strong computer science and coding foundation that you then build on regardless of the area of specialty. You build on that basic strong foundation to teach them how to solve the problems in forensic science. And so that's why I think FEPAC is so important, so that students have some type of benchmark to measure a program against and to know that they're receiving the preparation that they need so that they can get a job. There hasn't been any type of like tying a funding or anything to FEPAC programs, but if you look at the universities that are funded for NIJ typically, with very few high-quality exceptions, there are a couple that are really great universities like UCF that are not accredited, but typically your universities that are receiving research funding are also FEPAC accredited. And it's not designed, but I don't think it's an accident either, right? They're high-quality programs. They've built the faculty that have the expertise that can do the research that's needed in the field. And so I think that they mesh very well together.

Keith Morris [00:24:30] As far as FEPAC goes, I concur with Sarah. In addition, I would also say that from my sort of experience and interactions with prospective students and parents is they are very aware of accreditation. Those who do their research well have looked it up and found out what it's about. Then it's more of a question for the individual student of how well a fit is university A versus university B. And at least amongst all of the accredited programs, there is a baseline which they can base that decision. And I think that's a very advantageous idea. As far as NIJ funding and FEPAC and those things go, back in 2003, there was another group called the Forensic Resource Network, which was a program of NIJ. And at that time WVU was part of that and sponsored the TWGED group, which set up basically the document out of which FEPAC was sort of created as the guidelines for accreditation and obviously, as time has gone by, those have changed and evolved and improved and so on. So I think that was a significant role that NIJ played in establishing FEPAC. As far as the general support, the trickiest thing I think for forensic programs is funding of capital equipment. You know, when one applies for a grant and you say, well, I've got to buy a million-dollar piece of equipment, that reduces your competitive edge because if another university has got that, well then they don't need to spend that money. You know, there are a lot of opportunities that students get indirectly from these sort of funding activities.

Gabby DiEmma [00:26:09] Before we wrap up, are there any final thoughts you would like to share with our listeners?

Keith Morris [00:26:14] I would say two things. Firstly, from the side of academia requesting practitioners to get involved with their universities and universities to get involved with practitioners, but if that sort of gap becomes bridged in a far stronger way, then I think there is great opportunity for progress and addressing some of the challenges that labs might face and also giving faculty at universities a better idea of what the real needs are. Then the second one would be to students is, if you want to study forensic science, be committed and got to develop your thinking skills. You really need to think about what you do because as a forensic scientist, your work has a direct influence on people's lives and you need to make sure that you're doing the best work that you can. And that starts right now.

Sarah Williams [00:27:06] Yeah, I would agree with Keith and Gabby, you and I are on FLNTWG, which is Forensic Laboratory Needs Technical Working Group, and this is a big part of what we discuss is getting the research into the lab and getting the lab to send their questions, their research questions to the universities, because the university has time and hopefully some funding to address those questions and it's important that we be working together to move the field forward. So I completely agree with Keith on that and in the critical thinking for students, for sure.

Gabby DiEmma [00:27:43] Excellent. I would like to thank both of you for joining us today on the podcast and taking the time out of your day to chat with me.

Sarah Williams [00:27:50] Thank you.

Keith Morris [00:27:51] Take care.

Gabby DiEmma [00:27:51] If you enjoyed today's episode, be sure to like and follow Just Science on your podcast platform of choice. For more information on today's topic and

resources in the forensics field, visit forensicsCOE.org. I'm Gabby DiEmma, and this has been another episode of Just Science.

Voiceover [00:28:12] Next week, Just Science sits down with Dr. Mark McCoy from the University of Central Oklahoma and Josh Brunty from Marshall University to discuss the rapidly evolving field of digital forensics. Opinions or points of views expressed in this podcast represent a consensus of the authors and do not necessarily represent the official position or policies of its funding.