

“I Stopped Answering My Phone Today...”

An Editorial by Dr. John Allison, Director of Forensic Chemistry, TCNJ

For High School Students and Anyone Else Who Is Interested

On Monday, October 6, at 10 am, I just stopped answering my phone for the day. At least one high school class somewhere has been given an assignment to complete. The assignment is to contact someone at a college or university where a forensic class/department/program is offered, and ask them four questions:

1. When was your program set up?
2. Have the teacher(s) had prior real life experience with forensic work or or they just teaching students about forensics?
3. What type of degree can I obtain from your program?
4. What are the course requirements for the forensic classes?

So, for all of you out there who have or will have similar assignments, I'd like to offer my personal answer to you. But first, some background. This is not an innocent set of questions. We all know that, for the past several years, there has been a huge demand for college-level training in "forensics", due in part to the popularity of the CSI's and the dozen or more similar shows related to solving crimes. I think the popularity of the shows is good news for our society - young people are interested in solving puzzles and are interested in how science can be used to do it. That's very positive.

The fact is that, in response to the request for such programs, many schools created Forensic Science Degree programs out of very little. Students may learn a little Chemistry, a little Biology, a little about the Criminal Justice system, the Law, Statistics, perhaps with a few Physics and Social Science courses. Unfortunately, four years after such programs appeared, there were a number of upset parents calling those schools and asking the question: "My son/daughter just got a Forensic Science degree from your school. There is an opening at the State Police Forensic lab. My son/daughter applied and was rejected. If he/she can't get a job in forensics after completing a degree in forensics, what good is it?" In some cases, the answer is "not much". Most labs hire Chemists and Biologists, people with degrees in the "hard (basic) sciences", because they have taken enough courses in their field to be proficient at something - as opposed to having taken just one or two courses in lots of areas, but not being sufficiently well-trained to do anything.

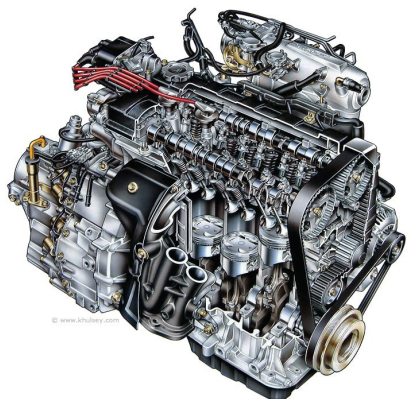


The American Academy of Forensic Sciences is aware of this problem and has been trying to respond by setting up a system for certifying degree programs in Forensic Science. This is good. Unfortunately, most of the people who are practicing forensic scientists have bachelor's degrees. A growing number have master's degrees, in part because of the large number of on-line M.S. programs. You should hope that, if you go to college, the person at the front of the class has a Ph.D. But what if it is a Forensic Science class? Forensic scientists, at least some of them, suggest that someone teaching Forensic Science must have experience - hence question #2. I'd like to provide my personal opinion on this topic.



Let me make it clear that I find the question objectionable. A college degree has been, for many years, the road to a good job. Faculty teach courses that prepare their students, by teaching them what they need to know, and that preparation is highly valued. You'll see this when you start looking for a job and notice how many openings, in all areas, require a college degree. It's not just a piece of paper, it's evidence of successfully completing valued training. The students who graduate with a Bachelor's degree in Business from TCNJ do very well - get good jobs, etc. I don't think that any of our faculty are also CEO's. We have a very popular B.S. degree program in Biology, and many students use the preparation obtained here to go on to medical schools. None of our Biology faculty are M.D.'s. It is rare to find a Chemistry Professor who owns a Chemical company or has worked in industry. How then, can faculty prepare students? The answer is - it is our job. It is our job to teach the fundamentals of a discipline. This requires that I identify and master the fundamentals of my discipline, to be constantly learning, and to convey the information that my students need through classes. This is what faculty have done for years, and the system works.

At TCNJ we have a Forensic Chemistry "Specialization" within the Chemistry Department. Chemistry majors can essentially "minor" in Forensic Chemistry. The courses are upper-level chemistry courses. My goal is not to create forensic scientists, but chemists who are well-versed in how chemistry is used in this field. This is how they can be effective. If you would like to someday change the future of the automobile industry as an Automotive Engineer, I'll give you two choices. You can take a class with someone who has been working as a mechanic for 10 years, or someone with a Ph.D. in Mechanical Engineering. I'd recommend that you choose the latter. There is nothing wrong with being an automobile mechanic, and a good mechanic knows a lot of practical things, but she probably can't explain to you how engines are designed, or how the gears in the transmission are built, or the chemistry of internal combustion engines. However, these are what you need to know to build the automobile of tomorrow. Experience has its place,



but there is a difference between a career goal and an educational goal. To become a forensic scientist (a career goal), you need to define your educational goal (become the best scientist you can be). Someone who has been doing drug testing in a forensic lab for a decade may not be able to explain to you the chemistry behind the drug test, but I can. I'm a chemist. My job is to know what you need to know for a career in a forensic laboratory.

You might not expect that there would be any friction between the scientific community and the forensic community, because it is, after all, forensic science. But they are very different species. Chemists who start working in a forensic lab have much to learn. A white powder is found at a crime scene. What is it and how might it be relevant? A chemist might run a number of chemical, spectroscopic and instrumental tests to try and determine exactly what the white powder is. An experienced forensic scientist, who may well have looked at hundreds of white powders under a microscope, could spend a few minutes with their microscope and determine that the powder is talcum powder. This is a lesson that Chemists are capable of quickly learning. One does not always need to use heavy artillery when a slingshot is sufficient.



As again a personal opinion, I've been to meetings of the most substantial forensic science organization in the land, the American Academy of Forensic Sciences, and many of the presentations given are surprisingly unscientific. This should not be surprising, for two reasons. First, since most who work in forensic labs hold B.S. degrees, they have not had the opportunity to learn how to do a substantial piece of research. As a Ph.D. Chemist, I spent years doing research on a subject in great depth, working with my graduate advisor, and in my position I've taught many students how to attack research projects. Many forensic scientists are very sensitive to their limited scientific background - much in the way that many who teach high school science have had little background in science, and feel uncomfortable with the topic.

I know that forensic scientists are often sensitive about their training, and gained insights into the topic the first time I gave a talk at an Academy meeting. For those of you who are not familiar with the process of national meetings, if you are interested in discussing your work in a particular area you submit an abstract, a summary of what you would like to talk about. If it is accepted, you're put into the schedule. At my first meeting, when the schedule came out, I was surprised that everyone in my session was given 20 minutes to talk, but I was given 40 minutes. That's certainly a nice way to welcome a newcomer! The reason why I was given more time is that I was the only presenter in the session with a Ph.D.(!) The second aspect of the meeting that surprised me was the continual requests from the person in charge of my session for more personal information, so he could adequately introduce me. I'm used to going to Chemistry meetings, where they read your name and title to the audience and off you go. At such meetings, if someone were to judge you, it would be on the quality of the work you do. At forensics meetings, much more time is spent in the introductions, explaining what certifications or special training the speaker may have. For me as an outsider, it appeared as though they were more concerned with the details of their training, and was less interested, or less comfortable in the scientific parts of their presentation.

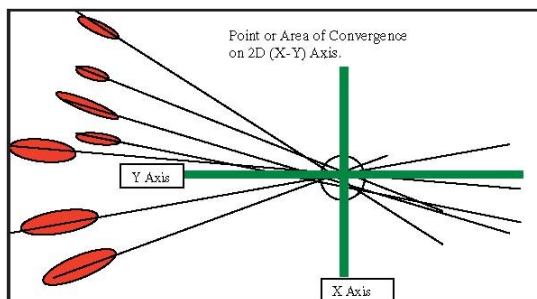
The second aspect of this is that all the problems began when someone doing a forensic investigation, who wanted to make it sound important, came up with the name forensic science. It doesn't have to always be science when it's forensic. There are experts in the field who have considerable experience in examining bullets. They understand how different kinds of guns leave different marks on fired bullets. They know what to look for, to distinguish between them. Is what they do science? Not necessarily. Often forensic investigations are an observational process.

Not too long ago, the use of fingerprints in the courtroom was questioned. If I was studying your DNA, I could identify unique parts of it and eventually match two DNA samples with a reliability of 1 part in several million. We have millions of fingerprints stored in databases. Why aren't we doing the same thing? If your fingerprint has a left-hand whorl, a certain % of the population has this feature. If you have an island or a specific feature, each occurs in a certain % in the population. So how many features would you like to compare when investigating fingerprints? Can we make a real science out of fingerprint comparison? Wouldn't that be good? Many were asked for input. How many features should we compare - some said at least 8, some said 16, no one could agree. The answer appears to be that the whole question makes little sense. If two fingerprints differ in only one way, in only one location out of the entire print, then they are not the same. They are not a match - end of story.



Forensic disciplines are changing every day, and in many cases, Forensic science is becoming Forensic Science, but in many areas, it doesn't need to be. Forensic Science is unlike any other science - it was not born from a natural curiosity about how things work, but was born in the courtroom, as an application of all fundamental sciences, to provide insights into evidential analysis.

So, understand, young readers, if you get a career as a crime scene investigator (of which there are very few), you'll receive training in the analysis of blood spatter after you're hired. It will make much more sense to you if you understand vector analysis, and how the force applied to a droplet of a blood of a certain mass results in a velocity that determines what will happen once



that droplet strikes a wall at a particular angle. With the right education, you can pursue your career goal. Good teachers will provide you with the education you need, and this is true for every course you will take. The quality of their class is not equal to the number of membership cards in their wallet, but in their dedication to you.

So don't ask me if I've had any real life experience or if I'm just teaching about forensics. You have to trust me to do the best that I can for you, and if you find yourself at a school where that trust is unjustified, it's time to move on.

These represent my personal opinions, and in no way represent the opinions of The College of New Jersey.