Just the Sole of Impression Pattern Evidence Podcast Transcript

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

Intro [00:00:21] Welcome to Just Science, a podcast for forensic science professionals and anyone who is interested in learning more about how real crime laboratories work. The Identification season of Just Science will focus on many of the different aspects of identification in forensic investigations. A majority of these interviews were recorded at the 2018 International Forensic Educational Conference in San Antonio, Texas. This conference, held by the International Association for Identification, represents a diverse and knowledgeable membership that meets annually to educate and share techniques, methods, and research into the various forensic science disciplines. In episode one of the Identification season, Just Science interviews Lesley Hammer, former president of the International Association for Identification and the current Chair of the Education Committee of the IAI. Listen along as she discusses pattern and impression evidence collection and the future of IAI. This season is funded by the National Institute of Justice's Forensic Technology Center of Excellence. Here is your host, Dr. John Morgan.

Dr. John Morgan [00:01:30] And welcome to Just Science, a podcast for forensic science professionals. I'm your host, John Morgan, with RTI's Forensic Technology Center of Excellence, a program of the National Institute of Justice. We're here today kicking off our season related to the International Association for Identification Conference in San Antonio. We're actually recording this in October of 2018 after the conference was over. But with one of the people who is one of the most influential leaders within the pattern evidence community that is represented at IAI primarily, and that is Lesley Hammer. Lesley is the former president of IAI and currently serves as the Chair of the Education Committee of the IAI. She had been a section supervisor with the Alaska State Crime Laboratory and is now in private practice as a footwear examiner. And I believe we do some other forensic science work in your private practice Lesley.

Lesley Hammer [00:02:29] I have focused on footwear and tire tracks.

Dr. John Morgan [00:02:31] Welcome to Just Science.

Lesley Hammer [00:02:32] Thank you. Happy to be here.

Dr. John Morgan [00:02:34] So we're really, one of the things that we're doing here at IAI is that we're going to be looking at about 7 or 8 different kinds of folks who are going to come through and talk to us sometimes about casework, other times about some interesting kinds of things going on research wise. So tell me, how long have you been involved with IAI?

Lesley Hammer [00:02:52] Since 1994.

Dr. John Morgan [00:02:55] Wow, and you were an entering forensic examiner at the time or.

Lesley Hammer [00:02:58] I was I was brand new at the Alaska State Crime lab. And one of the first things my supervisor had me do was sign up and go to an IAI meeting.

Dr. John Morgan [00:03:06] When you were a new scientist coming into IAI, what kind of, what did you expect to achieve out of IAI and were those expectations met or what was kind of your experience?

Lesley Hammer [00:03:16] I did not know what to expect coming into the IAI, but I found a few people who right away recognized me as a new person standing off to the side and really reached out and got, you know, helped me decide what to go see, what to listen to, became connections. And that's always been the most important part of being involved with the IAI to me are those connections that you make.

Dr. John Morgan [00:03:39] Were you in footwear and tire track at the time or did you start off? Most everybody starts off at latent print it seems.

Lesley Hammer [00:03:45] I did. I started off in latent prints and crime scenes and then did drug analysis for a little while and then footwear and tire tracks I started almost 20 years ago now.

Dr. John Morgan [00:03:54] Okay. So what brought you into footwear in tire tracks? I know it's a big deal in Alaska. I think Alaska is one of the few places in the country where footwear and tire tracks is done fairly routinely.

Lesley Hammer [00:04:04] Yeah, well, there's a lot of variety across country, that's for sure. And it waxes and wanes. But with the snow, I mean, in the mud, anytime footwear or tire tracks can be really obvious. Of course they get a little more attention when they're versus when they're latency and dust.

Dr. John Morgan [00:04:19] So where is IAI right now? So IAI 100 years old, which is unbelievable, really. And, you know, I don't think people realize how important IAI has been over the years. The FBI only even started to convene crime lab directors in the 1970s, really on a regular basis. And so for a long time, IAI was like the place to be, to get training and to communicate with other forensic scientists.

Lesley Hammer [00:04:44] Yes, it's played that role for a bit over 100 years now, which has been extremely important to the forensic community. And the main mission of the IAI really it's centered around education.

Dr. John Morgan [00:04:55] IAI has certain disciplines where it really tries to emphasize its work, especially education and training and certification kinds of activities.

Lesley Hammer [00:05:03] Yeah the IAI focuses on pattern evidence and crime scene disciplines, latent prints of course or tire tracks and crime scenes in general bloodstain pattern and the list goes on. And then some of the newer disciplines like facial identification and of course, just recently including a provisional committee for DNA evidence.

Dr. John Morgan [00:05:24] Well, that's really exciting because to bring DNA into IAI. The other discipline is really interesting as forensic artists. So we actually have a podcast about forensic art coming up part of the IAI season, which is really interesting, and the different elements of forensic art, because there are actually several different kinds of ways of using forensic art in casework examination. IAI really is a major home for a lot of those disciplines, and especially if you want to try to get that kind of training work.

Lesley Hammer [00:05:53] Right, especially if you want the hands on training and focus on the pattern evidence fields for sure. IAI is the place to go.

Dr. John Morgan [00:06:01] One of the things that IAI also does is it certifies examiners, which you all have been doing for a while, but you're actually improving some of the rigor of those processes as well.

Lesley Hammer [00:06:11] What we're working on is establishing another level of accreditation for our certification committee. So any time, as anyone knows, that goes through a care accreditation process it involves tightening up a few things here or there, but for the most part, you know, our certifications have been robust for a long time and will remain that way.

Dr. John Morgan [00:06:28] Does the Education Committee also put together the conference itself?

Lesley Hammer [00:06:31] I'm mostly a committee of one.

Dr. John Morgan [00:06:34] Okay.

Lesley Hammer [00:06:35] That's not really true, but I'm the only education coordinator. But who I rely on our discipline expert committees we call them science and practice committees of the IAI. And we have some amazing volunteers in each of our disciplines, and I rely heavily on them to come up with the program for the IAI. And believe it or not, we'll start working on that in December and maybe even a little earlier. So we work on it almost year round.

Dr. John Morgan [00:07:01] I think it's very appropriate for you all to be looking at DNA as the provisional part of the of IAI and hopefully that'll come full fledged discipline within IAI. It is, after all, an identification science in the end. It is not that much different in terms of what the outcome is, what you're trying to get at than fingerprints.

Lesley Hammer [00:07:20] Yeah, I think there's a lot of ways that collaborating with DNA analysts to make sense of the IAI certainly have a lot of people that come as investigators and look at overall crime scene information and DNA is critical to that. We also are an excellent venue for hands on education. So training crime scene collectors to collect DNA evidence better is a role that the DNA committee can play and ensuring that they're getting the best evidence in.

Dr. John Morgan [00:07:48] I hadn't thought of that. Yeah, you all do an awful lot of crime scene work, and you all are a major venue for the CSI folks to participate in as part of their professional development.

Lesley Hammer [00:07:57] Yeah, that's right. They're a huge contingent of our attendees.

Dr. John Morgan [00:08:01] Now, your particular discipline, of course, is really what you're practicing now is footwear and tire track. And I think it's really interesting time in footwear and tire track, there's always been a fair amount of actual engagement, but I think it's a whole new level now because I know FBI, for example, is looking at trying to facilitate some information sharing across the country in footwear. Tell me, do you think it's an exciting time for footwear?

Lesley Hammer [00:08:28] I think that is a very interesting development. And what I hope is that it promotes a lot more interest in footwear evidence. Footwear evidence, we are always as footwear examiners, beating the drum, that it's extremely underutilized in this country. So any time that we can put more investigative tools out there, more tools for examiners can generate more interest. But in the end, it needs to be collected to be effective. And that's been a really a different battle for different areas of the country. Some areas are very active, collecting footwear evidence and some areas are just not.

Dr. John Morgan [00:09:04] Well, I think one of the models for footwear, at least in my mind, is the United Kingdom. In Lancashire, they actually did a fairly extensive study showing a very large percentage of their ace clearances and it was definitely over 20% were related to footwear matches. And of course, the London Met now is very routinely collecting shoe impressions, outsole impression from every arrestee, at least in many of the boroughs, using automated technology.

Lesley Hammer [00:09:34] Yeah, that's my understanding, that they're collecting standards when people are arrested as well as just a lot of activity, collecting impressions from crime scenes. And then they have robust databases that are available to their different agencies where they can enter, compare and link scenes. So there's a lot of activity in the UK around footwear. That's my understanding as well. It has solved a lot of crimes.

Dr. John Morgan [00:09:58] They have an excellent software system that they use for sharing of information. But for more forensic intelligence perspective, it also a reference collection perspective. And Alaska actually uses that same software to do their work. But we don't really see a whole lot in the United States of folks who are really using footwear to the full extent, especially at the crime scene. It really is the key. Is really at the crime scene is most important to do the collection.

Dr. John Morgan [00:10:23] Well, like I said, I definitely there are areas around the United States that they do routinely collected that entered in databases that actively try to use it for scene linkage. And they see successful results. But we have a lot of work to do in the area of footwear collection in the United States and work on using databases in effective use to having it solve crime, provide intelligence before an arrest is made, even instead of just as a reaction to arrest and just comparing a suspect shoe with a crime scene impression. I remember the best talk on this I ever saw was that IAI and that was Mike Goran from when he was in Sarasota. He's at FBI now but when he was in Sarasota he collected some amazing data with respect to impact of really efficient crime scene collection of footwear impression evidence.

Lesley Hammer [00:11:12] Yes. What Mike did in Sarasota is a real example of how someone could come in and really push for evidence and push for its use as an intelligence instrument. And I don't want to speak for Mike. He's got a lot of information about that. But just in my conversations with him, he had a lot of success there. And of course, now he's at the FBI. So hopefully going to support other agencies to follow that kind of lead.

Dr. John Morgan [00:11:36] So one of the other things, of course, though, is that some of the automated collection, it's a lot easier to do collection of reference data now because there's the Everspry system out there. But there's a lot of folks who are kind of using new methods and it's becoming easier to collect, digitize and be able to do at least at that type classification level, that kind of work.

Lesley Hammer [00:12:01] Yeah, the Everspry scanner that you can just literally walk across and it records in great detail a shoe print impression sure makes the potential of collecting volume reference samples a lot more likely to occur.

Dr. John Morgan [00:12:17] So I talked to Lesley before the podcast and telling her this story, and I'm going to tell everyone else. My daughter is taking a forensic science class in high school. One of the things they did on their first project was to get out like a plaster thing she it was and do footwear impression that way. And I don't know like, sounds like it'd be all right or like doing type work, you know, to say, well, this is the type of shoe and it matches the different shapes and that kind of thing. And the shoe, it's always struck me it isn't just, you know, her class doing plaster. That always struck me. That's a very, very difficult process to be able to get the detailed information that you need to be able to individualize a shoe, especially given the fact that if you don't get it soon after because the wear issue.

Lesley Hammer [00:13:02] Sure. It depends on how bad the damage is that you want to look at. So there's there can be very fine detail that can be used to individualize that might wear off right away. You don't get the shoe the same day, but then other deeper cuts can last for quite a while. But definitely that time differential between when the crime scene occurred and when the shoe has been seized is considered in cases, and it's an important consideration.

Dr. John Morgan [00:13:27] How does the examiner deal with that persistence issue? Because like in firearms I.D., they sort of discount where there are mismatches between the evidence and a reference firing reference (indiscernible) because there's going to be variations from shot to shot for a single firearm, even the same type of ammunition. And so they expect there not to be complete agreement. And so they look for is there enough and they use the consecutive matching stria, some of them, some others use other criteria. How does the footwear examiner deal with the issue of there is a limitation to the persistence of the patterns that you see in a footwear impression?

Lesley Hammer [00:14:06] In a footwear examination, if you have the shoe and you're making several test impressions, of course, if you wore the shoe and walked right down a piece of paper with ink on your shoe. Every single impression wouldn't be exactly the same. But there important aspects of the features of the design and the features they wear or the damage to the shoe that you would expect to be repeatable. So making that's the reason for making several tester impressions and viewing those features and making sure that they are repeatable. And the other important aspect is examining the shoe to make sure that what you're looking at can be attributed to something random if you're using it to individualize versus some part of the shoe. That's a class characteristic. That's part of the design that came out of the mold.

Dr. John Morgan [00:14:51] Yeah. And so that seems to be a very difficult process. One of the concerns in forensic science right now is just like human error, right? You know, I'd rather be kind of biased but also just perception you're making a lot of what you just described. There's a lot of judgment there that a banner needs to make in order to be able to get through that analysis.

Lesley Hammer [00:15:12] I think that that's why the repeat testing in an examination. So you have the shoe. You can make as many test impressions as you need to, to come to your conclusion about if a feature is repeating in a way that you would expected and in

your determination of how much that particular feature is corresponding with the impression that you're examining.

Dr. John Morgan [00:15:34] Sure. And of course, the other issue that comes into this is I think the human factor is the flip side of statistics. The more human factor is important, the less I think these statistics can help you. I know that there's some efforts. I think WVU, I think West Virginia is doing a project looking at footwear reference collection and doing a database and looking at this issue. But it seems to me almost impossible to quantitate the process that you're talking about. I can see that the type of what the class, class characteristic level. But even that's difficult because they don't choose very in terms of like a different model or sole or even within a particular city or within a particular population that might be committing crime.

Lesley Hammer [00:16:17] Yeah, the variation on population of shoes, even just in class characteristics so make model and physical size are so variable that I've had many conversations with statisticians over the years trying to get some kind of approach that might make sense to a relevant database. And when you think about even if we know how many shoes are manufactured and how many were mailed to a particular area, we still don't know the frequency with which they're worn, which ones have been thrown away, how many might have been ordered on the Internet. So even if we have some kind of number that might approximate, but as soon as we figure that out for one area, then we go to the next area. So Alaska and Hawaii are always good examples and think about the different kinds of footwear that are in each place and how much more statistically significant a fishing boots or a winter boot be in downtown Honolulu versus, you know, a flip flop in Anchorage. So I think it's really difficult to think about how to even begin to approach relevant database when it comes to class characteristics in footwear, when it comes to the damage to footwear, there's an endless variety of ways that damage can be manifested on the outsole. But there's some ways, and some people have made some efforts to approach that. So whether they're taking the approach of how to statistically significant would one just small circular piece of damage be, just one small hole. That's been one approach that Rocky Stone took years ago. And there, I think there's some ways that we can go about looking at areas where damage might occur and how likely. But when you try to translate that to then in compounding with designs and locations of designs, it's a really difficult question to answer.

Dr. John Morgan [00:18:15] One of the things that's always struck me, I think the kind of the random things like gather like a pen and a sole or a fishing hook and the boot or whatever is the hardest problems. Footwear examiners also look at kind of these striations that occur from where as you're as you're walking around, whether it's a random thing or not. I don't know whether any way they look at them.

Lesley Hammer [00:18:37] Well, there's a little pattern that can develop that's just natural to the wearing of rubber called a shallow moth pattern. And that is an example of a very it's a very small fine feathering, which microscopically sort of looks like fingerprint ridges. And so that can be used to individualize and there's research to support that. But if you think about how just a little feathering of rubber and how it just in a few more steps that could change, that's an example of a type of damage that might not be really robust in terms of still being there a few weeks later.

Dr. John Morgan [00:19:11] And a lot of uniqueness, but not a lot of persistence. Yeah. Okay. Well, the other thing is, is like even with a particular model these days, the manufacturers, they might have the same outsole on a variety of different shoes in terms

of the model. Although I read about this as a fellow out there who actually has a database of some of the more unusual shoes that people like collect as their prized possessions, right? And so on, the secondary market for thousands of dollars. And so there's actually like a there's actually a market for those. And one of the things that's cool, I guess in some areas there are some of the folks are involved in crime that's their status symbol, right? They can't afford the large car, but they can afford the expensive shoes. And those are at least more individualizable in terms of like at least to the type where they can have the unusual types. And then you could say, all right, well, how many people are going to own this unusual type of Air Jordan or whatever it is?

Lesley Hammer [00:20:11] Well, when it comes to class characteristics, the question is there even one more out there, often with footwear. So unless the shoe is handmade and have something original carved from the bottom. There could always be one more that came out of the mold. It has the same classic characteristics. Some of the popular designs get remade often, and some of them get slight variations to the design because they're popular. So, you know, we have the famous example of the Bruno Molly shoe.

Dr. John Morgan [00:20:40] And it's famous within the footwear community, but I have never heard of the Bruno Molly shoe.

[00:20:45] Well, you probably recognize the name O.J. Simpson.

Dr. John Morgan [00:20:48] Yes. Okay.

Lesley Hammer [00:20:49] So that's an example of a shoe that was limited production. More of the handmade high end type shoe designs. And so you'll have to read Bill Bodziak's book to get all the details of how we considered the Bruno Molly shoe.

Dr. John Morgan [00:21:04] I've never read Bill's book on the Simpson trial, and we'll put a link to the Amazon page for Bill's book.

Lesley Hammer [00:21:11] It's a very good example of what we're talking about the consideration of class characteristics in an examination and when that can be really important to a case.

Dr. John Morgan [00:21:19] Okay. Is it possible, in your view, for us to do a statistical characterization of footwear impression decision at any level? It seems to me almost impossible. Reliability matters and reliability of the number that you might report matters. Can we come up with a? We can't even come up with a reliable statistical measure.

Lesley Hammer [00:21:40] I hate to ever say never, but I think that, first of all, it's very important to still think about it and still try. And certainly statistical studies are extremely important to supporting what we do. So I think we can do some scaled statistical studies that give us an idea of the value of a class characteristic, for example, but to directly apply them to casework, to be able to say, in this case, I plugged this in this database and I have any kind of meaningful likelihood ratio. I don't see that happening just because of the variability of shoe designs. I think that in the area of damage to the shoe or wear, same thing, we can maybe have some statistical studies that support what we do and maybe we can use those together. The class characteristics studies and the random accidental characteristics studies and use those together to support what we do and provide us more information. But I don't see us coming up with a database that we can really apply in case work in any kind of reliable sense.

Dr. John Morgan [00:22:48] Again, back over into the human factors, where training crime scene investigators and training footwear and tire track cause these same issues come up at tire track. Is there a difference in terms of the tire track impressions in this regard and kind of basic considerations here? I guess there aren't too many people who have ego trips over the kind of tires they put on their car. So yeah.

Lesley Hammer [00:23:11] I don't know, pretty fancy racing cars out there, but a lot of the basic principles that we're talking about apply to both footwear and tires. Definitely making tire test impressions is a little bigger ordeal than making them with a shoe?

Dr. John Morgan [00:23:26] Right.

Lesley Hammer [00:23:26] So those cases are a lot more work.

Dr. John Morgan [00:23:29] But the training of the footwear entire tread examiners then is all the more important. But it doesn't seem like we have enough resources to do the training of the folks to for the, you know, sort of the next generation of footwear tire tread examiners.

Lesley Hammer [00:23:45] I am doing a lot of training these days, and I really enjoy that stage of the career or passing on encouraging the next generation. But I definitely see a lot more need out there for training then there are opportunities and definitely a lot more opportunities for the evidence itself to be utilized more. Course that means training for the people collecting the evidence, training for the examiners to examine the evidence and what are the big challenges to training footwear examiners. For instance, if there's crime scene training and someone comes to a certain city and provides crime scene training, can fill a class with the locals for the most part. But footwear, since we're so spread out and footwear examiners also occur in many, it's usually a second discipline for people. Usually there are latent print examiners or firearms or trace or collecting documents, and then they do footwear on the side. So you have the competition of the primary discipline for a lot of examiners in terms of keeping their training up and then also spread out across the country and spread thin between trying to keep up. For instance, all the trace examiners don't show up to the IAI. So there's a lot of challenges to footwear examiners coming together and coming together for training.

Dr. John Morgan [00:25:00] Sure. Sure. So I hope there's greater demand for footwear examiners, but and tire tread. But that's really going to only happen when law enforcement really starts to value footwear and understands the value of footwear and therefore encourages crime scene collection.

Lesley Hammer [00:25:18] And it's hard to know where that starts because, of course, if there is successful cases, people get more interested. And so footwear is a big part of solving a crime, then there's going to be more interest. But if it's not collected, it can't really have a lot of success. So. Right. The cycle has to start somewhere. You know, I hope that my gravestone isn't she tried really hard but still hasn't collected a lot.

Dr. John Morgan [00:25:43] Right. And made that note on which we should end. (Indiscernible). You know, it's like every crime. Well, not every crime, but the vast majority. Somebody is wearing shoes.

Lesley Hammer [00:25:52] It's hard to perceive the crime that occurs where someone doesn't walk through the thing.

Dr. John Morgan [00:25:58] Right.

Lesley Hammer [00:25:58] So to have that never collected, I think that would be a really difficult way forward to justify.

Dr. John Morgan [00:26:05] One of the other podcasts that we're doing at the IAI, a case study where blood spatter made a huge difference in terms of establishing the facts of the evidence. And it really struck me in some respects, too, because crime scenes are messy places. Right? And when you come into a scene, it takes a different kind of analysis to say, wow, I need to make sure that I'm looking for that footwear impression. And it may not be obvious, just like blood spatter sometimes isn't obvious that that's going to be what's going to make that make or break an entire case where there are four different murders, ten different places or wherever it is, you know, you need to have that awareness to make sure that folks are doing that collection, even though it's not obvious at the moment when that's going to be relevant.

Lesley Hammer [00:26:49] Right. The awareness and the skills and techniques for detection and a lot of the types of evidence that we have at scenes can be latent not just friction ripped skin, but footwear. A blood drop might be hard to find. Fibers, all those things it takes skills and effort and technique and having the right materials and supplies. But in the area of footwear, the particular challenge is that while people are looking for evidence, they're usually walking over where you know the location of the shoe prints. So that is the type of evidence that almost always takes awareness from before you go in the scene.

Dr. John Morgan [00:27:25] Well, Lesley, thank you very much for being on the Just Science podcast today.

Lesley Hammer [00:27:29] Thank you, John.

Dr. John Morgan [00:27:30] And thank you all for listening to Just Science. We appreciate tuning in or downloading whatever it is that you do to listen to the podcast. If you like what you've heard, please give us lots of stars and thumbs up on SoundCloud or wherever it is that you are downloading the podcast from. And make sure to tell your friends and colleagues about Just Science. Thank you very much today for listening.

Outro [00:27:57] Next week, Just Science interview Suzanne Birdwell about the use of forensic art in recognition and identification. 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.