Dan Seed:

Hello, and welcome to Big Ideas. A podcast from Texas State University. I'm Dan Seed from the university's School of Journalism and Mass Communication. This month, we're joined by Dr. Kim Rossmo, university chair in criminology and the director of the Center for Geospatial Intelligence and Investigation in the School of Criminal Justice and Criminology here at Texas State. Dr. Rossmo has an extensive work history in and with law enforcement. And has published work studying the geospatial structure of terrorist cells, counterinsurgency, environmental criminology, and the geography of crime and epidemiology and biology among others. That is quite an introduction. You do a lot of cool stuff, Dr. Rossmo. Thank you so much for joining us.

Dr. Kim Rossmo:

My pleasure.

Dan Seed:

So off the bat for our audience. What is geospatial intelligence and geographical profiling?

Dr. Kim Rossmo:

Two separate things. So geospatial intelligence is the type of intelligence that law enforcement agencies, military units, our intelligence community, can derive from the locations of things. So some events become much more important if they take place in certain locations, vis-a-vis other locations, and by understanding the geography and the relationships between events. Let me just explain that, sometimes things that are close to each other, take on a certain importance that they wouldn't if they were happening miles apart. Then we can get maybe warnings, or we could start putting pieces of the puzzle together. That's a good way of looking at it, it's a big jigsaw puzzle. You're trying to connect the pieces. And of course, if they fit, that means they're close to each other too. So geography is a very important part of that.

Dr. Kim Rossmo:

Geographic profiling could be called a type of geospatial intelligence. It's used in the investigations of serial crimes. So you've got a serial murderer, you've got serial rapist, a series of robberies, and each one of those events occurs at a different location or a site typically. So what you then have is a bunch of dots on a map, but those dots are all generated by the same offender, if it's a serial crime. And that offender typically has a base, often their home, maybe workplace. Because we want to solve those crimes, then one of the things we try to do is treat those locations, those crime locations as clues. It's like connecting the dots, and then you figure out what that information tells us about where the offender is most likely based. And using a specialized computer algorithm, we input the locations of the crime sites. It generates for us what we call a probability surface or a jeopardy surface. And that's just laid over a map and then investigators start prioritizing their information.

Dr. Kim Rossmo:

It's worth noting that these cases often generate hundreds or thousands of tips or suspects. So information management becomes a big challenge. It's like trying to find the needle in a haystack, but so many of our records, whether it's police records or just your driver's license or your credit card history, your cell phone usage, that has series of locations attached to it. And so that's sort of the handle that we can use to prioritize things, and try to get to that needle sooner rather than later.

Dan Seed:

And you mentioned the algorithm, right? And reading this from what I've understood, and correct me if I'm wrong. You're the pioneer in this field. That you were working on your dissertation, and that you had this moment of inspiration that struck you while you were riding a train in Japan. Right? Can you tell us about that?

Dr. Kim Rossmo:

So I was studying under a Professor Paul Brantingham, who was one of the early people that worked in the area what's called environmental criminology. A lot of criminology is concerned with what makes offenders, why they offend, and why they do what they do. But environmental criminology is interested in where things happen. And when things happen, the influence of the environment on the patterns of the crimes. And so I wanted to know... They had developed a theory to explain where criminals were most likely to offend. I was curious whether or not I could turn that around, and use some version of their theory to tell me, if we know where connected crimes have occurred, where's the offender. So it's sort of the opposite question of looking at it from a 180 degree perspective.

Dr. Kim Rossmo:

I was on another research project studying Kōban police stations in Japan. And I was just looking out the window and the idea popped into my head on how to do this. And I grabbed some napkins, JR Japan Railway napkins. And wrote all this stuff down on them and had to wait until I got home, because it could only be done on a computer. But that was pretty exciting, especially when it worked out.

Dan Seed:

I usually don't have ideas like that when I look out the window, I'm going to be completely honest with you. So the fact that you had that idea, that a-ha moment, is pretty fascinating. So this algorithm that you've developed, what exactly are you putting into this algorithm to spit out information? Walk us through that a little bit.

Dr. Kim Rossmo:

So the main input is just the locations of those crime, the dots on the map. I refer to them as clues and that's exactly what they are, especially when they form a pattern. So what we try to do is to code that pattern and figure out where it's originating from. So location is important, we need to know the crimes are connected. We also like to have the timing information, the temporal data, because that's important, when something happens. Just for example, if you were on the square in San Marcos at 1:00 AM on a Friday night, it would be very different then how it would look on a Monday at 1:00 PM. So we have, day, a week, and weather, and time of day patterns that affect what's going on. And that's an important consideration as well. Those are all parts of the environment, all parts of the pattern.

Dan Seed:

And so I do have to ask before we get more into this. What drew you to this? To thinking of criminology and investigation in this kind of manner. Because we're going beyond what we see on Law and Order. The dots on the map, and the strings and all that. Like the stereotypical police stuff that we see. But what drew you to this? I mean, it's very fascinating.

Dr. Kim Rossmo:

Well, I had started off university as a mathematics major, but found it a little dry and wanted something with some adrenaline in it. And so I went into policing. One of the things I learned as a police officer was, and this is in Vancouver, Canada. One of the things I learned, is there's only so much you can do. But one thing you can do, is look at things in terms of its location. If I'm in a certain spot, I have some control there. If we're taking a look at macro social economic factors that might affect crime rates, might not. I don't have any control of those, as a cop. So for me, it was the practicality, and the media utility of it that made it interesting to me.

Dr. Kim Rossmo:

I don't want, and maybe just say, this is kind of a guiding spirit of the Center for Geospatial Intelligence and Investigation GII. Is to try to do stuff that has near term use, to improve the functions of, mainly law enforcement, but also intelligence and military, to the degree that some of their work is overlapped with policing functions in certain areas. So it was all about trying to be useful and practical, and then deliver a benefit to that particular community. Not just a book that goes on a library shelf, for example.

Dan Seed:

A proactive benefit for the community, that clearly helps with safety and community response and whatnot. For our audience to better understand. You've explained it very clearly. But can you give us an example of how this works, from maybe a case that you've worked on, and how it helped either solve the case or give insight? And it may not even be a crime. We could go into the terrorism work that you've done as well. Any area where you can kind of just give us a sense, paint a picture for us, of how this helps.

Dr. Kim Rossmo:

So I'm going to play off of the Louisiana sticker that you've got on the fridge, there in your office that I can see. So some years ago, Detective Mac Gallien, who worked for the Lafayette, Louisiana Police Department, reached out to me in Vancouver. And they had a serial rapist there, it was called the South Side Rapist. And the crimes had been linked together by DNA, they maybe collected a couple thousand suspects. And he was looking for anything he could find to try to solve the case. So I ended up flying out to Lafayette and worked with Mac, and looked at all the locations, and then did the analysis, which I sent to him, which he used to try to figure out who was left in his suspect pool that hadn't been given a DNA test. While this was happening, a new tip came in of an individual, which wasn't really placed so well on the profile.

Dr. Kim Rossmo:

But Mac was thinking... just a minute. Mac was a very thorough detective. And he said, "This is based on where the guy was living at the time of the crimes. So I need to go back and try to find that out, see if it's different." And when he did that, he found the guy lived right in the middle of everything. So as a consequence, put a little bit of surveillance on the individual and got a discarded cigarette. They submitted that to the lab. It was a match. They went and arrested him and the person was given a life sentence. He's still in prison. The interesting thing was, he was a Sergeant in the Sheriff's department. Lafayette Parish Sheriff's Department.

Dan Seed:

Oh my gosh.

Dr. Kim Rossmo:

Yeah. So he knew what was going on in the case, he was plugged in, he changed his appearance. He was not considered really a viable suspect because he was a police officer. But because of Mac, and I want to be very clear. We never solved the case. It's the detectives that solved the case. We just tried to give them another tool. But Mac put all those tools together and the case was resolved.

Dr. Kim Rossmo:

It received a lot of media attention at the time from Dateline, and the other sources. But it was a nice illustration of the potential utility. But to me also underlines the importance of, underneath it all, is a good detective that just doesn't give up. So it's all about information and how can we best use that information. And I'm a big believer in research, research in criminology, criminal justice. But also geography, psychology, anthropology, all helping law enforcement do their job better. It's important to realize that they're not a separate entity, they're part of our community. Sir Robert Peel said, "The police are us and we are the police." And so to the degree the university can help them and provide these tools. I think that's very rewarding and very important.

Dan Seed:

One of the cases that you've had interest in and written about is Jack the Ripper. You worked as an expert on the 2009 film Zodiac, about the Zodiac Killer. So you've got this wide range of stuff that you're working on, but for you, what's the most fascinating case that you've worked on and why?

Dr. Kim Rossmo:

That's hard to say because a lot of them has been very interesting. I think it was Operation Lynx in England. It was a serial rapist, and it's at least from my perspective, a number of factors made it interesting.

Dr. Kim Rossmo:

First of all, we didn't have a lot of locations, but the offender stole a credit card and used the credit card to make purchases. So now I'm wondering, can we analyze these credit card purchase sites? And this was early days, and of course we do this routinely now, but I didn't know if that would work. Second thing was, they were about to shut down the investigation after a few years, and they were doing a hand search of fingerprint files because they had a partial print. And a match popped up just at the end when they're about to shut things down. And just again, getting back to the point about Mac Gallien, you get someone who's stubborn and sticks with it and you're much more likely to solve the case. Third thing was according to records, this particular individual was in prison at the time. And if they'd come about it from another direction, they would've just eliminated him right from the beginning, but he'd been given a day pass when he committed one of the rapes, and that was not recorded.

Dr. Kim Rossmo:

So I just found that very, very interesting. But so many of these cases each have their own angle, their own unique twist. And I would say it's very few of these cases I don't learn something from as well.

Dan Seed:

And I'm curious when you consult police, where you're invited by the police department, and you're working with the detectives. Are they hesitant at all to go off on a tangent here a little bit? In sports, the idea of the old school manager and the new school guy, who's big into analytics. Do you ever get pushback in that regard? Where it's like, "Hey, I'm just going to do the shoe leather detective work and forget that."

Dr. Kim Rossmo:

I'm sure that attitude exists, but the only way I'm involved in a case is if they reach out and ask for my help. So if they're not interested, I just don't hear from them. I never try to intrude into a case. So it's entirely up to them. I'm more than busy, so not looking for extra work. Even if you did a great job, if they don't follow through on it, there's no real value. So yeah, that's how I limit things, and that's sort of my philosophy.

Dan Seed:

And so, as I mentioned at the top of the podcast, your work has gone beyond crime. In one of those areas where the work can be applied is biological and epidemiological data, to directly identify for example, sources of infection. Tell us a bit about that. To me, it's especially relevant now in the COVID-19 era that we're in.

Dr. Kim Rossmo:

So, some years ago I was approached by some biologists and zoologists from University of British Columbia, and from Queen Mary University in England. And they were interested in potential application. I was quite thrilled by this because I had actually read some books about animal foraging, and hunting behavior to inform my doctoral dissertation.

Dr. Kim Rossmo:

As a consequence, working with people like Steve Le Comber and others, we did a number of studies and started to expand the applications to be foraging great white shark predation patterns in South Africa, that actually got in Shark Week. Invasive species spread, which is I think of an interest in Texas. And then one of the papers we did was to take a look at determining where the outbreak source was for a infectious disease. An epidemiological application, which we were able to publish in one of the journals. So some diseases are spread from a single source, like a contaminated water pool for cholera. Others like malaria, as a result of mosquitoes who breathe sometimes in the most unlikely small water pools. Whether it's West Nile virus or malaria or some of these other diseases. It becomes important to know exactly where to focus your spraying efforts and other such things.

Dr. Kim Rossmo:

So we published a paper on that. But then when the current pandemic broke out, there was interest from some epidemiologists at the Naval Health Research Center in San Diego about applying this to other emerging infectious diseases, COVID-19 is one example. And what I learned from that is first of all, there's no shortage of what they call EIDs. They pop up all over the world. Fortunately most of them are fairly limited in their spread, or risk of contagion, but there's lots of them. And the greater the human population, the more that population intrudes unto forested areas, or wilderness areas, the more interactions there are with animals and insects. And they say the majority of new emerging infectious diseases are zoonotic. In other words, they're linked to some animal. So that's probably an issue that's just going to become a bigger and bigger problem. And the ability to determine exactly where a disease originated, so you could respond quickly, understand it better, save lives, is really, really important. Even right now, we're still debating where COVID-19 originated from.

Dan Seed:

How long does this process take to get all this data, put it together, and then have a sense of where this is originating from? Be it a disease, or be it a criminal. Because you're having to solve, or look at this stuff in real time. But there's a expiration date or a shelf life, I suppose. To where we've got to get this stuff answered quickly. So this person isn't out here, or this disease doesn't spread. So how long does it take to do all this? Because to me, it seems like it would take quite a while.

Dr. Kim Rossmo:

Well, my part of it is actually fairly quick. If someone sends me an Excel spreadsheet with the information, I can usually have it done within a day or two, input, understanding. Sometimes it take a little longer, if you want a written report.

Dr. Kim Rossmo:

The other part though, the biggest part here, is the realization you've got a problem. Again, we saw that with the pandemic. We also see it with serial crimes. You've got a couple of robberies that have occurred some months apart, maybe in two different cities like Kyle and New Braunfels, don't necessarily think of them as being linked. So because of computerization, we're getting much better at connecting those dots. But that's sort of what I've found, that sometimes it takes them a few years to recognize that there's a problem. And sometimes they know literally within days. So to go back to Operation Lynx, that serial rapist operated for a few years before they recognized it, because he was in different cities. If you go to the D.C. Snipers and I was involved in that task force, well they knew within a few days that something was badly wrong. So really, it's that first part, that awareness part. There'll be a little time pulling stuff together, that's in my experience, not too burdensome. And then the analysis can happen fairly quickly.

Dan Seed:

So when you go through this analysis, and you find what it is that you find in a case. Again, be it crime, epidemiology, whatnot for you. You've been doing this for a long time. What is your reaction when you see the data, and it comes together and it's like, I think we know what's happening here. What is that like for you?

Dr. Kim Rossmo:

Well, that's interesting, especially when some things, kind of feedback and connect, that gives you some affirmation. But a profile is just a color map or a piece of paper. That's not going to solve the case. You need then to do... You have to come up with recommendations that are useful. That's where my experience helps. But it's also very important to talk to the people on the ground working on the case, what ideas they have, what limitations do they see. What have they already tried. One of the things I've learned over the years is the importance of trying to get a debriefing session at the end, with the people that are working on the case. And then you talk about it. You talk about the profile results. You talk about what has worked in other cases, and they come up with their own ideas, and you brainstorm back and forth. I think that's very, very important for buy-in, but also for generating useful operational strategies.

Dan Seed:

So you mentioned that the key part of this is meeting with investigators and discussing the cases and going over this. But when you're looking at historical cases, like for example, Zodiac Killer's been in the news of late. Jack the Ripper, there's always stuff coming out about that. How can this be used to help with those cases and knowing the context, where the investigators are long gone. And being able to discuss this with them and take the data and apply it to cases like that. How does this work in that context?

Dr. Kim Rossmo:

Well, sometimes it's just done of interest, but sometimes it can be applicable. There's a potential the Zodiac is still alive. Probably one of the most famous cases that I had some involvement with that was solved, and led to arrest was what's now known as the Golden State serial killer. Many years ago I was asked by a retired detective to take a look at some of, what was called the East Area rapes in Sacramento. And with the development of genealogical DNA, and ability to focus on some of the geography, and some dedicated analysts and district attorney who wouldn't give up in Sacramento, they solved the case and arrested DeAngelo. So you never know, obviously Jack the Ripper's no longer alive. It would almost be a shame to solve that case because it's such a fun mystery, and hundred plus years later.

Dr. Kim Rossmo:

But I did recently something called the Nude Murders that occurred in London. I mean the sixties, that person might be alive, might not be. I think sometimes the family members, or descendants of family members of the victim, like to know that there's been some resolution. So I think that's also a positive. And sometimes it's just historical interest. There's a very famous, sorry, a not so famous serial murderer that stalked servant girls in downtown Austin back in the 1800s, even before Jack the Ripper. And so we did an analysis of that case. It was very interesting going through all the old newspapers at the History Center, and trying to figure out maps and trying to figure out what certain things meant. And you learn about the city of Austin and the 1880s. And so I think sometimes it's informative, educational. Sometimes it's for justice, sometimes for public safety, sometimes just for interest.

Dan Seed:

And so lastly, we're here again with Dr. Kim Rossmo. Before we go here, let's talk a little bit about your time here at Texas State. You've been here a long time. You've had an extensive background, as I mentioned in law enforcement, and working with law enforcement. Why here? Why did you choose to come here? Stay here? And what has this program here meant to you, and working with the next generation of folks going into this field?

Dr. Kim Rossmo:

I've been here since 2003. And I think I was the first research professor hired. The chair of what was then the Department of Criminal Justice, Quint Thurman, knew of my work, and was able to bring me out for some talks. I could see what the area was like. I would say for me, the most compelling thing was the direction of Texas State. That it was growing its interest in becoming an R1. Criminal justice developed the doctoral program, which was very critical. And so this sense of, I guess when I was hired, I felt that Texas State was a can do type of place. I think that's very exciting. Do you want to be someone who helps contribute to the reputation of the place, or do you want to work for a big name place and get your reputation from that. The latter's not that enticing to me.

Dr. Kim Rossmo:

And then your colleagues that you get an opportunity to meet and work with. And I want to say that, that interaction has not been limited to just my school, the School of Criminal Justice and Criminology now. But also with people from geography and some of the other sections of the university. And so you feel you're part of a team and we're supposed to generate knowledge, we're supposed to teach people. And we're also supposed to do service. I'm fortunate as a research professor that I've had really good opportunities to do all of that, and to actually be involved in operational cases and assist law enforcement.

Dan Seed:

Well, Dr. Kim Rossmo. Thank you so much for joining us on this episode of Big Ideas.

Dr. Kim Rossmo:

My pleasure.

Dan Seed:

And thank you all for downloading and listening until next time stay well, and stay informed.

Speaker 3:

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