Ask A Biologist Vol 090 (Guest Catyana Falsetti)

Drawn to Bones

Television portrays the lives and work of forensic artists, but what is it like to really be a forensic artist? Are the tools you see on the big and little screen really used by the people who recreate the face of someone when there might only be a skull or parts of a scull to use as a starting point? Dr. Biology visits with forensic artist and author Catyana Falsetti to learn the answers to these questions and a lot more.

Transcript

Dr. Biology: This is "Ask a biologist," a program about the living world, and I'm Dr. Biology.

While we often look at science and art as two different worlds, they are actually closely linked. For instance, you need to be both creative in both science and art, at least if you want to be successful.

If you think about it, we design buildings, and we design experiments. Both science and art include communication as part of their focus. If you take some time, you are likely to find even more ways science and art really are kindred spirits.

But one career that clearly shows how these two worlds are really one is the forensic artists. These are the people who can put a face on a skull of an unknown person. Often their work is the key to solving a crime or mystery that without their skills, talent, and knowledge might be left unsolved.

My guest today is Catyana Falsetti – a forensic artist who's been helping to identify people for more than 14 years. She and her forensic anthropologist husband, Tony Falsetti, have been involved in a collection of cases and mysteries. When we'll get to go back to, I hope, in this show, with our guest.

Welcome to this show Catyana Falsetti and thank you so much for joining me.

Catyana Falsetti: Thank you for having me. It's a pleasure to be here.

Dr. Biology: Before we delve into your world of the forensic artist, let's talk a little bit about forensic art.

Catyana: There're many different types of forensic art. Forensic, just means it's for use in court. Forensic art can be used to indicate any graphics that are used in court. The most commonly seen types of forensic art are composite sketches.

Composite sketches created when an artist sketches down with a witness to help find an unknown suspect. He'll create an image to be put out into the media to help identify that suspect. More accurately, the person would be a composite artist as the majority of composite artists, that's their main focus. They don't necessarily do the other types of forensics art.

Other types of forensic art are age progression. National Center for Missing and Exploited Children does the majority of those. Although, I have training and other people around the country have to had training for age progressions.

Age progression is for children are done when there are abductions or children go missing to make them look older. It can also be for adults for a long term fugitives, like in the case of John List, Frank Bender create an amazing facial reconstruction sculpture.

There are also image clarifications or image enhancements. They're called two different type-of-things. We'll take video and then try to enhance that and sometimes create a drawing from those images. Facial reconstructions or, approximations, which is when we'll take skeletal remains of an individual and create a face from that.

If there is enough flesh left on a person, we'll also do what I call a post-mortem image. If the person has some decomposition or some scars on them, we'll just use that photograph to create an image that can be put out into the media for unidentified individuals. We have over 40,000 unidentified individuals in the country, there are 1,300 in Arizona.

Dr. Biology: I didn't know that there were that many.

Catyana: It's called the silent epidemic.

Dr. Biology: Where did you start that got you on this path to being a forensic artist?

Catyana: I've always been an artist. I feel like I could probably draw before I could write. My mother always was like, "Here's some paper, go entertain yourself." Coming from a family of artists, that seemed to be the norm. I was always interested in art. I was always interested in history. I liked earth science and biology, found it all very fascinating, origin of human kind.

I always loved museums, loved sculptures, loved looking at sculptures of us, of individuals. Wax museums when they had wax museums, like that was a normal thing. I always wanted to do sculpting, I always wanted to do portraiture. I did my first portrait when I was 12, I think.

I studied fine art at Colorado State University for a year-and-a-half. Then I took my first anthropology course, and had always been fascinated by the origin of human kind. The idea of universal morality, cultures in general, how people developed.

I switched to anthropology and history because it was either you're a creative thinking person, art person, maybe history and English, but certainly not chemistry, biology or physics on the other side. I found that to be very detrimental looking back, looking back, because my grandmother was a pharmacist, a tailor, an oil painter, assuming painter as a well as other creative things and that was normal for her.

She used her creative ability, her spatial thinking for multiple paths and Michelangelo, Leonardo De Vinci, they weren't one or the other because it's all the same.

Dr. Biology: That's actually something that's very recent in history that we started to separate these out. It's not uncommon you have the engineer, the architect, the artist. It goes on and on and what I

found also interesting is the fact that you say you come from a family of artists. Your mother's an artist?

Catyana: And scientist. I guess my father was an engineer. My grandfather was...his department in the treasury, so he was an accountant, a businessman, then the other side that was teachers. They were English teachers.

Dr. Biology: There aren't that many forensic artists in the country. I was doing some research and there's a little over 50, possibly out there. While there may be a lot of jobs, it seems like you'd be in demand because there are lots of places that that kind of skill, both the science and the art are important.

Whether it's a cold case, that's more of a crime or as, we'll talk a little bit, in a bit about the world of mysteries, historical mysteries that are fun to deal with. You obviously have found a love of this and have stayed with it. What is it about forensic artist...what is it that gets you up in the morning?

Catyana: The possibility of helping giving family or individuals the answers to what happened to their loved ones. I have one case, that individual was found in 1975 in Ohio and he was unidentified and buried. In 2012, he was exhumed and then I was asked to do a facial reconstruction.

In that case, I did a clay work construction, there was hair found at the location, so I could use that information and I created a facial reconstruction. It went out on the media and within a day, the niece called in and said that was my uncle. She and her brother both gave DNA samples and he was positively identified.

Dr. Biology: From 1975?

Catyana: Mm-hmm.

Dr. Biology: Wow.

Catyana: I got to meet her and her brother, they were very, very thrilled to have those answers.

Dr. Biology: You mentioned that you were able to positively identify this gentleman with samples from the niece and the nephew, using DNA. If we have DNA, why do we need forensic artists anymore?

Catyana: Everyone thinks that there's a DNA database out there with everyone's DNA in it. For privacy issues and lots of other reasons, that's not true. The DNA of the individual, the unidentified individual would never have been compared to his niece because she's not in the database.

What having forensic art does is through namus.gov, which is the first publicly searchable DNA database, that is solely used for the identification of unidentified persons.

Dr. Biology: You've basically narrowed down the field, since you don't have DNA from everyone, you get the groups that say, "Oh, that looks like my uncle," and then you ask, at that point, "Can we have a DNA sample?" Then you can get that match, which would never be possible otherwise.

Catyana: You said that better than I did. [laughs] That's what all forensic art is. It's to composite sketches, it's to narrow down the field of possibilities. A composite sketch should never be used for an arrest. Facial reconstructions should never be used as a positive identification.

Dr. Biology: One tool.

Catyana: It's just a tool and the step to a positive identification.

Dr. Biology: Let's talk a little bit about the tools of the trade. What are some of the tools that you use in your job?

Catyana: Cameras. Cameras are always very important. When I first started doing this, I would either do a drawing and I'd take photographs of the skull, a stand for the skull to put in the correct position, which is called the Frankfort horizontal position, which is thought to be the most natural position of a person's head in the resting position, so a camera, a scale.

Dr. Biology: So you could make sure you knew measurements?

Catyana: We need to have a scale, because we're going to be using mathematical formula to do the approximation for the nose and the mouth and that kind of information. Historically, we would put the markers onto the skull. Now, with Photoshop, I do it digitally, generally.

Dr. Biology: Are the markers only positioning on the skull spatially or are they also giving you the depth?

Catyana: They give you the depth.

Dr. Biology: The depth. One of the things I'm learning -- just because I like doing research on my guests -- one of the interesting things is you start with the skull. The question is how do you build it up into an actual living, breathing, in the sense of skin and muscles, all that. Part of that is through these measurements that have been done for a long time? People have been studying this?

Catyana: Yeah, historically, I think the first tissue depth measurements were taken in 1893 by a German anatomist named Wilhelm His. He would take the measurements on cadavers and that was the norm until about 2000 when they started using ultrasound.

Mary Manhein did a big study using ultrasound, which changes the dynamic completely because a corpse is lying down, number one, and then they're also dehydrated. Also, the sample size was relatively small and more recently we've been taking it with ultrasounds, with CT scans.

I've been working on a research project with Terri Simmons-Ehrhardt in Virginia Commonwealth University. We've been looking at over 300 CT scans of live people and comparing the soft tissue to the facial bones, and just to see how that impacts the assumptions that have been made historically with facial reconstructions, and creating new data for the future for more accuracy.

Dr. Biology: For example, where is the deepest amount of tissue on a face? Where would you find that?

Catyana: It'd be in the cheek; I mean the lower cheek, right around the molar.

Dr. Biology: With the ultrasound, how accurate are those?

Catyana: They're within 0.2 millimeters. It's very high accuracy compared to the cadaver data, which the first time they would take the measurements, they would take a CT needle, as the article described it. They'd take a needle, put it over a flame to make it black, and then insert it at that point and pull it out and then measure the depth that the soot was gone.

Dr. Biology: It was good but only as good as the technology of the day. Now, we move fast forward, we have ultrasound, and then we have CT scans, what computer tomography, and that allows us to get some very precise measurements and even better, we have it done on living humans so that we can have a bigger sample size?

Catyana: Yes.

Dr. Biology: When we're talking about tools of the trade, we have a camera?

Catyana: All right. [laughs]

Dr. Biology: We have Photoshop?

Catyana: Well historically, we have to have a stand for the skull. We use Duco Cement still to glue the skull together, use cotton balls to imitate any tendons or soft tissue, spacers, as well as clay. We use oil-based clay, or some artists use water-based clay, to do the clay reconstructions and now we're moving into 3D software sculpting.

I've been using Blender (www.blender.org) a lot because it's an open source software that's out of the Netherlands. It's really great for educational purposes and sculpting purposes that anyone can use around the world. There's an artist in Brazil that uses Blender exclusively for his facial reconstructions. Other artists use ZBrush more than anything else.

Dr. Biology: This is sculpting in the virtual world? Does it allow you to try different versions? What ifs? Because that's one of the things that I find the computer allows you to do, to explore much easier than if you're doing an actual clay model. It's a lot more tedious to do and then undo?

Catyana: Yeah, just like in Photoshop, there is layers that you can make visible or turn off. Once you have the skill-set of the software, it's easy. [laughs]

Dr. Biology: What's your preferred tool?

Catyana: Every artist is taught to draw. That's the baseline. Drawing is enjoyable, sculpting is satisfying, but it can take up to two weeks, if not longer. You're also covering the skull and you can't just use a layer to turn it on and off. Photoshop is the fastest and the easiest so far, and I'm transitioning into the 3D software arena.

Dr. Biology: Do you use color in your work?

Catyana: I always provide an image in black and white and we will only do color if there's evidence to back that information up.

Dr. Biology: What do you mean by that?

Catyana: If there's hair found at the scene, then I'll take the hair, and I'll clean it off, and I'll make measurements of the hair, take pictures of the hair to try to get the most accurate color, and that's why Photoshop is great is because you can use the eyedropper to get colors.

Also, if there is any clothing found at the scene -- if there's a shirt with a specific pattern, or a dental implant with a specific pattern on it, we'll use that, or some glasses that are found at the scene, or dental implants, meaning dentures, then we'll use that information in color.

Dr. Biology: Is there a reason to avoid color?

Catyana: People's perceptions are varied and some of the population have expectations of images to be exactly accurate. The more ambiguous we can be about the specifics, like a hair style, or a hair color, or a skin tone, the better, because then it makes the audience understand there are possibilities of variance within that image, hopefully.

I had a forensic artist when I first started, he said, "I did this facial reconstruction."

I think it was in Norfolk Virginia. "I used green clay because that's what they had." They had green clay, he did the reconstruction, and then he took it over and showed the grandmother of the person they thought it was. She's like, "Nope, not him."

We took the dental records, they compared the dental records. It looked like it was him. They took the image over to her again and she said "That's not him! His skin wasn't that color." I think that's the first time that the artist started to realize, is that everyone doesn't have the perception of an artist.

Some people can walk into a house and say "Oh, look this would look great in blue with grey drapes, and this..." Other people walk in and say, "I've no idea what you're talking about, I can't even imagine that."

Dr. Biology: They can't visualize.

Catyana: So we have to accommodate, or try to accommodate, people that can't [laughs] visualize the color differences.

Dr. Biology: What are the most common traits of a human head that we key in on this, when we're looking? What are the things we typically see?

Catyana: Humans generally recognize head shape, first. If you see someone across the room and you think, "Is that my friend?" It's because they kind of have the same body build and gait and head shape, and then...

Dr. Biology: So long and narrow, or rounded, or...?

Catyana: Right.

Dr. Biology: I get it, I get it.

Catyana: Then different people notice different things but, some people have a very large nose or very big eyes, or a big mouth, and that will stand out more. So I don't know, among the features, it's more the positioning of the features.

The features have to be positioned spatially, in the right place, for them to look more identifiable. There are websites that if you google celebrities, they will put Tom Cruise's eyes close together, or something, and they just look completely different.

And that's the good thing about the skull, is the skull will tell us where the eyes are, where the nose was, and where the mouth was, in relationship to each other.

Now, the studies that we're doing is looking down into more of those details of lip width, and positioning of the nose, in relationship to the nasal aperture and the eyes within the orbits. So they're trying to get even a higher level of accuracy.

Dr. Biology: So, if you have a long, narrow, nose, or a broad nose, those are things you're going to be able to know more with these databases.

Catyana: That and where your nostrils are, in the relation to the nasal aperture -- if it's right over it, if it's five millimeters below it, the width of the nostrils.

Dr. Biology: One of the things we are getting to talk about, where you said, "Well, I can't put hair color on someone unless I have samples of their hair." The other question is, how do you know their skin color?

Catyana: Now we're working with DNA profiling and can help more with phenotype, just talking to one of the DNA specialists up at ASU West, and he's going to be helping us with a project.

I said, "Can you help determine what her skin color was," and he said, "Yes, we should be able to."

Dr. Biology: Right, and so when we get into the genetics, there's genotype and phenotype. With the phenotype, that's actually how we looked on the outside. That would be our hair color, our eye color, skin color.

Is the skull accurate enough, or does it giving enough information to know if someone is very symmetrical? Because that's one of the interesting things. We have a tendency to look for symmetry.

So, really balanced on the eyes, balanced as far as the ears, where they're positioned. You getting clues from that or is it not a good reference?

Catyana: No, the bones are the starting point for the whole body, so they're very strong indicators of symmetry. Humans, on average, have four millimeters of symmetry or less, and if they have more than that, then it becomes noticeable.

But everyone's asymmetrical, and that can definitely be seen on the skull and...I mean, every nasal aperture I've ever seen is asymmetrical, and so if you start looking at people's nostrils, it will start to really freak you out.

[laughter]

Dr. Biology: You know, that will be what we'll do from now on, as I'll be looking at everyone's nostrils.

Catyana: Yes. [laughs]

Dr. Biology: I'm looking across at your... are your nostrils symmetrical. [laughs]

Catyana: But that's also an interesting point, is that one reason why people that have had plastic surgery look unnatural is because they look too symmetrical.

Dr. Biology: Right, too perfect.

Catyana: Right, which is unnatural. [laughs]

Dr. Biology: In talking about these reconstructions, you touched a little bit about clay reconstructions can take a couple of weeks. In general, when you used the different techniques, how long does it take to do the reconstruction?

Catyana: For a Photoshop reconstruction, I can do that within a day or two. The 3D reconstruction will take around two weeks.

Dr. Biology: OK. And then, old school, you have to first do the clay model, then do the sketch? Can you ever do a sketch easily, without having the clay model?

Catyana: I would do the sketch first, and you don't need to do a clay model. You do sketch, you can just do a sketch.

Dr. Biology: Right off the skull itself?

Catyana: Mm-hmm.

Dr. Biology: So the process of that is, again, just taking measurements, very precise, measurements on the skull?

Catyana: Yes, taking photographs to scale, having those photographs to either draw by hand over it, on a piece of vellum or a tracing paper.

Dr. Biology: Over the photograph?

Catyana: Over the photograph that has the markers on it, and the scale.

Dr. Biology: When talking about the world of computers, we have Photoshop and we have the 3D software that's coming from the Netherlands and we're using now computer tomography, which are CT scans and ultrasound.

I can't help but also think about the television show "Bones."

Catyana: [laughs]

Dr. Biology: Yes, I can tell you know where I'm going. So, you have your fictional counterpart out there, who is the forensic artist on the program and...

Catyana: I have never seen it.

Dr. Biology: You've never seen it? OK, well, you are Angela Montenegro, just so you know.

Catyana: [laughs]

Dr. Biology: And the intriguing thing about that is she comes from a background of artists as well. It's interesting to me, because she has a background, also, in computer science. Because she's built this amazing computer, that does these three dimensional holograms, they call it the Angelatron.

With Hollywood, we always have to think, "OK, this is neat, but it's not necessarily real," but it does seem like you're moving in that directions.

So, is there going to be a Catyanatron, someday down the road?

Catyana: I don't have a minor in computer science. [laughs]

There are software that are being developed, or that have been and then are being developed, to help create facial reconstructions with varying levels of accuracy and availability and helpfulness. Maybe, but I just feel like it's like computer animation for the movies.

You're always going to need someone with skill behind it to know how to use the tools. So the tools are going to be changing, but to have a creative human mind, cannot be replaced.

Dr. Biology: No, and when this case, Angela...she uses it, and she's the only one that knows how to use it. Anybody else that tries to get on that machine, or that instrument, it's always a challenge for them to use it.

Let me shift into an area that we do with all my guests on Ask a Biologist, no one gets to get out of here without answering three questions.

And yours will be a little bit unique because you're going to have the science and the arts part. So, the very first one is -- when did you first know you wanted to be an artist, or a scientist?

And since you have... you do both, where was the, what I call, the "Aha!" moment? Was there an "Aha!" moment that you said, "Oh yes. This is it?"

Catyana: I started studying forensic art in 1997. The reason I got interested in it was because I actually read a novel, because I always loved murder mystery novels.

I was in Brazil, I think I had two weeks there and I just kept reading through...I read six or seven books in that two weeks. I don't even remember the book, but I remember that there was an anthropologist who did a facial reconstruction to help identify an individual, and I thought, "That's what I want to do."

Dr. Biology: Now, was it...the course was set?

Catyana: Yeah.

Dr. Biology: And how old were you, again?

Catyana: 21.

Dr. Biology: 21? OK. Now, the next question is...I'm going to take all this away from you, so I'm going to have to take away quite a bit. You're not going to be an artist.

Catyana: I don't think I'd be alive, then. [laughs]

Dr. Biology: Well, hope we can figure out something there. And I'm going to take away the anthropology side and some of that. If you could be anything, or do anything, what would you be, or what would you do?

Catyana: I mean, so that excludes writing, too?

Dr. Biology: No, I think that includes writing. You want to be an author?

Catyana: Yes, I just finished and published my first novel. It's a murder mystery novel called "Facing Death," and it's digitally published now on Amazon and NOOK and iBooks, and some other platforms. It will be available for print in the next few weeks.

Dr. Biology: What's the character?

Catyana: The character is a forensic artist.

[laughter]

Dr. Biology: What's the first rule of writing? Write what you know.

Catyana: Yes, and I did. It's the first book in the series and I hope to highlight a lot of the issues with unidentified decedents, as well as some other lesser known important issues that speak to me, like the Japanese internment camps in America, or massacres in Colombia, or the mass deaths in South America, or other places around the world.

I want to highlight and educate people in an entertaining way, as well as educate about forensics in general. This first book I started 13 years ago, and it's kind of a coming of age for a young woman in the forensics field, which, especially at that time, was heavily law enforcement. So, there were fewer women.

Dr. Biology: What advice would you have for young CSI person, someone that wants to be a forensic artist? What would be your suggestions?

Catyana: As far as majors go, I would say getting a degree in something like criminal justice or forensics sciences, a major and a minor in fine art. If you're an artist, you should always have strong drawing skills. In addition to that, computer animation skills or computer software skills.

Dr. Biology: Well, on that note, Catyana Falsetti thank you for being on Ask a Biologist.

Catyana: Thank you for having me.

Dr. Biology: You've been listening to Ask a Biologist, and my guest has been forensic artist, Catyana Falsetti. If you'd like to continue to explore the human skeleton, and learn a bit more about bones, leave a fun section on our companion website called "Busy Bones."

Just point your browser to askabiologist.asu.edu/busybones, and you will find a collection of games, simulations and experiments, all focused on bones. If you'd like to catch up on the earlier interview with Tony Falsetti, you can just go to our podcast section and look for "Skeleton Secrets."

The Ask a Biologist's podcast, it's produced on the campus of Arizona State University and is recorded in the grassroots studio, housed in the School of Life Sciences, which is an academic unit at the College of Liberal Arts and Sciences.

And remember, even though our program is not broadcasted live, you can still send us your questions about biology using our companion website. The address is askabiologist.asu.edu, or you can just google the words, Ask a Biologist.

I'm Dr. Biology.

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