

Field Notes Ep. 8
Where Can a CEE Degree Take You?
School of Civil and Environmental Engineering
Georgia Institute of Technology

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JIM ANDERSON: That's a good example of what's happened throughout my career, is before you know it, you take a lot of those adjacent leaps and you end up in the world of social media.

JOSHUA STEWART: From Deformable Bodies & Fluid Mechanics to social media, flying 747s or helping inventors patent their ideas. On this Field Notes, how far and wide a civil or environmental engineering degree from Georgia Tech can take you from where you started.

<THEME MUSIC SWELLS AND FADES>

STEWART: Welcome to a new episode of Field Notes from the School of Civil and Environmental Engineering at Georgia Tech. I'm Joshua Stewart. This season, we've been talking a lot about what you can do while you're in school at Tech. So I think it might be fun to pull back a bit and see where your C-E-E degree can take you in life. This doesn't exactly apply in the podcast world, but the too-long-didn't-read version is: a lot of places you might not expect. Like flying commercial airliners. Or to law school, where a love of environmental law becomes a thriving career in intellectual property, a book deal, and a guest spot on a PBS TV show. We'll get to both of those in a few minutes. But we'll start in the world of social media.

ANDERSON ON MSNBC: There's more than 500 million tweets that go out a day across Twitter. And so, yeah, 16 or 17 tweets is very active for a president, obviously, but out of 500 million? And yes, he has millions and millions of followers on Twitter, but people are doing other things throughout their day. So the chances of you, if you follow him on Twitter, actually seeing what he puts out are really quite small, just arithmetically.

STEWART: That's Jim Anderson, CEO of a company called SocialFlow, talking — with just a touch of engineering flair — about President Donald Trump's use of Twitter on MSNBC's Morning Joe in early 2018. What would probably surprise you, were you not listening to a podcast from the School of Civil and Environmental Engineering, is that he's also a Tech grad with a degree in civil engineering.

You may not know Anderson's company, SocialFlow. But I'd just about guarantee you've been touched by its work. His clients include the New York Times, the BBC, iHeartMedia, Disney and many more. The company provides software to publishers that helps them distribute their content on social media and make money from it.

Jim's here from his office in New York to connect us from engineering to e-publishing. Hi, Jim!

ANDERSON: Hey. How are you?

STEWART: Good! Thank you for making some time for us.\

ANDERSON: Glad to do it.

STEWART: Why did you want to study civil engineering when you came to Tech?

ANDERSON: Well, it's funny. This is gonna sound incredibly ironic based on what I do now. I started out a computer science major. And I changed to civil engineering. I did about a year of it. And I was doing my introductory coding, and there was something about that, and electrical engineering and other forms of engineering, that I just didn't find terribly tangible. And one of the things I had always loved, even as a kid, is I would walk by construction sites and look at the big yellow iron digging holes in the ground, and those kinds of things. I always really loved the, the tangible nature of construction. And so as I was looking at various options, you know, sort of just finishing up my first year in computer science, civil engineering was really quite appealing to me, because, you know, we all can see things that are built in the constructed world, and I thought that was appealing then. I still find it appealing, I still stop by construction sites and stuff and watch them.

STEWART: And you actually started your career, you were consulting on geotechnical engineering and environmental issues. As you went through your degree, was that sort of the plan? You got interested in geotech and said, that's a good place to go?

ANDERSON: Well, it's interesting. So I got two civil engineering degrees from Tech. I got my masters in Geotech at Tech as well. And I started out with CH2M Hill, a big consulting firm, and the intent was to do more geotech projects. But of course, you know, one of the early lessons I learned — and this applies, you know, throughout your life — is the economics dictate a lot. And so, the economics of the engineering business at that time were, there was a lot more environmental engineering work than there was sort of classic construction work, especially in and around big cities. And so I just got steered that way. And at first, it was remediation projects, you know, diesel fuel contaminated soil. I worked at a uranium enrichment facility in Kentucky that had uranium contaminated soil, but it all sort of was tied back to soil and geotech. But then over time, I ended up being exposed to other areas of environmental, including air permitting, right? Air emissions from factories have very little to do with geotechnical engineering. But they were sort of adjacent to what I was doing. So that's a good example of what's happened throughout my career is, before you know it, you take a lot of those adjacent leaps. And you end up in the world of social media.

STEWART: So bridge that gap, that path that you travel from geotech and environmental engineering work and getting involved, really, in the early days of the rise of the Internet.

ANDERSON: 1997 was really the formative years. So I had just turned 30, I think it was 31 at that point. I really enjoyed the work I was doing at CH2M Hill; enjoyed the people, enjoyed the clients. But what I didn't enjoy was the tough economic conditions, right? Everybody was struggling to grow. If you were going to grow your business by 3%, it meant taking 3% market share away from another company. And so, you know, a lot of times, and we talk about this a lot in the context of the civil engineering curriculum, you know, you don't spend a lot of time in school studying economics and the business side. There's only so many hours you can take, and there's so much you need to learn on the engineering side, it's sort of up to you in the business world to pick up the business side of, you know, who pays the bills? And why, and how do you get the projects and how do you, you know, advance your career, get promoted, get raises, all the things that you want to do throughout your career. So I was sort of looking around and saying, wow, this is really a tough economic environment, you know, you it's sort of, I can continue to slog away and deal with this competitive pressure. But I have this opportunity to jump over into an adjacent space. It was the internet business, again, back in 1997, back when dial up internet was the rage. And there was this company in Atlanta called Mindspring, you know, which was one of the early internet service providers, and they were doing amazing things. They had just gone public. And it was, it was the rage. And I just, through a fairly long series of coincidences in circumstances, I had the opportunity to join Mindspring, and I'm like, why not? Why not try that? And by the way, the other thing that's worth mentioning at that point, there weren't people who went to school to study the internet in 1997, right? Everybody who went into the internet business came from somewhere else. So it wasn't really as unusual as you might think, for a civil engineer to be jumping into the internet business, because, you know, everybody was coming from somewhere.

STEWART: So how did you end up ... and maybe we should, maybe the question is, what were you doing with Mindspring? I sort of think of that as more of an access company. You were, it was more about getting people connected to the, this web. Whereas now, you're very much in the content business. And a lot of ways, I mean, you're still connecting people with content, right? But ...

ANDERSON: Yeah, well, the common denominator is software, right? So what did I do at Mindspring? I did a lot of things. But they all revolved around software and having talented engineers, in this case, software engineers, product, you know, the developers, developing consumer experiences that, at that time, were access to your desktop or laptop, these days, might be accessed through your mobile phone. So I learned quite a bit about software product development. Again, the irony that I started out at Georgia Tech a computer science major is not lost on me. But it really is more business than it is, you know, coding. I don't code at all, because A) I am terrible at it. My skills, they don't code in Fortran anymore, right? I mean, it my skills are completely not relevant in that space, but software is the common thread. And so right now, SocialFlow, we do connect people, but we're a software company. We provide software to people like the New York Times and the Wall Street Journal and The Washington Post to allow them to get their content out to Facebook and Instagram and Twitter, etc. And so at Mindspring, and then Earthlink, which Mindspring became a part of, that's what I did there, too, is I managed software and teams of engineers developing

software. And then reconciling the, the, the software and the technology piece with the business case.

STEWART: It seems like even though software engineering is different, it would seem like understanding the engineering mindset, really being trained with an engineer's mind, would have to be really valuable in that in that endeavor.

ANDERSON: Yeah, I tell people that all the time. I think the engineering education, regardless of your discipline, you know, first and foremost trains you how to think, think analytically, think quantitatively how to break problems down, I deal with a ton of spreadsheets now. And I'll create sort of ridiculously complicated spreadsheets, that they're mostly tracking dollars. And, you know, they tend to be economically driven, you know, what's the business model? What's the forecast? What's the revenue growth, what's the market share, you know, all those types of things. So it's not quite, you know, active earth pressures and passive earth pressures and, and the kinds of things that I would be using, maybe not spreadsheets, but software for if I were, you know, more directly practicing engineering. But they are problems and there are a lot of, you know, foundational elements that I find incredibly important and useful to everything I do today.

STEWART: You said something to me when we were talking about doing this interview that I really thought was pretty prescient. And that was that you could very well end up working on projects closer to what we might think of as traditional engineering — like autonomous vehicles or smart cities — before your career is over.

ANDERSON: Yeah, I hope so. It's interesting. And right now, it's funny that the interim step before I get to autonomous vehicles right now is blockchain. Our company is doing a lot of work in and around blockchain, which is its own crazy and innovative space. It's filled with, you know, all manner of overhyped nonsense as, as, you know, hot markets get to be as well as the internet, right? If you think in 2001, back in the dot-com boom, right?

STEWART: The just pre-bust era, right?

ANDERSON: Yeah, yeah, it was craziness going on there. And so the blockchain space and Bitcoin and all of the cryptocurrencies going around it, there's no small amount of hype. But I'll tell you, I feel the same sense about blockchain and the core capabilities that I did about the internet. I think it really has the ability to be transformative in a way that not a lot of things do. And so I don't know how long that run will go, or whether that will even lead me back to autonomous vehicles, which I think are another really potentially transformative technology or capability. Trying to predict exactly how it will play out is, is maybe a little farther than I can imagine right now. But I can absolutely see it, and I've never lost my love of engineering or my love of, as I mentioned, construction sites and, and things in and around it. So, you know, we're all the product of our cumulative experiences, and so it wouldn't surprise me one bit if I end up back in a space that looks a lot more like traditional civil engineering.

STEWART: Yeah. Well, it is always a pleasure and I always learn something when we talk Jim. Thank you so much for making the time today.

ANDERSON: Certainly.

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STEWART: We're going to drop down the coast just a bit to the Washington D.C. area now, where we found Andrea Hence Evans, a patent attorney running her own firm with a just-published book on the patent process. She also was a mentor on the second season of the PBS TV series Make 48.

It all started with a civil engineering bachelor's from Georgia Tech in 1999 as well as a math degree from Spelman College. But Evans always knew the law was going to be part of her future.

ANDREA HENCE EVANS: Actually, I did know that I always wanted to ultimately become a judge, and Judge Wapner was the inspiration behind that. I actually come from a family of scientists and engineers, but I was always the one in the family advocating for everything, from going to the store saying, hey, you counted the wrong change to seeing a price in the store that was incorrect, and, you know, being overcharged. But ultimately, I ended up going to George Washington law school, and you have to actually have a science background or some type of engineering degree to pursue patent law. And my professors, they encouraged me to take the classes, to work in the field. And I ultimately fell in love with intellectual property.

STEWART: That's so interesting. So you knew to get there, you had to have some sort of technical background. Why did you pick civil engineering to help you get to that point?

EVANS: Well, while I was at Georgia Tech, I was really active in the community. So I was going out in the community doing community service. And basically, what I found is that a lot of neighborhoods were purposefully dumping trash in their backyards, just because they didn't, they were misinformed about what was required to help not have their backyards flood during these storms that were occurring. And so ultimately, I thought I'd go to George Washington to pursue environmental law so that I could be an activist, an environmental activist. But that's when I learned that you had to have the science background or the engineering background. That's when I took those classes. And that's when I found out about patent law. So I actually didn't plan to be a patent attorney, I planned to be an environmental lawyer. But hey, fate took another turn here, I guess

STEWART: Do you use your engineering background, you must use it on a on a pretty regular basis, then.

EVANS: Oh, every day, You can imagine my target audience is essentially independent inventors. So these are the inventors that are in their garages, tinkering with things. Some of

them have great ideas, and you can't ultimately patent an idea, so we have to talk to them more about going from an idea to having a real invention and being able to describe it in a way that someone can make or use that invention. We never can really call the invention what it is, so I need to understand how things work, I need to understand synonyms to be able to do proper searches. Because the search is ultimately the most important thing about having an invention, because that's going to help to determine if you have something patentable and help you to determine what steps will be required to best protect those inventions that you have.

STEWART: So you're now running your own firm. I just wonder what does a day in your life look like?

EVANS: Well, a lot of emails, but it is a lot of fun. And I love most about this is that I represent a range of clients with a range of different technologies and different inventions. I'm also a trademark and copyright lawyer, so I'm able to help to protect their brands. And my passion is ultimately educating people about the importance of protecting their intellectual property. So a typical day requires me to have my computer with me. And it I'm working on researching to determine if someone has something that's patentable. We're looking at what we call prior art. So reading a lot of patent applications, talking to a lot of clients to distinguish their inventions around the prior art that we found, or this research that we found. I'm writing a lot of patent applications based off of that. I'm in a lot of meetings, on a lot of calls. But I love what I do, I cannot complain about it. I rather be busy and have work to do and have success than have a business with no business.

STEWART: That's right. You've just published your first book about all of this. It's called, "All About Inventing." What is your goal with that? Who should be reading it? Who are you trying to reach, and what are you trying to tell them?

EVANS: The full title is, "All About Inventing: Everything You Need to Know About Patents From a Former USPTO Patent Examiner and Patent Attorney." So what's unique about my background is that I actually worked at the patent office for three years as a patent examiner and then two years as a trademark examining attorney. So now, having had this firm for 11 years, I speak around the world talking about the importance of protecting patents. And what I found is that a lot of inventors have these great ideas. And they're really burying them in their backyards, or they're scared to talk to people about them, they don't know who to talk to, or what to do. So this book is written for that inventor. So it ultimately goes from having just an idea to being able to describe that in a way that it's a real invention. And what I hope that this book will do for inventors is to help them to navigate the patent prosecution process, and then read this book and ultimately take it to a qualified attorney like myself, to help them to protect their patents and, you know, their inventions. Because there's so many different shortcuts and companies out here that will take advantage of inventors, and at least reading this book, they'll be able to say, oh, but I know that this is supposed to happen next, and they'll be more informed and educated.

STEWART: Yeah, it's interesting. It doesn't really, it's not like a do-it-yourself book. It's a, here's what you need to get ready so that you can then actually go work with an attorney really effectively and patent your idea.

EVANS: Yes, and I that is what I'm extremely proud of. Because what I found researching and writing this book is that there are books that either go from one extreme to the other. That is, you don't need an attorney, let me teach you how to write this patent application — which I would never recommend you do, because so many people try to navigate the process themselves and then they jeopardize their rights. So that's one extreme. And then I've seen other books that will say, hey, you don't need a patent. Here's why you don't need a patent. And let me tell you what to do and why you shouldn't get a patent. So this book is making you a more informed consumer. So that way, you know what questions to ask, you can have a more informed consultation where the attorney is not spending time teaching you generic things. They're specifically talking to you about your specific intellectual property issue.

STEWART: So I have to ask you about this other thing that is occupying your time or has been, and that is this PBS maker series Make 48. And as I understand it, the idea is, there are some number of teams, and they have essentially 48 hours. They come up with an invention, they make a prototype, they've got a plan marketing and build their pitch. And you're one of the mentors who are helping them through this process.

EVANS: Yes, and it's only taken up 48 hours of my time, because the show was literally taped in 48 hours. And it was an incredible experience. So the way the show is set up is, there were 12 teams. And on the spot, they give them a very broad topic. And the clock starts, and they have to invent something, solve a problem, make a website and market it, pitch it, and even build a prototype in 48 hours.

STEWART: Oh, my goodness, it sounds exhausting.

EVANS: It was a lot of work. And I'll tell you, because of the nature of the show, and because it's not normal to invent in 48 hours, there was a lot of pressure for myself as the patent attorney doing the research, but also the teams, because you don't want to hear that your invention that you created in 10 minutes is not patentable. But if you look and you see that the team next to you has created something and they're already at the phase of making it, it's a lot of pressure for you to move and act on that. So one team may have had, you know, five inventions that needed to be researched because maybe you search the first four and they weren't available. So it was a lot of work but a lot of fun.

STEWART: So you were going through your entire process multiple times in those 48 hours too, then. Just to see if what they were coming up with was patentable?

EVANS: Yes. And I do that every day, but just not under those time constraints with cameras next to me.

STEWART: The full season of Make 48 is now available at PBS.org to stream. Here's just a taste of Evans in action, helping a team who came up with a lighting fixture for outdoor plants.

MAKER TEAM MEMBER: So that's kind of a little bit different than that design, that also, because it's not even that type of light. They're talking about one, like a fluorescent type of light or whatever.

EVANS: Did you create that light, though? That's what I'm worried about. Cause they'll just put any light there. If this light exists, they'll take the lights out of this at the patent office and say that it's obvious to use the ABC Company lights.

STEWART: Andrea Hence Evans is a patent attorney in the Washington, D.C., area, author of the book "All About Inventing," and you can see her on the second season of the PBS show Make 48. Thank you so much. It was a great to talk to you.

EVANS: Thank you. Thank you again.

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STEWART: Our last stop on this trip takes us to Rick Garcia, who retired in 2009 with more than 30,000 hours flying cargo and passengers — mostly for Delta and later for Singapore Airlines. He captained almost every type of plane in Delta's fleet — the old 727s, MD-88s, 757s, 767s, 777s, and then 747s for Singapore. How does a Georgia Tech civil engineer end up spending a career as an airline pilot? Rick's here to tell us that story from his home in Naples, Florida. Hi, Rick!

RICK GARCIA: Hi. How you doing, Josh?

STEWART: So you graduated in 1973, had a civil engineering education, and you set out to do what, with that, in life?

GARCIA: Well, I actually started flying in high school. My brother was a pilot with Eastern Airlines. So I had already started flying. So when I started Georgia Tech, I actually started out as an aeronautical engineer. And just, 45 years ago, it's the same as it is today. You can switch, one switch no problem. And I guess in after two semesters, I realized I didn't really want to build a bolt in the back of an airplane. I wanted fly. But my dad had grown up, and I had grown up my dad's construction company. And so anyway, I just went over and visited civil engineering department and thought it'd be a good fit. So I made the transfer, I think mostly because it would give me a more general engineering background in case I wanted to, you know, there was a big chance I wouldn't make it as an airline pilot, because that's

STEWART: It's competitive.

GARCIA: Back in those days, it wasn't easy. Very competitive.

STEWART: Yeah, I mean, even now, it's hard to sort of get to the place where you're flying for the big airline and flying the big planes, right? So it sounds like you were sort of keeping your options open.

GARCIA: Yeah, exactly. Exactly. And I did like civil engineering when I got into it. I was 17 years old; I had no idea what engineering was, I didn't know there's different disciplines, you know. So everybody takes the same subjects the first two years, so that didn't make any difference. But then I got into, oh, concrete, and actually ended up kind of flowing into fluid mechanics. I had Dr. Martin there that I ended up, as you always do as a senior or whatever, you end up spending half your time down the lab doing projects. And it was a tough decision when I graduated, because I actually had three huge choices to make. Dr. Martin wanted me to stay in the his program and get my master's degree. I had an offer with Chicago Bridge and Iron to go to work for them. I ended up following the flying, and it worked out for me.

STEWART: Yeah. So I want to talk a little bit about your career. What was your favorite plane to fly? I hit in the in the intro, you flown a lot of them, a lot of the ones that people know of and that they have flown on. What was your favorite to fly?

GARCIA: Honestly, the most fun airplane — if you remember the movie “Casablanca,” at the very end, when she, when they take off, that airplane, that's called a Beech 18. It has two big rotary engines, carries about 5,000 pounds, and had as tail wheel. I flew that after I got out of school, because I probably had 300 hours when I got out of school and you need 1,500 to get a license as an airline pilot and a lot more than that to be competitive. So I was flying cargo out of San Jose, California, and I flew that airplane every night, eight hours a night, for about a year and a half. You had to fly it every second till it stopped.

STEWART: Oh, no autopilot. No, technology really.

GARCIA: No technology. Yeah, you just flew.

STEWART: Did you have a favorite route?

GARCIA: When I retired with Delta, I'd actually made it to the top and was flying all my routes to Europe. So I got to fly to every city in Europe, which is fun. Flying to Nice was the best; just a wonderful city. I got to know, actually know people in the restaurant cause I went every Monday, Tuesday, Wednesday. But then when I went to Singapore, all of a sudden things changed and you'd go on a 15-day trip. You would leave Singapore, fly to China, Japan. Pick up cargo. Fly, we'd stop in Alaska, get off. New crew would get on. You'd wait for the plane the next day. Take that plane to Dallas or Chicago or someplace in the States and we go from there to Europe, Frankfurt, the Middle East. Then from there, you'd go to India or Africa and then back to Singapore. That entire, around the world took 15 days.

STEWART: I was gonna say, you were basically circumnavigating the globe once a month.

GARCIA: Exactly once a month. So you'd fly 15 days and have 15 days off, which was one of the benefits of have a flying career. I guess you have to have the right personality. But you know, to be gone that long, but then to be home that long. So I have four kids. And they remember when I worked with Delta, and I'd be gone. But they also knew that when I was home, I was home. You could coach baseball. And actually, we moved to California, and then I got to use my civil engineering degree because I decided to buy some land and I built a house, built a farm, had 20 acres. And, you know, I just drew up the house — a big barn and a house on top. But you know, I had enough knowledge to know, step by step, it's easy to get something done. And I think Georgia Tech taught me that.

STEWART: Why did you pick Georgia Tech?

GARCIA: That was very, very lucky. I was 17 years old. My parents had moved to Atlanta right at that time, and actually it was the closest school to where we lived. And I was just lucky that they took me I guess. You know, it's funny though. My mother, my mother had never gone to college. But she knew the fight song, the Ramblin' Wreck fight song, because I was born in 1952, and that's the year that we won the national championship.

STEWART: Yeah.

GARCIA: And the song actually was on the radio and became number one that year.

STEWART: So do you still fly?

GARCIA: I have not flown ... I took my grandkids up probably about six years ago. And they said, Wow, that was fun, grandpa. Thanks. And they've never asked me to fly again.

STEWART: And that's it.

GARCIA: But what I did do when I was about 50, when I had up, you know, I flown, you know, 30 years already, I really got interested in sailing. So I went back and got a merchant marine license and got into boating. And, you know, it's one of those things that, even when I thought about it, you know, I mean, having my Tech education, it's like, well, if I can graduate from Georgia Tech, I can certainly get a merchant marine's license. How do you start? I went on, you know, found out how to do it. And eight months later, I was a merchant marine, which I never, you know, tried to make money doing, but what I have done is taken my whole family on sailing trips around the world.

STEWART: Well, Rick Garcia, it has been great to talk to you. Thank you so much for sharing your story.

GARCIA: Hey, thank you. I hope if any young high school kids have any questions, let them reach out to me. I'd be happy to talk to them.

STEWART: If you are interested in chatting with Rick or some of our other alumni to ask them about their careers or how their degree has helped them, just send us an email at communications@ce.gatech.edu and we'll connect you. That's the same address where you can send your comments, questions or thoughts about our podcast — which you have reached the end of, for the moment.

A quick programming note seems appropriate here. We've thoroughly enjoyed bringing you stories in a different way through this audio version of Field Notes. And I am deeply appreciative to all of you who've been listening. For the moment, we're going to take a hiatus from producing new episodes. We'll see what the future brings, but in the meantime, our series lives on our website at ce.gatech.edu/podcast.

Since we started this journey, a bunch of other folks at Georgia Tech have spun up podcasts that you might want to check out in our absence, including [The Uncommon Engineer](#) from the College of Engineering that's hosted by Dean Steve McLaughlin. He has lots of interesting conversations about the leading edge of research at Tech and, shameless plug here, that includes School of Civil and Environmental Engineering Professor [Pat Mokhtarian, who talked all about the future of transportation](#). Check that out when you have some time.

For now, that's it for Field Notes. Keep in touch with us across the web. We're on Instagram, Twitter and Facebook at CEE-at-GT. That's the letters C-E-E-A-T-G-T. I'm Joshua Stewart. We'll see you next time.

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