



Sloan Career Cornerstone Center

Profiles of Mechanical Engineers



Corinne Connon

**Assistant Professor, Mechanical Engineering
Colorado State University
Fort Collins, CO**

Education:

Ph.D, Mechanical Engineering, University of California, Irvine
MS, Mechanical Engineering, University of California, Irvine
BS, Mechanical Engineering, University of California, Irvine

Job Description:

Assistant Professor of Mechanical Engineering, with research interests in particle mechanics with applications in HVAC and collaborative work with the Department of Biology on biomechanical studies of fish.

Advice to Students:

"I think it's important that everybody take an EIT (engineering training exam). It's your first step toward a professional engineering license."

Comments:

Corinne has work experience in petroleum production and nuclear power, but chose education because it offers a unique combination of research on the cutting-edge of engineering and teaching.

Video Transcript 1:

"I think it's important that everybody take an EIT. It's an engineering training exam. It's your first step toward a professional engineering license. I took mine at the beginning of my senior year and I think that's sort of the time frame you should be looking to take it. If you choose an industrial job, there are many places that eventually will require that you take your professional engineering license. And you have to have your EIT before you take your professional engineering license. It comes in handy."

Video Transcript 2:

"And now I'm looking at, of all things, the evolution of fishtails. I'm in a collaborative project at the moment between the biologists or biology at UC Irvine and the mechanical engineering department."

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Interview:

It's also important to have contacts. Take time to get acquainted with a faculty member, introduce yourself when you're still a junior. Maybe you will work for them, maybe not, but add them to your repertoire of contacts. When the time comes to apply to graduate school, they can be instrumental in getting you into programs on your own campus, or they can introduce you to professors at other universities and tell you things about departments that you probably would never discover on your own.

Q: OK, why don't you tell us who you are and your current status?

Connon: I'm Corine Connon and I'm currently a Ph.D. candidate at UC-Irvine. And I am closing in on my final months. Got about nine left, so I'm in the process of not only looking for a job but also trying to wrap everything up and bring it to completion.

Q: Tell us about the progression from how you get interested in engineering to start with, to what made the difference in getting into graduate school. And tell us where you went to school, the different places, things like that.

Connon: When I was growing up, I spent a lot of time with my father working under cars and just building things in the basement. And so, when it came time to choose a career path, there seemed to be only two choices -- mechanical engineering or architecture. And it just happened to be that I got accepted at a school that I felt most comfortable at, which is UC-Irvine for my Bachelor's program, so I decided to go into mechanical engineering. And the reason I liked the campus was purely because it had a lot of parks and very few buildings and it was small and quaint. But still, it was part of the UC system. I went through my college career and was completely convinced I was going to join the corporate world and just be a normal engineer and carry on my merry way. But closing in, I had a few internships near the end of my Bachelor's -- one with an oil company which was a lot of fun. I worked in the oil fields and got a taste of kind of the roughneck-type life and learned how engineering is applied in real life. And then I had an internship at a nuclear-power plant, which I thought would be very much up my alley, very high tech, very design-oriented. It was everything to the contrary; everything had already been done. They didn't want to change it and I didn't feel like I fit in. And I chose to go on to my Master's degree and at that time it was very controversial to go on to a Master's degree. I had lined up a job and I had a secure future and there were hardly any jobs when I graduated in 1992. There were very few engineering entry-level jobs available. So, when I decided to go to graduate school and give up a job offer, many people thought I was stupid. But the reason I did was, because I didn't see that job or any job that I could get a hold of at that time, giving me the flexibility to be kind of "cutting edge," if you want to say that. But mostly just using all my engineering talents, using everything I'd learned in the last four years. So, I went to graduate school and did my Master's at UCI under a professor, who I told, "I'm going to join the corporate world and I'm only going to be here for a year and a half or two years and that's it." And my professor gave me an ultimatum halfway through my Master's program. He said, "You have to decide if you're going to carry on for your Ph.D. or not, and you have to decide in a month because I have to find funding for you." So I had to sit down and make a choice, and how I made that choice was to evaluate what I had done in the past, all the different jobs I had including my internships, my different counseling jobs, and teaching positions I had had. And I came to the conclusion that the real job that I wanted integrated

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engineering -- cutting-edge engineering -- research and design, and would be teaching-oriented. And what's that equal? It equals a university life. So, I walked into his office and said, "Yeah, I'm going to go on for my Ph.D. Here I am, whether you like it or not." That's how I got to where I am now.

Q: Tell me about your research.

Connon: Well, I do a couple of different projects. The group that I am in, we do not do just one particular area of research. Everybody in the group does a different form of research. My area of concentration -- from my Master's thesis and my Ph.D. thesis -- is "spray atomization," mainly looking at droplet/droplet interactions at a specific thermodynamic state called "supercritical." I've done other research including HVAC -- which is heating, air conditioning and ventilation. In particular, I was looking at smoke, or contaminant, transport through a model room, experimentally. At that time, there was the controversy about whether restaurants were "smoking" or "non-smoking." Did smoke get into the nonsmoking section or did it not? How should we be setting up the ventilation systems? So I looked at that. I've also used many different laser-diagnostic techniques to look at a variety of different atomization processes and HVAC processes. And now I'm looking at, of all things, the evolution of fishtails. I'm in a collaborative project, at the moment, between the biologists at UC Irvine and the Mechanical Engineering department. We're using laser-diagnostics techniques that engineers use every day, or research engineers use every day and taking it to the biology people who don't know anything about it. So, what I do is I map a velocity field behind a fishtail. And from the fluid dynamics, I can help the evolutionary scientist decide if what he thinks is happening is actually occurring -- and if how a fish actually swims is being contradicted with these results, and if the evolution of the fishtail has been completely based on how people perceived how fish swim. So, this is just one of the many interesting research aspects that I end up in.

Q: So you started off in mechanical engineering and now you find yourself in seafood?

Connon: A little bit, yeah. It's a lot of fun. It's nice to be able to use your talents in a variety of different subjects. And I consider myself a specialist in thermodynamics -- supercritical thermodynamic behavior -- but I like the change of scenery, to go over and look at biological sciences and be able to apply what I know in that field.

Q: Have you gotten family support for this? How does your family feel about this?

Connon: They were more than happy to let me go to my Master's program. They thought that was a good idea. When I told them I was going to get my Ph.D., they were a little unhappy. My family mainly were farmers and then my father was the first person to go to college. So, to have a child think about becoming a professor, he didn't know anything about that world and he kind of thought maybe it was a silly job and you shouldn't go do silly things, you should go do practical things. And over time though, he's realized that I've thought out a career and I've thought out the job opportunities. And I've not closed any doors and he respects the decision I've made. And I'd say now he's very supportive. But in the beginning, it was sort of a rough time, a couple years of rough, non-family support. That's not unusual. I think that's very typical, actually, of Ph.D. students. I think a lot of families don't encourage you to take the next step.

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Q: Where did you grow up? Talk about that.

Connon: I grew up in Canada. Well, I was born in Canada but we moved every two years to many different places. My father was an oilman so the range of places were, wherever oil was. It was a good, kind of "naturalist" life. In Canada there weren't a lot of cities at that time and the cities were small where I lived. And so a lot of the things that I learned to appreciate have always been natural. That's why I chose UC Irvine because its surroundings were very park-like and forest-like.

Q: Do you have to get straight A's as an undergraduate to succeed in graduate school?

Connon: No. I am definitely a testament to that. I had too much fun as an undergrad. It helps if you keep your average at least at a 3.2. If you're below that, many schools won't look at you. But you can still have fun and goof around and make mistakes your first two years but you have to turn it around in the end. If you want to go to graduate school, you have to turn your grades around and make some very positive grades -- very, very positive grades in the last few years of your education. It's also important to have contacts. Take time to learn a faculty member, introduce yourself when you're still a junior. Maybe you will work for them, maybe not, but just create a repertoire and when it becomes time for you to apply to graduate school, they'll become instrumental to your enrollment in the campus that you're currently at. But they'll also be instrumental in introducing you to many other professors in other universities and telling you things you probably would never know about like, "Yeah, they're only ranked 50 in the nation but their area of combustion is number two and you should really consider that. They're not top choice if you get in there." Those are important things to know, that you wouldn't find in a book or in the newspaper.

Q: Any surprises as a graduate student, that were unexpected as an undergraduate?

Connon: I think my perception of what graduate school was going to be like is not what it was. I came in thinking that I had an easy time with the courses when I was an undergrad, and so I'll have an easy time when I hit graduate school. But I nearly flunked out my first quarter of graduate school because I was in that frame of mind. So, I think just the work level that you have to put in, it's misleading. You think it's very much like you're an undergraduate and you got used to your undergraduate work. You could do this work; there was no problem. But the same step that you took from high school to college, you're going to take from undergraduate to graduate school. The workload was going to increase by that much. And that's shocking, just as it was when you started college, it's shocking.

Q: Talk about the same transition between Masters and Ph.D.

Connon: There is not a transition like that between a Master's and Ph.D. The transition between a Master's and Ph.D. is purely that you're given more responsibility. In a Master's program, I perceive that your thesis/dissertation topic is developed mostly by the professor with some interaction for yourself. But your Ph.D. dissertation topic is pretty much determined by where you want to go and how you want to take it there. And that's the difference between the two levels.

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Q: Talk about the grad teaching fellowships.

Connon: Graduate teaching fellowships are \$5,000 a year for three years renewable. And if you get it, if you're lucky enough to get it, the school that you're going to has to promise to also give you a teaching assistantship for one quarter that year. So, essentially, the ASME graduate teaching fellowship gives you a full year's worth of funding, somehow gets you a full or a half year's worth of funding. And why is that nice? It's really, really nice because when you're in graduate school, how you want to spend your time is kind of determined by who's paying you. If you're bringing in your own money, your professor has a harder time giving you deadlines and has a harder time telling you, "You have to study this or you have to study that." You have more influence over how you approach your education. Whereas if they're paying for your education, it's almost for sure that you're going to have to pull "all nighters" because the grant deadline is tomorrow. Or you're going to have to work on this particular area, even though it's not your thesis topic; you're going to have to do research in this particular area for two months because the area that you want to work in has no funding. So, just that getting a fellowship, even a small fellowship, really gives you kind of flexibility in how you approach your education and a little more "gun power" when dealing with your professors and the university in general.

Q: How about teaching? Have you thought about going into teaching?

Connon: I thought about going into teaching, specifically in a university setting. Everybody trying to go pursue that career has to understand that the jobs are scarce and the people working for those jobs are the "cream of the crop." So, you can't put all your cookies in one area, you know. You can't line yourself up just sure that, "I'm going to get a teaching position at a university." I want that, and I've made sure that I've developed that aspect of my career path, but I also know that that might fall through and I've developed other areas that I think can lead into industry. I've tried to make sure that the research I've taken not only lends itself well to a university setting, but also possibly to transitioning into an industrial setting.

Q: In terms of advice to a freshman/sophomore student, what can you say?

Connon: Freshman/sophomore? Well, I just think getting to know graduate students and professors is important. Not only are they a contact for you to use to get jobs later and get into universities, but they're easier to get a hold of than your local industrial engineer. They're on campus. They're in your classroom most of the time, actually, and they'll give you their opinion. But it's hard to just come up to a graduate student or just come up to a professor out of the blue and ask them these questions, whereas if you work for them or with them for even one quarter, you develop a friendship, or at least some sort of relationship where you could talk to them about these things. And people that come through our lab, I think, have benefited immensely from knowing people in the lab, knowing graduate students, knowing the professors. I think it's helped their development as engineer and their final career choices. And I'd say only a handful of those that have come through our lab end up in an academic role like going on to graduate school. A lot of them end up in industry, but how they got their job was instrumental from the professor and one of the students in the lab.

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Q: You talked about the EIT. Why don't you talk a little bit about that?

Connon: I think it's important that everybody take an EIT. It's an engineering training exam. And what it is, is it's your first step toward a professional engineering license. I took mine at the beginning of my senior year, and I think that's the time frame you should be looking to take it. The beginning of your senior year, end of your senior year. Reason: It's important to take it while you're in school when all this information is fresh in your mind. It's going to be very difficult -- even if you go on to graduate school -- to take this test after you've been out of the cycle of using this basic engineering and this diverse or broad engineering subject matter. I had to go back and take a subject exam for the GRE a couple of years after I entered my graduate school -- my Master's program -- and I failed miserably because I couldn't remember certain simple laws that only two years ago would have been on the tip of my tongue. So, I think it's important to take it while you're in school while it's easier, and if you choose an industrial job, there are many places that eventually will require that you take your professional engineering license. And you have to have your EIT before you take your professional engineering license. It comes in handy.

Q: What's a day in the life of a graduate student like?

Connon: It's different from person to person. My day starts very early. I choose it to start very early. I come to school before 8:00 and I leave 6:30, 7:00, at night. I choose regular business hours because I want to be able to go home and do things at regular times. That's not necessarily typical. A day in the life of a graduate student is, getting what you want to get accomplished personally but making sure you get accomplished all your academic responsibilities. And sometimes that means all-day and all-night for months on end -- no fun, just like when you're an undergrad. But then there are times that you can relax, you can go surfing every morning or whatever, you know, whatever you care to do. But I would say it mostly entails research, sprinkled in with a little class time.

Q: What do you do when you're having fun outside of school?

Connon: I play soccer, actually. I play in several soccer leagues, but consistently in the Orange County Women's League. And the reason that I do that is because I want to associate and have contact with people outside academia. And these people definitely are not in academia and they're fun, they're lots of fun.

Q: What do you really like about what you're doing?

Connon: Diversity. Because what I do every day changes. One day I'll be working downstairs on an experiment -- all day long working with the lasers. The next day I'll have to be upstairs working, crunching all the data I took the day before. I'll have to be interacting with undergraduates that are working in the lab. I have to teach them -- I spend a lot of time teaching them about how to conduct good research. I also am a TA from time to time so I have to learn new subject matter and be able to convey it to students in a classroom. I have interactions with biologists. That's a diverse, unknown quantity right there -- learning about fish and how fishtails move. It's all about diversity. Every day a new subject -- something I have to become an expert in.

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