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Ask an Acoustician: Whitney Coyle

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Meet Whitney Coyle

Welcome to the second installment of our new *Sound Perspectives* series “Ask an Acoustician.” This article highlights Whitney Coyle, an assistant professor at Rollins College, Winter Park, Florida (rollins.edu). Whitney represents the musical acoustics field. She received her BS from Murray State University, Murray, Kentucky, in the fields of music and mathematics. She then went on to Pennsylvania State University, University Park, for her MS and PhD in acoustics. Whitney has a strong association with the Acoustical Society of American (ASA), including serving on the Student Council

Committee from 2011 to 2015. She received awards for the Best Student Paper in Musical Acoustics in 2009 and 2014 and the Best Young Presenter in Noise in 2013. Whitney serves on the ASA Web Advisory Committee as chair, the Women in Acoustics Committee, the Education in Acoustics Committee, and the Musical Acoustics Technical Committee. Whitney recently answered a series of questions designed to get to know more about her and her field. Readers can also learn more about Whitney’s work at <http://acousticstoday.org/clarinet>.

A Conversation with Whitney Coyle, In Her Words

Tell us about your work.

I am a musical acoustician, studying the physics of the clarinet. I am part experimental, part computational, part theoretical ... whatever helps my students! It is easier to be an experimentalist when working with undergraduate students so that is where my work has pivoted in the last two years. Under my current musical acoustics research umbrella, I am interested in finding objective, acoustical quality markers for musical instruments. Throughout my PhD, I focused on analytical methods to predict the playing frequency of the clarinet. There are many factors that would alter our expectation that a closed-open pipe (the simplest version of our clarinet system) would have certain integer multiple resonance frequencies.¹ One of these factors is the flow created by a vibrating reed on the clarinet mouthpiece. Currently, I am interested in experimental methods that can be used to measure the reed-induced flow that is present in the clarinet. Having a more accurate measurement of this quantity will improve the analytical models that were the focus of my PhD work. I am also interested in studying the asymmetrical vibrations of the clarinet reed while the instrument is played by a musician. These questions are difficult to study objectively and accurately due to the human interaction with the instrument and, of course, because the human tends to impede any visualization studies. For now, as many musical acoustics labs do, we use an artificial mouth

¹ See article in this issue of *Acoustics Today* by Wolfe on the acoustics of woodwinds.

setup to play the clarinet. In the future, finding a way to repeat these measurements with real musicians would be ideal (but perhaps impossible).

Currently, I am working at an undergraduate liberal arts institution so even though I am expected to do a significant amount of research, my priority is becoming the best teacher I can be. I teach a full load of courses each semester, advise students, etc. I really enjoy teaching the introductory physics courses, our mathematical methods course for physics majors, and, of course, doing original research with undergraduate students.

Describe your career path (how you got your start, what made you choose your field).

I studied music and clarinet performance and mathematics as an undergraduate and one day heard the word acoustician (somewhere around the first semester of my junior year ... before that I thought I wanted to teach music!). I joined the ASA to get the journal and began seeking research opportunities. Luckily, I found one at Coe College, Cedar Rapids, Iowa, with Jim Cottingham, which led to my attending the 2009 San Antonio ASA meeting. From there, even more excited, I applied to graduate school. I worked on my masters at Penn State and began applying for fellowships for PhD work because funding was scarce. I was awarded a National Science Foundation (NSF) graduate fellowship and used this to pursue study in musical acoustics.

I spent the majority of the last three years of my graduate study in Marseille, France, traveling back often to attend ASA meetings as a member of the Student Council. During the last year of my PhD, I applied for and was offered a visiting assistant professorship at Rollins College. After graduating with my doctorate from Penn State in August 2016, I began the tenure-track position at Rollins College. I know that if it weren't for Jim offering me my first research opportunity, I wouldn't be where I am today!

What is a typical day for you?

This really depends on the time of year. If it is during the academic year, I get to work around 7 a.m. and begin answering emails. Students arrive in the building closer to 8 a.m., and I can expect students to come knocking no later than 9 a.m. Often, I teach two to three classes a day depending on the semester. Most days, I offer at least one office hour. Going into my third year of teaching, I plan to dedicate 5-8

hours a week in the lab doing research, measurements, etc., otherwise it's *all about teaching* and prepping for teaching, grading, assigning homework, and reading. I attend many meetings around campus for campus service and teleconferences for ASA business.

If it is in the summer, I work with at least two undergrads in my research lab for at least eight weeks. We begin at 9 a.m., and I usually get in around 8 a.m. to prepare a to-do list for that day to give to the students. This gives me time to reflect on the work that the students are doing and give feedback if necessary. It's a different world on campus during the summer, but it's great for me and for the students to have this dedicated time to deeply think about research.

How do you feel when projects do not work out the way you expected them to?

I am at the beginning of my career and so I am still overly optimistic about all of the ideas I have jotted down thus far. Then again, because musical acoustics has been around for a while and I am just getting started, I generally assume that what I try might not work the first time. This has become less and less hard to deal with; it is an expectation in experimental physics. The tenure-track timeline does make this a bit more stressful, but I am lucky to have many mentors to go to for advice.

Do you feel like you have solved the work-life balance problem? Was it always this way?

Absolutely not. There are times when I consciously sacrifice one for the other or sacrifice both for sleep. I think that is how things have improved – that I am choosing when to allow things to take over... to an extent. I try to take the whole “step back and see what this one chunk of life will impact” or “can my students wait one more day for their exam grades if it means I get to take a break and have a little me time?” Yes, I think they can, especially if it means that I am sane and clearheaded for them the next day. It's a push and pull, give and take. It'll take a lifetime to perhaps begin to “figure it out.” If you're doing something you love, it's never too big of a problem; it all works out. That's how I feel at the end of each semester teaching; it's crazy and the list keeps building, but then, all of the sudden, it's over and everything keeps moving, time keeps trudging forward, despite my efforts to make things slow down. It's all going to be fine is something a tiny voice will say to me, often. And most of the time I tend to believe it.

What makes you a good acoustician?

I will forever be inquisitive. I love learning and I am fine with the fact that there will always be someone who knows more than me! I think that I am becoming increasingly ready to be wrong and to ask more questions when something isn't clear. It makes me a better acoustician and teacher. I am a willing and motivated collaborator, ready to hear others' ideas and points of view. Specifically, in being a musical acoustician, it obviously helps to be a musician. I have an enormous appreciation for the beauty in my subject and the joy it can bring as well as the physical complexities the instruments contain.

How do you handle rejection?

It is early in my career so I haven't dealt with too much rejection because I haven't had enough time to try, just yet. I think what's nice is watching your peers, colleagues, and predecessors; they have so much work out there, but they'll never lie and say that they haven't been told no. I think it's important to see their success as a whole and not focus too much on one particular portion of your work. Especially early on, I hope I will be able to, even under large amounts of pressure to publish, step back and see that big picture (a 40+ year career and all that this could entail).

What are you proudest of in your career?

I am not sure yet; ask me again in about five years. Some things I am proudest of so far: seeing my first research student present at the Boston ASA meeting and reaching out to foreign research collaborators, which allowed me to study abroad during my graduate degree. This move made it possible for me to learn from many impressive mentors and acousticians in France and one that thankfully required me to learn to speak/read/write in French in my mid-20s, skills for which I am now forever grateful.

What is the biggest mistake you've ever made?

I make it often – not speaking up when I don't understand.

What advice do you have for budding acousticians?

Ask questions, now and forever! I spent a lot of time being scared to look silly or stupid. In fact, I still struggle with this.

Try everything! You don't have to specialize so early. Get a taste for it all to see what you like. Don't let someone tell you that you have to know what kind of acoustician you will be as you enter graduate school (or even early in your professional career). There's always time to pivot. I never thought I would be where I am, and I am glad that I didn't listen to those who told me that musical acoustics research was not an option.

Have you ever experienced imposter syndrome? How did you deal with that if so?

Daily. I try to talk about it a lot, with others feeling just like me and with those who don't seem to be affected by it. Sometimes I get self-conscious because I feel it borders on "compliment fishing," but I just find people I trust and talk it out. If I keep it in too much, I begin to shut down and give up a little. Then again, I like competition and winning a little too much, even if the competition is usually against myself. I like setting goals and accomplishing them so if I do shut down, it isn't for long. It's usually at conferences or when reading other people's papers during the semester when I don't have time to do research and publish as much that I start to feel like an imposter. I say this to my friends: "It's amazing that they trust me with a classroom full of students. I can't believe I got this scholarship or that one ... it's probably because ... well, I am sure they'll be better than me because ... well, I could never do that like them because..."

I think the biggest thing is to keep going – you got where you are because of hard work. No matter the circumstances.

What do you want to accomplish within the next 10 years or before retirement?

- (1) Remain active in the society and serve on the Technical/Executive Council of ASA.
- (2) Publish, with a (undergraduate) student!
- (3) Have a research student go into a career involving acoustics! (Inspire!)