

Alma Matters-Plus : Alumni

The Science of Sound



Bonnie Schnitta, G78

The tears were unexpected. But there they were, flowing from the eyes of the conductor as music filled his home theater.

A few weeks earlier, the conductor had called Bonnie Schnitta, G78. *My home theater doesn't sound right*, he told her and, soon after, Schnitta went to work. She met with the conductor and after getting a sense of the issues at hand, she was able to diagnose the problem.

The reverberation time (i.e., echo) of the room was much too high and there was also the potential for a "standing wave," which occurs when sound traveling from the front of a room meets sound reflected from the back of it resulting in the reduction or elimination of waves. Because of this wave issue, one could conceivably hear music better from outside the room than within it.

The problem with the home theater, at its most basic level, was that sound was bouncing off the walls too much and the wave interaction that did occur was causing secondary problems, such as the standing wave. It was a problem that Bonnie Schnitta had seen countless times over the course of her career.

"We placed absorbers and diffusers on the walls," recalls Schnitta, president of SoundSense, LLC, an acoustical engineering and consulting company located in East Hampton, New York. "The forward wall housed equipment and speakers, and transparent fabric had to be chosen so the speakers could perform properly and not be muffled. Finally, there was a projector with a noisy fan in the ceiling. We decided to line the area with an absorber so that this noise didn't disturb the room."

After these features were added, Schnitta returned to the conductor's home.

"I said [to the conductor], 'let's experience the room together,'" recalls Schnitta. "He put on his favorite CD and tears began to roll down his cheeks because he had never heard it sound as beautiful as it did when he was conducting it."

Taming the Beast

Sound is a unique element. Whether it's a conductor listening to music in relative isolation or an orchestra playing before a packed auditorium, sound

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has the power to touch the deepest of emotional chords. But sound has a dark side as well. It can come in the form of a blaring television in the apartment next door or the beeping of horns from a busy city street. In any event, these sounds bring neither joy nor contentment to those affected by them.

"Sound and noise are such personal things," says Schnitta. "First, we try to figure out where any unwanted sounds are coming from. Then, we determine how to eliminate these sounds. Finally, we establish the treatment required for the ideal acoustic wave interaction within the room."

Schnitta launched her company in 1981. Since its inception, it has focused on a variety of different areas related to sound management. The company has developed patented acoustic products (including barriers, absorbers/diffusers, and floor treatments) and designed a variety of computer programs aimed at helping to create ideal acoustical spaces.

A key component of the company's work is its consulting division, which allows Schnitta to work with a number of diverse individuals and businesses and also apply many of her company's products and computer programs.

"We will get calls from people who'll say, 'I can't sleep at night because there is a generator outside my window that's keeping me up' or 'I'm building a recording studio and I know nothing about it. Please design it for me,' says Schnitta. "We have also worked on noise problems for auditoriums, schools, and restaurants."

The Tufts Experience

Bonnie Schnitta didn't plan on going into acoustical engineering. After graduating from Purdue University with a bachelor's in mathematics, she went to work for General Electric of Lynn, Massachusetts as an Engineer-in-Training. Soon after she arrived at GE, she was accepted into the Tufts University mechanical engineering program. She probably would have remained in this field if not for two things: a class she took as a graduate student and Florida.



"I was taking a course in vibration at Tufts and I just loved it," she says. "It [the discipline of engineering] just took hold of me and then shortly thereafter I met someone who I eventually ended up marrying. He was doing his residency down in Florida and I moved down there. I happened to stumble across a company that did signal processing. While I was working there, I became involved with mathematically modeling signals and noise, so that was where the seed was planted. But it all really started at Tufts."

Becoming One with the Sound

When Bonnie Schnitta walks into a room for the first time, she sees more than furniture and art hanging on the walls. She sees sound. Or, more



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appropriately, where it resides.

"I kind of become one with the noise," she says, when asked what goes through her mind when working within a specific space. "I look at all the pathways of the noise, how loud it is, and if there are any anomalies, meaning that sometimes noise can get into an area and start to bounce around and amplify. For example, noise can sometimes go from room to room through an HVAC duct so you have to make certain that everything is going right through the duct and not the wall. It's really about getting a very good perspective on how the noise travels, what is the source of the noise, and what are its frequencies."

Once Schnitta has a sense of the wave interaction in a space, she can then modify the area she's working with to fit the needs of her clients, who have included the designer Ralph Lauren, songwriter and philanthropist Denise Rich, Dunkin' Donuts, and the Pfizer Pharmaceutical company.

For a school, these modifications might mean installing ceiling absorbers to reduce cafeteria noise or, in the case of a restaurant, installing absorbers on the walls so patrons can, in the words of Schnitta, "feel the energy of the place but also hear what someone else is saying without having to yell."

Of course, identifying and eliminating unwanted sound is just one aspect of Schnitta's work. She must also take into account how her proposed modifications will appear.

"I can solve the sound problem, but coming up with something that looks exactly like the client wants it to is a challenge," she says. "Usually, I ask the client if they have a designer that they are working with. If they do, I say 'Great, let me work with your designer.' If not, and they are doing the design themselves, I have them tell me what's on their mind and we go from there."

This collaborative model was part of Schnitta's recent work for *Esquire* magazine. Hired by the publication to provide acoustical engineering consulting on its "House of the Year," Schnitta worked closely with those charged with designing the home last August.

"Every year, *Esquire* does a house and this one was called the "360" because it's on a mountain which has 360 degree views of Los Angeles," she says. "They [*Esquire*] pick a theme for the house, design it, have fundraising events there, and then publish the home in the magazine. This year the theme was "Man and Technology" and what would be the perfect house with today's technology. I was working on a home theater for another client at the time and the designers [of the *Esquire* home] talked to me about what I was doing to make the home theater acoustically perfect. They said 'That's exactly what we need in this house.' So, I went to LA and the designers shared what they were putting in the room with me. I had my computer and I did the analysis right then and there and was able to tell them if the room would work with their design. If it didn't, we

negotiated. They gave me a sample of the carpet they were using and I told them what they needed to put under it to make it work right and I told them what kind of acoustic liner they needed to put in their curtains. Each room was intended to be acoustically correct because in today's world many people have a television in each room. It may not be to watch a television program or a movie. It may be to find out what's going on with the stock market or to watch the evening news."

Getting the Noise Out

Perfect sound, whether it's an individual's home theater or the conference room of a Fortune 500 company, comes at a price. Along with consultations, there are costs associated with purchasing materials and hiring construction companies to build (or modify) an existing space. But for those who lack the financial resources of Schnitta's more affluent clients, there is another option. It's called NoiseOut Essentials™.

"With how affordable things like iPod's and plasma televisions have become many people have almost the equivalent of a home theater," she says. "The problem in many cases is that the room has the wrong reverberation time. Now, this would seem like an easy thing to solve, but historically you would have to pay real money to an acoustical consultant. Instead, many people just say 'let's try this' or 'let's just do that' or the people who try to solve the problem are sales people who say 'just put in this speaker and it will sound great.' Sometimes these decisions work out but it was just a matter of dumb luck. What we did [Schnitta and her partner, Randy Wilson] was develop a program where people can pick up the phone and call us at 1-877-NOISEOUT. The line is staffed by one of our engineers and he or she will feed information about the person's room, things like its size and height of the ceiling, into one of our computers. Using software we have developed, we can then tell the person how to solve the reverberation problem by using a series of everyday household objects that we sell. We sell acoustic pillows, special under-layment that goes under carpets, and special foam that goes behind paintings without glass, which turns them into absorbers. We've basically broken things down by units. When a client calls, we tell him or her that their room will be perfect as long as they have so many units. We then fax over a list of our products, they pick out the units they want, and then, all of a sudden, they have an acoustically correct room."

Schnitta's company launched NoiseOut Essentials™ at the CEDIA Expo in mid-September. Like any other businessperson, she hopes the product is a success. If it is, she will have considerably expanded the mission which is at the heart of her work—bringing peace to as many people as possible.

"One of the most enjoyable parts of my work is helping to improve the lives of other people," she says. "I get to help people sleep at night, hear music in ways that they never have before, and not be bothered or agitated by noise. I feel lucky that I have been able to use my gifts in this way."

To learn more about SoundSense, LLC go to

<http://www.soundsense.com/>. Bonnie Schnitta can be reached at bonnie@soundsense.com or by calling 631-324-2266.

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