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The Boston Globe

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She helps sound out a building's acoustics

By Cindy Atoji Keene, Globe Correspondent | September 19, 2010

Acoustics often are an after-thought on construction or renovation projects — the library that's too noisy with street traffic rattling by, the office suite that's so quiet that you can hear your cubicle neighbor breathing. But acoustician building consultant Ioana Pieleanu of Acentech Inc., makes her living in the science and study of sound.

Acoustician building consultant Ioana Pieleanu studied music for many years and also worked as a sound engineer. (Mark Wilson/ Globe Staff)

"Hearing is one of our five senses — and one way of perceiving the world — but sometimes it's not as obvious,'' said Pieleanu, who says her job is to make sure the quality of sound in a particular space is suitable, whether it be an athletic stadium (controlled crowd noise may be the goal) or restaurant (ambient sound wanted, but without masking conversations).

Until recently, the science of acoustics relied on experience and analytical calculations to predict how a certain space would sound. Now, computer modeling tools allow acousticians to generate virtual sound pictures of a space before it's even built.

"This helps identify potential problems such as echoes and poor speech intelligibility, as well as allowing designers to refine the room for best sound reproduction,'' said Pieleanu, who has large databases that describe the acoustic attributes of different surfaces. And with the recent emphasis on green products, she works with sustainable, earth-friendly insulation, finishes, and sound-absorbing tiles.

"Acoustics as a green element is not a tangible item, but is a big part of one's comfort, just like being able to open a window for fresh air,'' Pieleanu said. "It's part of human experience.''

How did you get into this line of work?

Acoustics is not a profession you typically run into, and people get into acoustics from all kinds of different fields. In my case, I studied music for many years and also enjoy math and physics. In an attempt to marry art and science, I got a degree in sound and music production, then worked as a sound engineer, and one thing led to another. Many colleagues have backgrounds similar to mine; others are trained as mechanical engineers or architects.

What's the process of designing acoustics for a space?
I work with the project designers on the shape and finish of the room to achieve a certain acoustical response in terms of vibration and clarity; we also strive to achieve sound isolation — windows, doors, floor construction — and all the elements of the enclosure and how they should be built. A final crucial element is the noise and layout of the mechanical systems such as the heating and duct layout.

How is this field still coming of age?
Acoustics is only about 100 years old and compared with other sciences, that is not such a long time. In the 1850s, we still had no idea why echo would occur in a building. We are still doing a lot of research to understand how people hear and perceive sound. In terms of computer modeling, there is still much space for improving technology and making it more accurate and intuitive to use.

Do you think your ears are more highly tuned because of the work you do on a daily basis?
Absolutely, whatever building I go into, sound is very obvious to me and just jumps into my face. I immediately notice if a concert hall is too dry or a restaurant is too loud. I have a tendency to study rooms to see if there are sound absorption qualities in the space. Looking to see if there is acoustical tile on a restaurant ceiling is a habit of mine that I need to break.