In the classroom, Bruce Allison delivers the tools of the trade—and a message about our connection with trees.

Tell me about the class you're teaching. How did it come about?
Well, a year or so ago, the department approached me about teaching because they wanted to have the knowledge that people may gain by working in the field available to students. And of course I'm in favor of that. I think it's important for students to get some exposure. And I thought with some of the new tools that we've brought to the class, there was an opportunity for students to see some of this new technology and what we're trying to do with it.

What kind of new tools did you introduce?
Acoustic tomography, for example. Sound waves pass much more quickly through wood than they do through wood that is decayed or cracked, and so we can use sound waves to see as we decay or defects inside the trunk. We use thermal imaging and acoustic tomography, which has 12 sensors that you can put around the trunk of the tree to create a matrix of measurements. The software then translates those measurements into a graphic diagram, which gives you a very good visual idea of what's happening inside the trunk—if there are internal wounds or decay that could affect its stability.

The key is that we're able to non-destructively see inside the tree. When I'm looking at a tree that may have internal defects, I don't really want to be knocking on it. We're using the same kind of technology that we use in medicine—some of the same principles, but adapted for trees. We're driven by the same principles. It's the same concept as in MRI or CT scans. It's all very new. Only three companies make this equipment, and they're all in Europe. My company was the second one in the United States to bring it over here.

When was that?
In 2009. I purchased it when I had a contract with the Wisconsin Department of Administration to examine 155 trees around the State Capitol.

I remember that project. There was a lot of interest on what might happen to those trees. There was, but I think in the end the public worked out being very positive. We were able to explain the science behind what we were doing and show people the data we had collected on the trees, and people were very supportive of our management plan. I felt that since the facts were presented, people understood that everything was being done to protect the trees and preserve public safety.

Are there things always consistent—protection trees and protecting safety?
Well, whenever you have trees in an urban setting, you have a responsibility to manage trees for safety. That's one of the unique aspects of managing an urban forest. The biology of a tree is going to be the same whether it's growing in a city or the forest. But in a city setting, you're not looking at them solely in terms of a production cycle, where you know you're going to cut them down after a certain time and use them in forest products. Your goal is to care for them as long as you can, to have a much aesthetic contribution as possible. So structure and stability become very important. It's not just about promoting every tree—it's about managing trees intelligently for the best benefit of future generations.

Bruce Allison shows acoustic tomography equipment around a tree to allow the student to view the interior structure of the trunk.

Do you talk with students about the role of urban forestry in your classes?
Absolutely. In a forest, you might plant a tree and walk away 30 years later, but in a city setting, you have ongoing issues of maintenance, aesthetics, and rainwater runoff. We have responsibilities to provide trees to keep roadways and utility corridors clear, and we also have to think about the interaction between trees and people. Trees have a special role in our communities. There are some great studies that show hospital stays are shorter when patients can look out the window at trees, for instance. We also know that in neighborhoods with healthy tree cover, the incidence of crime and other social problems is less. So we know trees are making far more than biological contributions to our neighborhoods. There are social and cultural benefits, as well.

Imagine the career opportunities must be pretty good, then.
There is tremendous need out there. The U.S. Forest Service has concluded that a 40 percent canopy cover in urban settings virtually eliminates the heat island effect of cities. You can reduce energy use and improve stormwater runoff by planting trees in cities, and that's what many urban areas are wanting to do. In Wisconsin, there is a plan to plant 20 million new trees by the year 2020. So the career possibilities are excellent right now.

How does your class give students a taste of those possibilities?
I want students to have a good classroom understanding of the science, and I want them to be able to see the new technology in practice. We select a few hands-on project assignments, where we do a complete evaluation of a tree for a real client. Last fall, we did a report for an insurance company about the Rockfall Terrace, and it was fantastic. We were able to diagnose some problems and propose some solutions to help protect the trees, which are so important to the character of the place. And I think that makes things more tangible for the students. They've been walking and sitting under those trees for a long time, and now they can see them in a way that they hadn't before.

We're using the same kinds of tools now that are used in human medicine—it’s the same concept as MRIs or CAT scans.

Are you targeting students from areas other than forestry?
That is definitely the goal. I use this class as a chance to introduce students to a number of different areas—people who come from a different kind of study and develop a portable cat-scan device for trees. And he said to me, "I've seen all that equipment around. Let's see if we can pull it out and conduct an experiment." And he took me over to meet another professor who had X-ray tubes that we might use. And I just thought, well, this is what's great about this university. This is the cross-fertilization of coming together all the time.