Root Lessons

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

IF YOU ARE A TREE, it's a good thing to know Bruce Allison, proprietor of Allison Tree Care and all-around champion for Wisconsin trees. As a professional arborist, Allison has nurtured thousands of prized trees to ripe, old grandeur, including the majestic oaks that shade Memorial Union's Terrace. As an author, he's written three books that chronicle some of Wisconsin's rarest, most beloved trees. Now he's a teacher, leading a new course on urban tree care for the Department of Forest and Wildlife Ecology, where he serves as an adjunct professor.

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 like me gain by working in the field available to students. And of course I'm in favor of that. I think it's a great function of an adjunct professor. And I thought that with some of the new tools that I've been working with, it might be a good opportunity for students to see some of this new technology and what we're trying to do with it.

What kind of new tools?
Acoustic tomography, for example. Sound waves pass more quickly through solid wood than they do through wood that is decayed or cracked, and so we can use sound to alert us to decay or defects inside the trunk. We use multi-path acoustic tomography, which has 12 sensors that you can put around the trunk of the tree to create a matrix of measurements. The software turns 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 drilling big holes into it. We're using the same kinds of tools now that are used in human medicine—it's the same concept as in MRIs or cat 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 2005. I purchased it when I had a contract with the Wisconsin Department of Administration to examine 153 trees around the State Capitol.

I remember that project. There was a lot of concern about what might happen to those trees.
There was, but I think in the end the public dialogue ended up 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 once the facts were presented, people understood that everything was being done to protect the trees and preserve public safety.

Bruce Allison strings acoustic tomography sensors around a tree to allow him to see the interior structure of the trunk.

Are those things always consistent—protecting 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 in a 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 carry them as long as you can, to have as much aesthetic contribution as possible. So structure and stability become very important. It's not just about protecting every tree—it's about managing trees intelligently for the best benefit of future generations.

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 for 50 years, but in a city setting, you have ongoing issues of maintenance. Community foresters have responsibilities to prune trees to keep roadways and utility corridors clear, and they 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 where 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 that trees are making far more than biological contributions to our neighborhoods. There are sociological and cultural benefits, as well.

I imagine the career opportunities must be pretty good, then.
There is a 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 starting 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 hands-on project each semester, where we do a complete evaluation of trees for a real client. Last fall, we did a report on the six large trees at the Memorial Union Terrace, and it was fantastic. We were able to diagnose some problems and propose some solutions to help protect those 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.

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Are you targeting students from areas other than forestry?
That is definitely the goal. I see this class as a chance to talk to students from a number of different areas—plant pathology, horticulture and even some of the other sciences. I was asked to give a lecture on tree stability to an honors physics class this fall, and that was just fantastic. It was at 8 a.m., and I was expecting that they were going to be half asleep. But they were totally engaged in the topic. If you subtract the fact that a tree is a biological organism, it's also just a giant structure that is subject to the same physical forces you study in physics.

One outcome of that talk was that I mentioned to their professor that I was trying to develop a portable cat-scan device for trees. And he said to me, "I've got some old 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. There's this cross-fertilization going on all the time.