UF/IFAS CITRUS STATE

To apply knowledge, we first have to build it

By Jack Payne, jackpayne@ufl.edu

It's a dazzling discovery: a sensor you point at a tree and get an instant read on whether it's HLB-infected.

It's the kind of gee-whiz technological advancement that generates headlines and creates buzz at industry meetings. Won Suk "Daniel" Lee, a UF/IFAS professor of agriculture and biological engineering who led the team working on the device, gets positive publicity. UF/IFAS solidifies its reputation as a research and innovation arm of Florida agriculture.

The story that doesn't always get told in a straight news-du-jour account is that Lee's breakthrough was only possible because years ago his colleagues did the unsexy foundational work of examining how much starch is in tree leaves.

End-use technologies are almost without exception built on years of basic science research. Often it's hard to foresee the applications of basic science investigations. Ed Etxeberria wasn't trying to invent a light sensor when he became interested in the starch levels in leaves in his work at the IFAS Citrus Research and Education Center. He was — and is — a plant physiologist with a curiosity, a drive to expand what we know about the natural world.

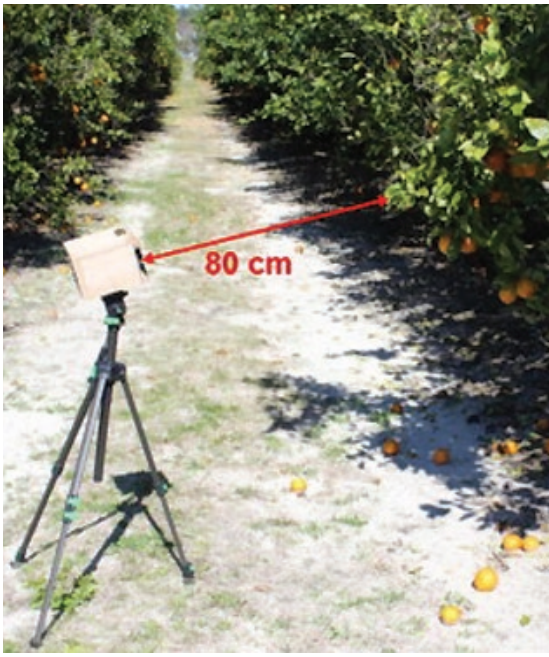
But his unheralded work helped determine that elevated levels of starch in citrus leaves is a strong indicator of HLB infection. Armed with that knowledge, Lee could get to work figuring out how to detect starch levels. What Lee came up with was a sensor that fires light at leaves, and the starch inside affects the resulting images. In infected trees, the leaves have veins that appear as a pale shade of gray under the sensor. Healthy leaves produce a dark-gray image.

That kind of instant feedback can help growers to detect HLB early and to sidestep the time-consuming, labor-intensive groundwork of collecting leaf samples and sending them off to a lab for analysis.

Science has worked this way throughout history. The pioneers of electromagnetic fields did not know that their work would eventually make television and cell phones possible. There were decades between the determination of the structure of DNA and the analysis of DNA samples in forensic science. The work of astronomers searching for radio waves from exploding black holes was vital to the development of wifi.

This is why we need to continue supporting basic science, what can look at first like academic inquiry without a useful application. It's the seed corn for innovation. So if we cut corners on it now, we'll pay for it down the road.

I like the way Neil deGrasse Tyson put it during an interview with Fareed Zakaria on CNN last year in dismissing critics of fundamental scientific research: "So we can say, 'Let's not explore it. Go ahead. Here's a ticket back to the cave. I'll meet you there. We'll build a fire together.'"



Research from the University of Florida's Ed Etxeberria and Won Suk "Daniel" Lee led to the development of a sensor that can detect HLB in citrus leaves.

We need a mix of research that focuses on commercialization, applied science and basic science.

UF/IFAS researchers know you need solutions to citrus greening now, not a decade from now when there's a payoff from today's basic science research. That's why we have people like Lee working on tools you can use in your groves.

But Lee can only do so much if Etxeberria hasn't done his work first.

So while we focus on the urgency of now, let's not forget that we have to get started on the work of 10 years from now.

Jack Payne is the University of Florida's senior vice president for agriculture and natural resources and head of UF's Institute of Food and Agricultural Sciences.