

# What does it take to scale up the XyloTron?

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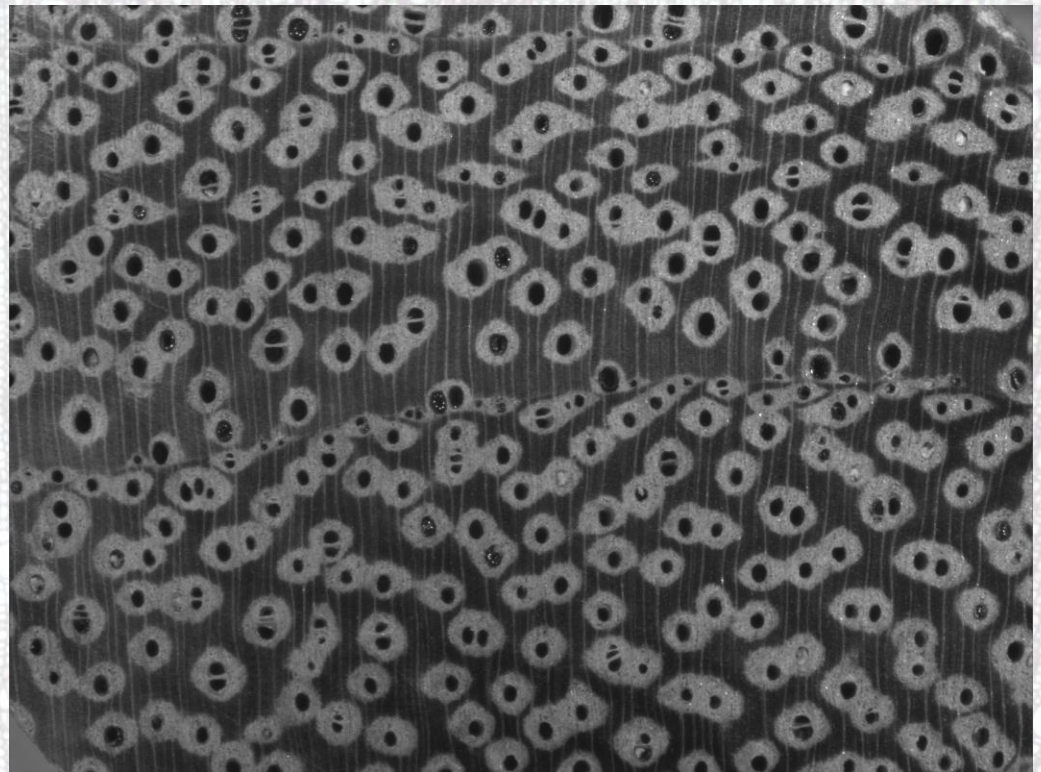
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# The XyloTron: machine vision wood identification\*

- Research-driven
- Targeted goals according to funding
- Replace human field expertise
- Confusion about our research mandate



*\* and a powerful tool for many other applications*



# XyloTron research

(it's a nerd thing, internationally)

- We have been funded to:
  - Create and test prototype devices ✓
  - Develop a and test a model for common Central American woods ✓
  - Develop and test a model for commercial woods of Brazil (ongoing)
  - Work with Sandra to deploy the XyloTron within Brazil; attempt a stand-alone CITES XyloMatic module; and other research (ongoing)





# XyloTron research

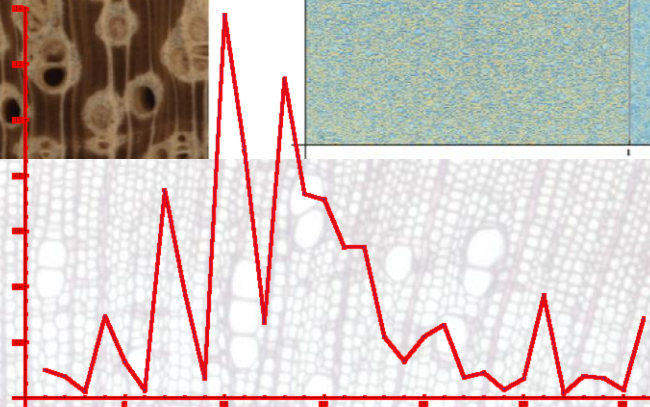
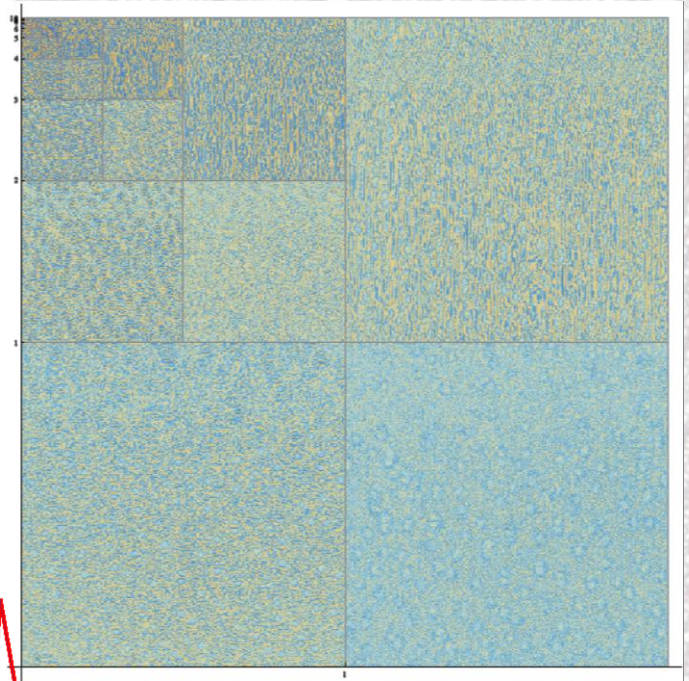
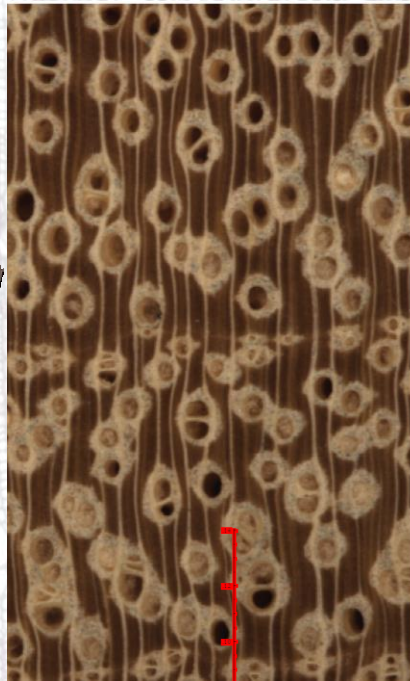
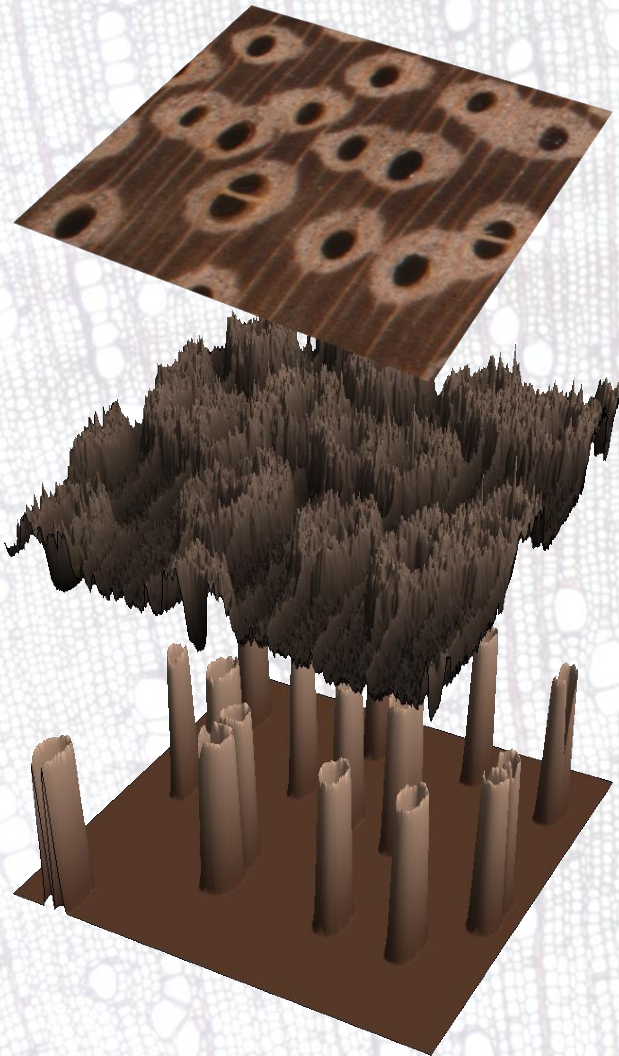
(it's a funding thing, everywhere)

- We have **not** been funded to:
  - Manufacture and distribute XyloTrons
  - Deliver or support XyloTrons other than to research partners for testing
  - Commercialize the XyloTron in any way
  - Engage in the research necessary to deliver a XyloTron that will work at US ports, borders, etc.
- Any of these would require specific, committed funding





# Scientific basis of the XyloTron





# Application of the XyloTron

- Laboratory testing internationally
- Field use at Port of New Orleans, SEATAC
- Demonstrations at conferences around the world
- UNODC identified the XyloScope as an important tool for distribution in advance of stand-alone XyloMatic functionality



# Scaling up the XyloTron

- Full XyloTron (XyloScope + computer)
  - $\approx$ 2000 USD per unit regardless of scale
  - We expect and hope the cost of critical components to fall
- XyloMatic
  - Research necessary to advance system, provide new, relevant models



# Scaling up the XyloTron

- Identify goal of scale-up
- Identify “customers” or recipients
- Establish training regime for operation
- Establish hardware support centers on each continent
- Develop appropriate software, e.g. XyloPeek



# Partners and sponsors

- US Department of State
- US Forest Service
  - Forest Products Laboratory
  - International Programs



# Collaborators and colleagues

- Dra. Sandra Florsheim, IF, Brazil
- Dr. Hisashi Abe, FFPRI, Japan
- Dr. Gerald Koch, TI, Germany
- Dr. Yafang Yin, CAF, China
- Dr. Peter Gasson, Kew, England
- CWAR-FPL Team: André Lima, Bruna Ferreira, Richard Soares, Tiago Ribeiro, Joe Destree, Dave Dostal, Dick Jordan, Peter Kitin



A microscopic image of a plant stem cross-section, showing several vascular bundles arranged in a ring. Each bundle contains xylem on the inner side and phloem on the outer side, separated by a vascular cambium. The xylem consists of large vessels and tracheids, while the phloem consists of smaller sieve tubes and companion cells. The ground tissue is composed of small, thin-walled cells.

Questions?



# XyloTron as built: hardware

- XyloScope  $\approx$ 1700 USD
  - Custom-designed, hand-held device with off-the-shelf components
  - Illuminates and images specimens
- Computer  $\approx$ 300 USD
  - Desktop for laboratory use, algorithm development, and research (Über-station)
  - Laptop for demonstration, data collection, and field-deployment



# XyloTron as built: software

- Field (XyloMatic) and laboratory (XyloScan)
  - XyloMatic models are context-dependent:
    - The Central America model is only applicable to Central American woods
    - The Brazilian model (in development) will only be useful for Brazilian woods
  - XyloScan is for scientific staff to add reference material from botanical collections