Progress Report

Quantifying carbon sequestration as a function of silvicultural treatment in loblolly pine (CAFS 21.89)

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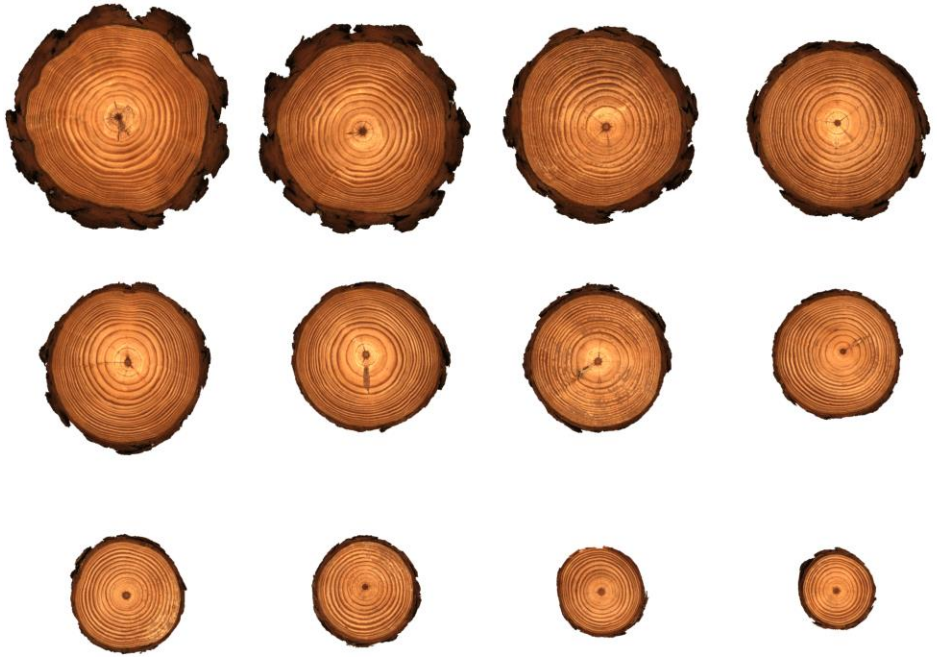
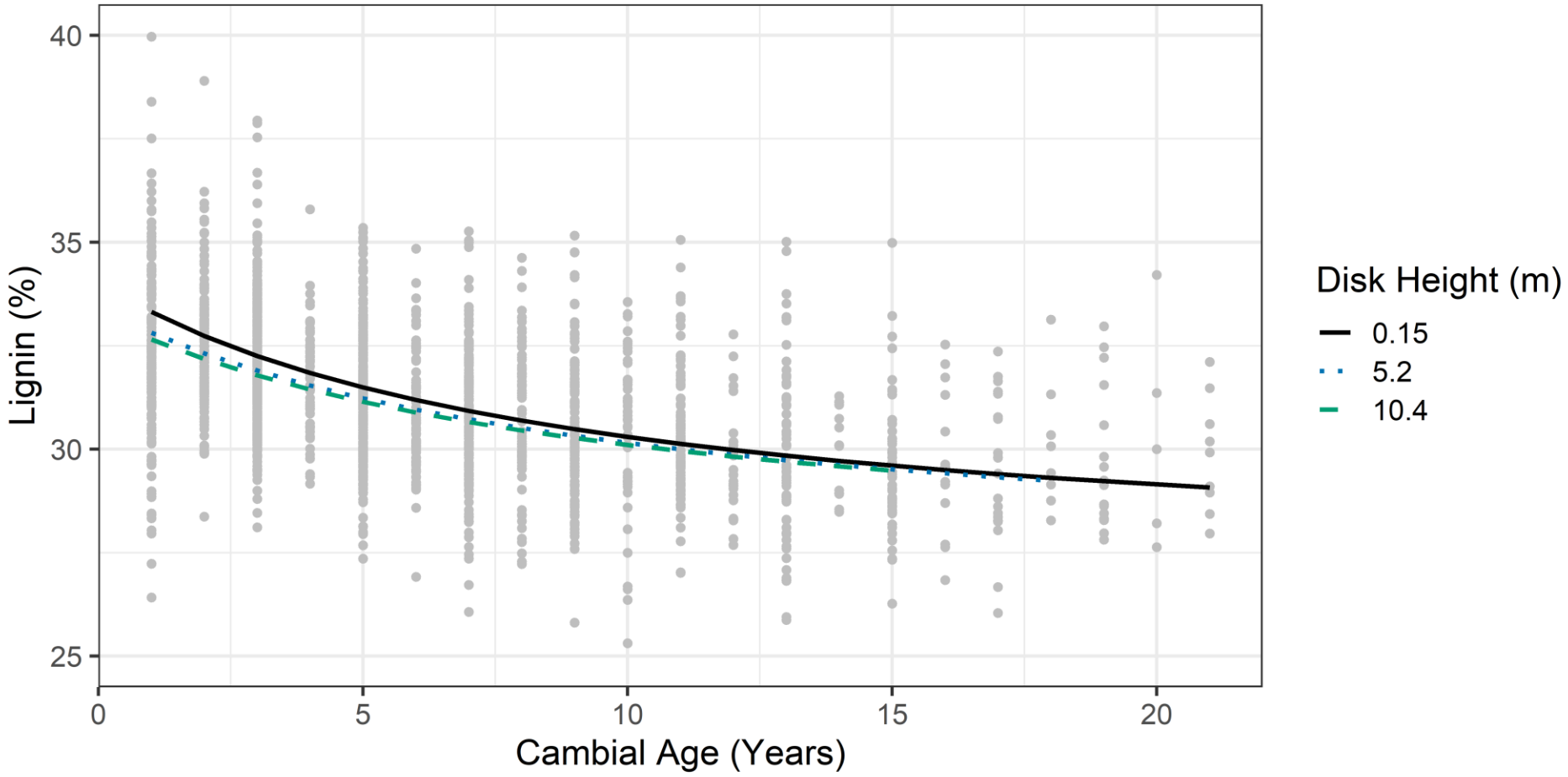
Presenter: Joe Dahlen (UGA)

Project Overview

- Growing interest in quantifying carbon in managed forests
- Weight of carbon for a tissue (e.g. wood) is a function of the volume, specific gravity, and carbon %



Wood carbon % largely a function of: 1) lignin to cellulose content



Wood carbon % largely a function of:
2) Extractives content

Supplement reference data with NIR

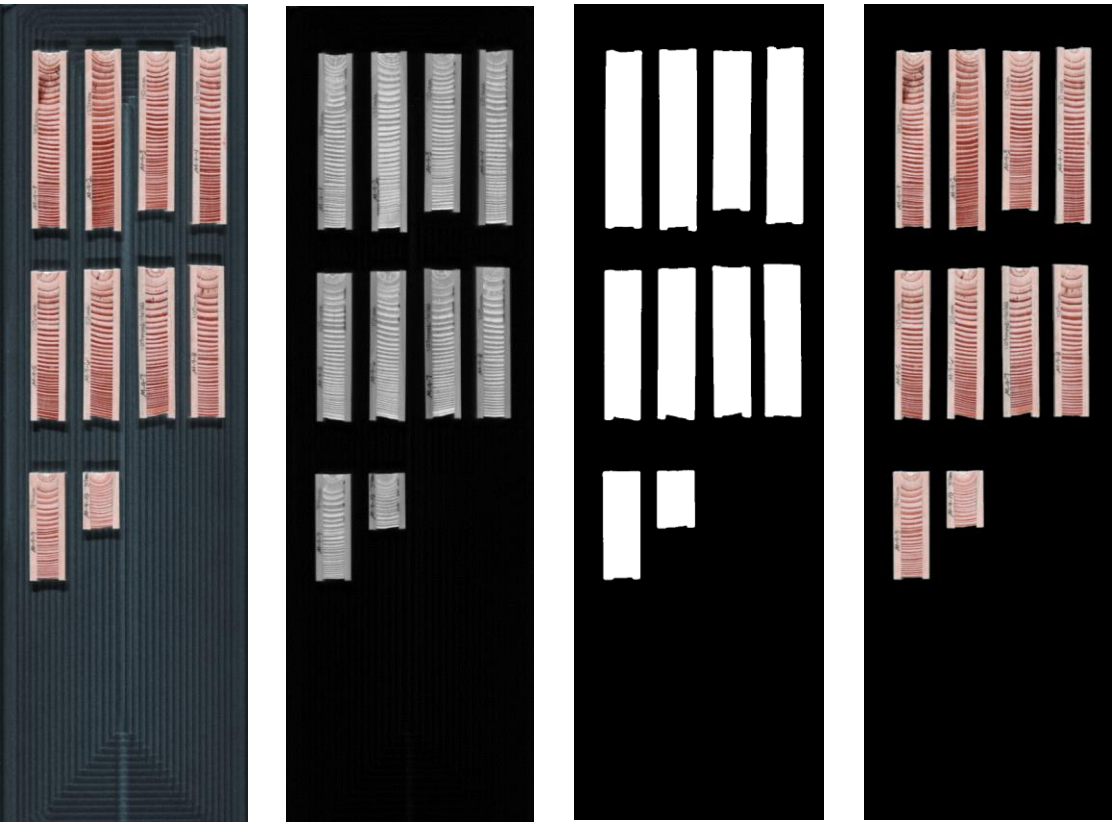
Develop extractives, lignin (and cellulose), and carbon % models for loblolly pine

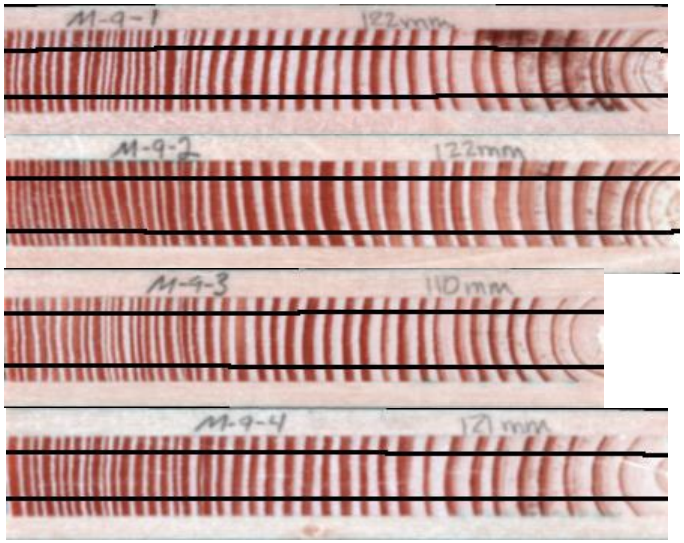
Specim FX17

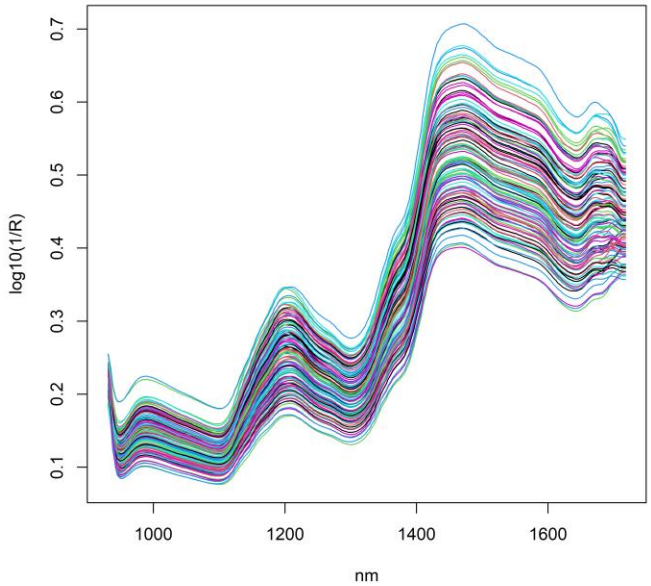
- 931 to 1718 nm wavelength range
- 2 lights 45° from camera
- Dark & white reference
- Tray contains 1 trees worth of samples
- Scanned 1000s of samples

Image processing

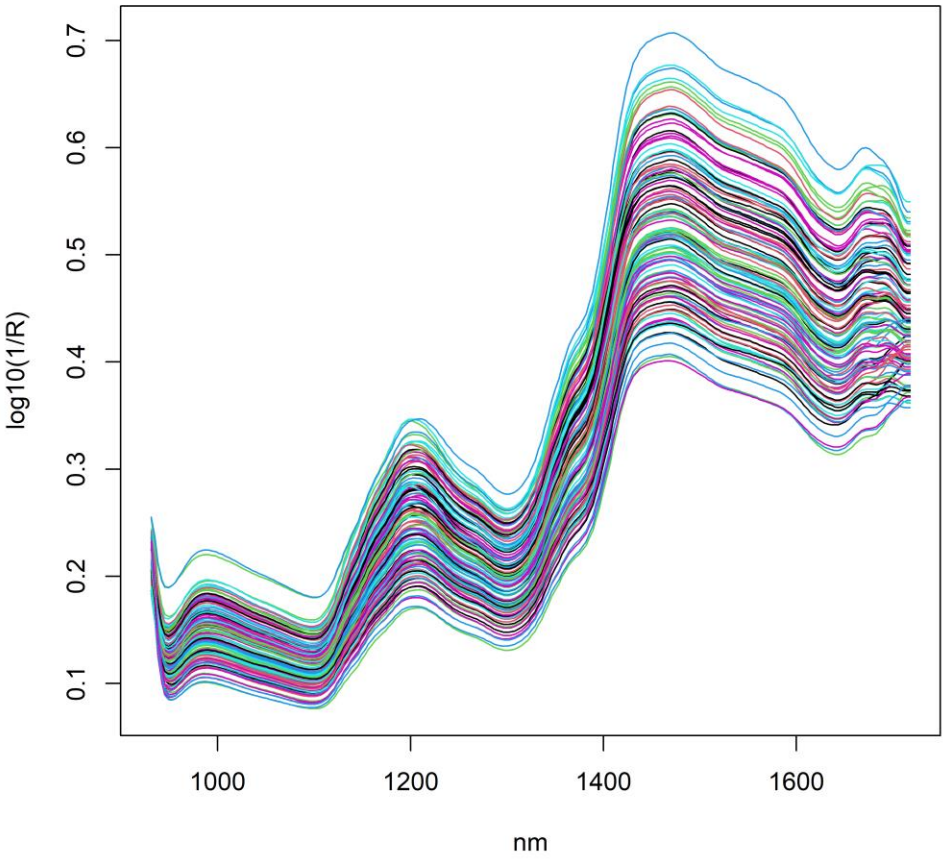
Current Progress



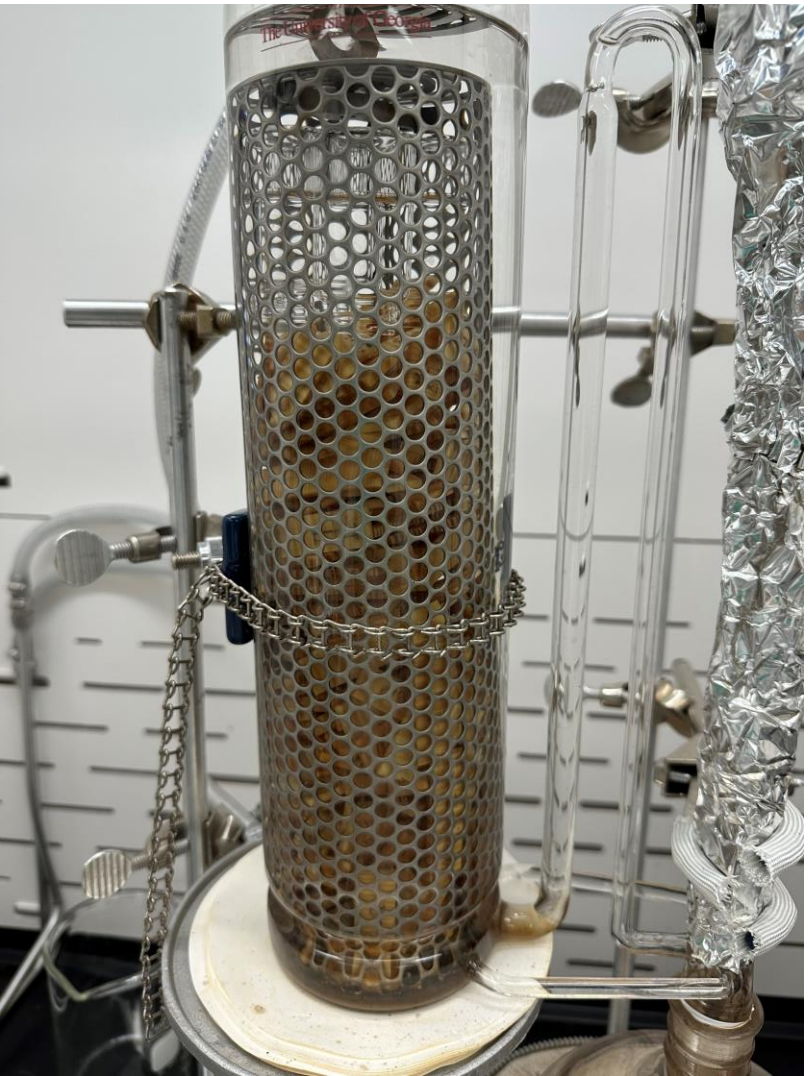




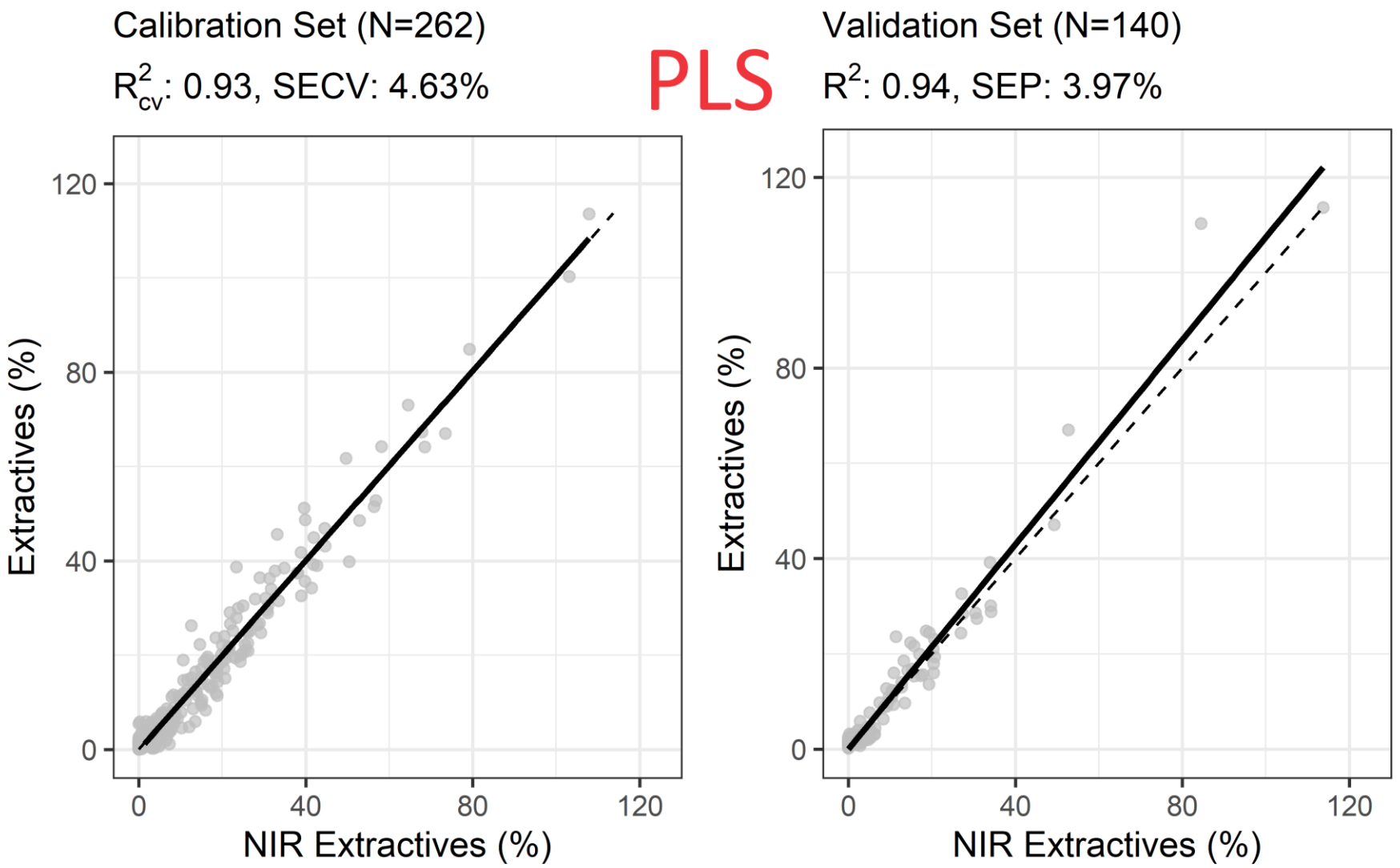
Select most unique samples



Extractives % = dry weight of samples before and after Soxhlet extraction

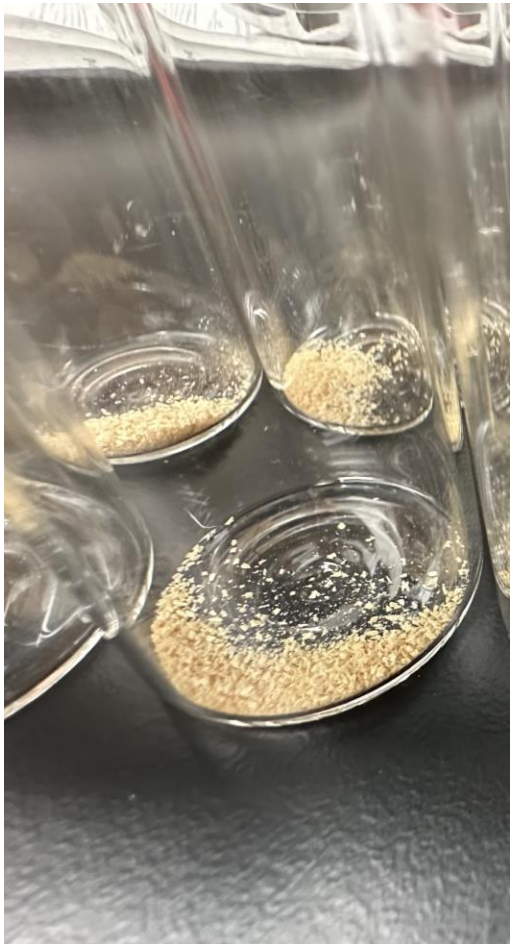


Extractives model for southern pine

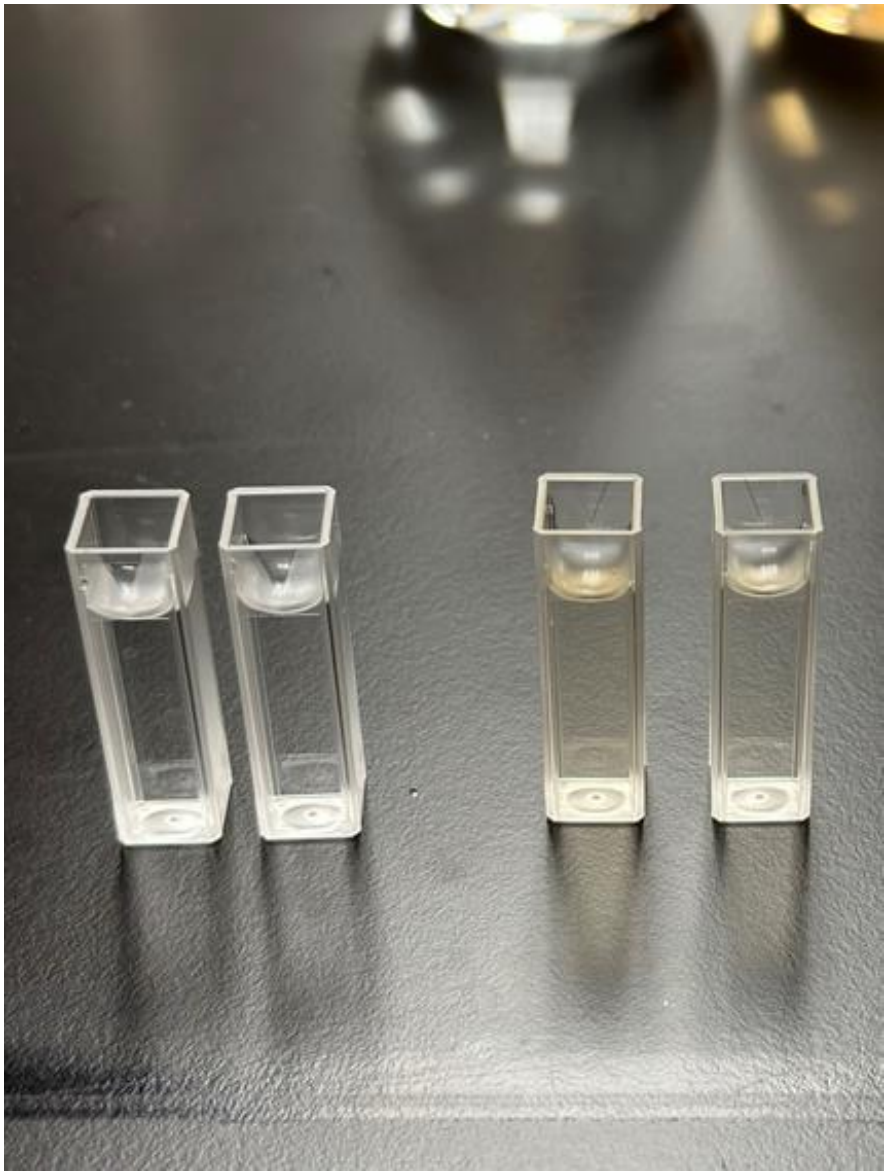


Current Progress

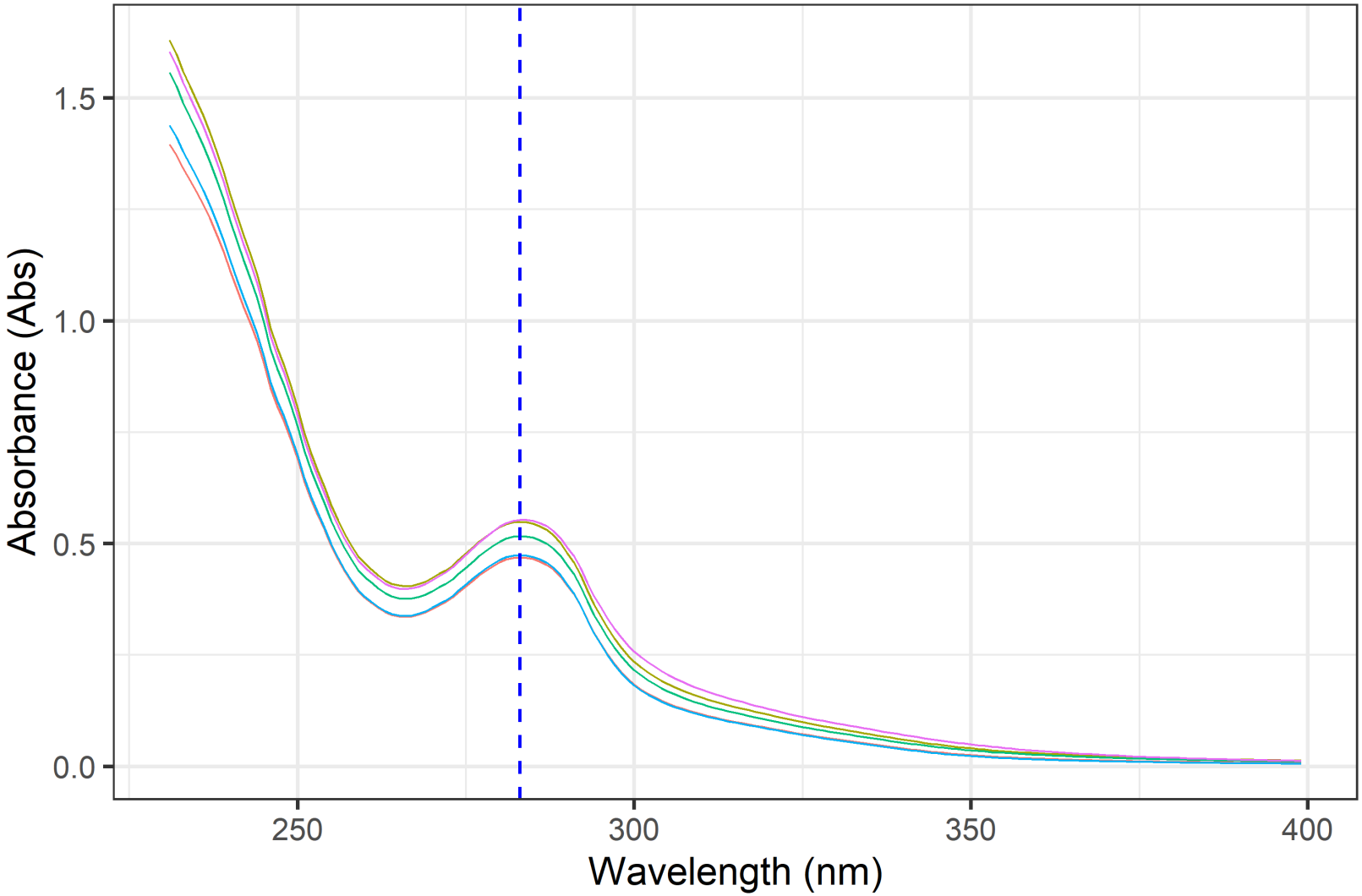
Grind samples
Lignin % - dissolve samples in sulfuric acid + cysteine



Lignin % - dilute solution

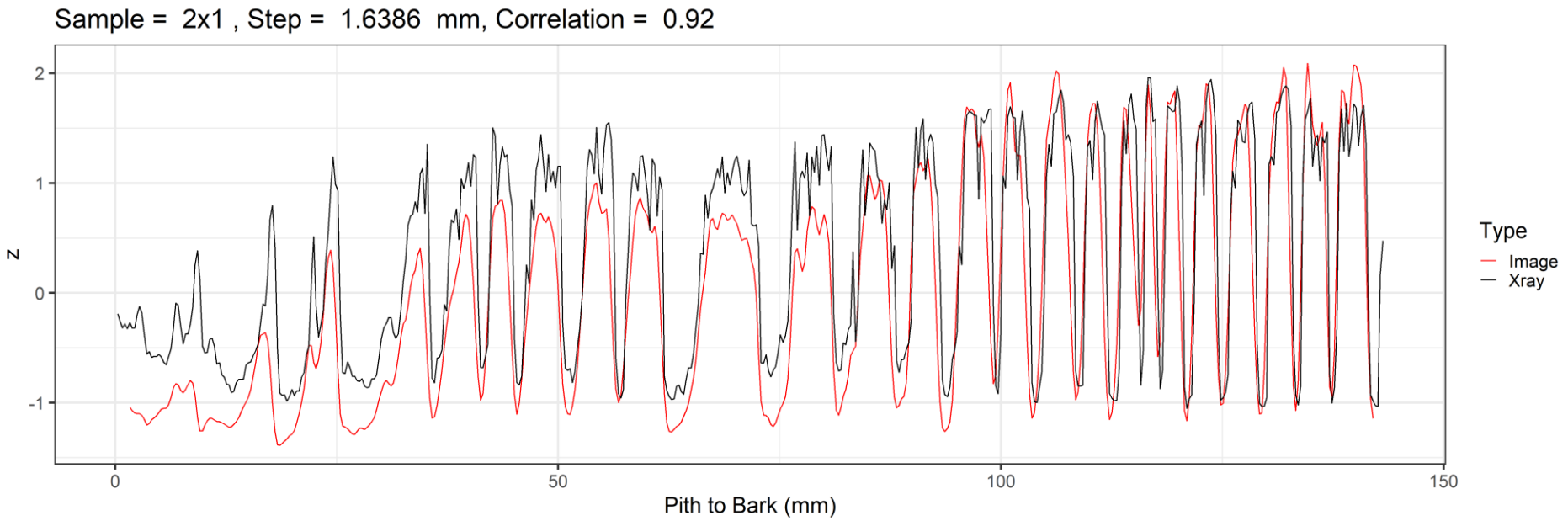


Lignin % - quantify lignin % using spectrophotometer at 283 nm



Future Plans

- Lignin methodology finalized – samples being run
- We're ~90% done with the cellulose methodology
- Work with Dan Markewitz (UGA) to measure carbon %
- Align NIR data with ring level X-ray densitometry data
- Predict ring level values and build models



Thank You and Questions?

- NSF Center for Advanced Forestry Systems
- Members of CAFS
- Members of the Wood Quality Consortium and Plantation Management Research Cooperative
- USFS Forest Products Laboratory

- jdahlen@uga.edu

- Comic: xkcd