

# UGA Center for Advanced Forestry Systems

Joe Dahlen (UGA), Bronson Bullock (UGA)



# Overview

## CAFS at UGA

- History
- Overview
- INTERN, START, Culture by Density

General updates from UGA and Warnell



# Thanks to all companies for supporting CAFS both at UGA and at other institutions!

ID	Member Name				
1	Agrium Advanced Technologies	42	Forestaciones Operativas de México	84	Nature Conservancy
2	Agropical	43	Forestal Rio Biabo	85	Nelson Irrigation
3	AgXplore	44	Forestland Group, LLC	86	North Carolina Forest Service
4	American Forest Management	45	Forestry & Land Resource Consultants, Inc.	87	Oklahoma Forestry Services
5	APRIL Asia	45	Four Rivers Land & Timber	88	Olympic Resource Management
6	ArborAmerica	46	Gavilon Fertilizer, LLC	89	Oregon Department of Forestry
7	ArborGen	47	Georgia Forestry Commission	90	Pacific Denkman Co.
8	Arkansas Forestry Commission	48	Global Forest Partners	91	Packaging Corporation of America
9	Atherton Foundation	49	GMO Threshold Timber Corp	92	Payne's Flying Service
10	Baskahegan Corporation	50	Green Crow	93	Plum Creek Timber Company
11	BBC Lands, LLC	51	Green Diamond Resource Company	94	Port Blakely Tree Farms
12	Beasley Timber Management, LLC	52	Green Edge	95	Pottlatch Forest Holdings
13	Boise, Inc	53	Greenwood Resources	96	Prentiss and Carlisle Company, Inc.
14	BTG Pactual (formerly RMK Timberland Fund)	53	Háloa 'Ala	97	Purdue Research Foundation
15	Buckeye Technologies	54	Hampton Affiliates	98	Quinalt Dept. Natural Resources
16	Bureau of Land Management	55	Hancock Forest Management	99	Rayonier, Inc.
17	Campbell Global	56	Idaho Department of Lands	100	Red River
18	Canopy LLC	57	IFCO Seedlings	101	Reforestadora de la Costa SA (formerly Refocosta S.A.)
19	Carolina Soil	58	IFOM	102	ReEnergy Holdings LLC
20	Cascade Timber Consulting, Inc.	58	Indiana Division of Forestry	103	Renewable Resources LLC
20	CatchMark Timber Trust	59	Indiana Hardwood Lumberman's Association	104	Resource Management Service, LLC
21	CBD Technologies, Ltd.	60	Inland Empire Paper Co	105	Roseburg Forest Products
22	Claritas	61	International Forest Company	106	SAPPI Fine Papers
23	Clayton Lake Woodlands Holdings, LLC	62	International Paper	107	Scotch Lumber Company
24	CMPC Forestry - Forestal Mininco/Forestal Bosques del Plata	63	International Plant Nutrition Institute	108	Seneca Jones Timber Co.
24	Cooke Foundation	64	Irving Woodlands, LLC	109	Seven Islands Land Company
25	Copener	65	James W. Sewell Co.	110	Sierra Pacific
26	Deforsa	66	Jordan Lumber Company	111	Snowshoe Timberlands, LLC
27	Delaney Development	67	Katahdin Forest Management, LLC	112	South Carolina Forestry Commission
28	Dettic Timber Company	68	Kingwood Forestry	113	St. Joe Company
28	Domain Timber Advisors	69	Klabin	114	Starker Forests, Inc.
29	Dougherty & Dougherty Forestry	70	Koch (AGROTAIN)	115	Steelcase
30	Dow AgroSciences LLC	71	Larson and McGowin, Inc.	116	Stimson Lumber Company
31	Du Campo	72	Lesco Aviation	117	Superior Pine Products Company
32	DuPont Agricultural Products	73	Lewis & Clark Tree Farms	118	Suzano
33	Eldorado	74	Lone Rock Timber Management Co.	119	SweTree Technologies AB
34	Evans Properties	75	Longview Fibre Co. Timber Department	120	Sylvan Timberlands, LLC
35	F&W Forestry Services, Inc	76	Louisiana Department of Agriculture & Forestry	121	Syngenta
36	FCB	77	Lykes Brothers	122	Tennessee Division of Forestry
37	Fibria	78	Maine Bureau of Parks and Public Lands	123	TerraSource Valuation
38	Florida Grown	79	Milliken Forestry Company, Inc.	124	Thrash Aviation, Inc.
39	Foley Timber and Land, Inc	80	Molpus Timberlands Management, LLC	125	Timberland Investment Resources
40	Forest Investment Associates	81	Montana Deptment of Natural Resources and Conservation	126	Timbervest, LLC
41	Forest Resource Consultants Inc.	82	MeadWestvaco Corporation	127	TimberWest-Coast Timberlands
		83	Native Forest Nursery	128	USDA Forest Service Research
				129	USDA Forest Service State and Private
				130	Valor Florestal
				131	Van Eck Foundation
				132	Varn Wood Products, LLC
				133	Virginia Department of Forestry
				134	Wagner Forest Management
				135	Washington State Department of Natural Resources
				136	West Fork Timber Co., LLC
				137	Westervelt Company
				138	Weyerhaeuser



# Thanks to CAFS administration!





# Phase 1



09.09 Developing Growth and Yield Predictions for Enhanced Genotypes - Bruce Borders

09.13 Developing Improved Understanding of Relationships between Loblolly Pine Stand Response to Thinning and Post-Thinning Treatments and Stand, Crown, Leaf Area, and Light Interception Attributes - Michael Kane

09.16 Integrating Wood Quality Predictions into Growth and Yield Models for Evaluating Advanced Genotypes and Silvicultural Responses – Dick Daniels



# Phase 2



13.46 Linking Growth Modeling to Product Quality for Loblolly Pine - Joe Dahlen

15.60 Assessing stand characteristics of enhanced genetics in loblolly pine plantations in the Southeast – Bronson Bullock

18.74. Environmental predictors of form and quality - Cristian Montes





# Phase 3





# Phase 3



21.88. Quantifying silvicultural treatment effect on  
lumber quantity and quality in loblolly pine – Joe Dahlen

21.89. Quantifying carbon sequestration as a function of  
silvicultural treatment in loblolly pine – Joe Dahlen

22.99. The effects of dominant tree height definition on  
loblolly pine growth and yield model outputs in the  
southeast U.S. - Bronson Bullock



24.106 Integrating SAE methods with stand-level forest inventory and growth projection for southern pine Plantations – Sheng-I Yang

24.109. Throughfall Reduction Impacts on Loblolly Pine Plantations Pre- and Post- Thinning – Bronson Bullock

25.XXX. Silviculture by genetics loblolly pine research trial – Bronson Bullock

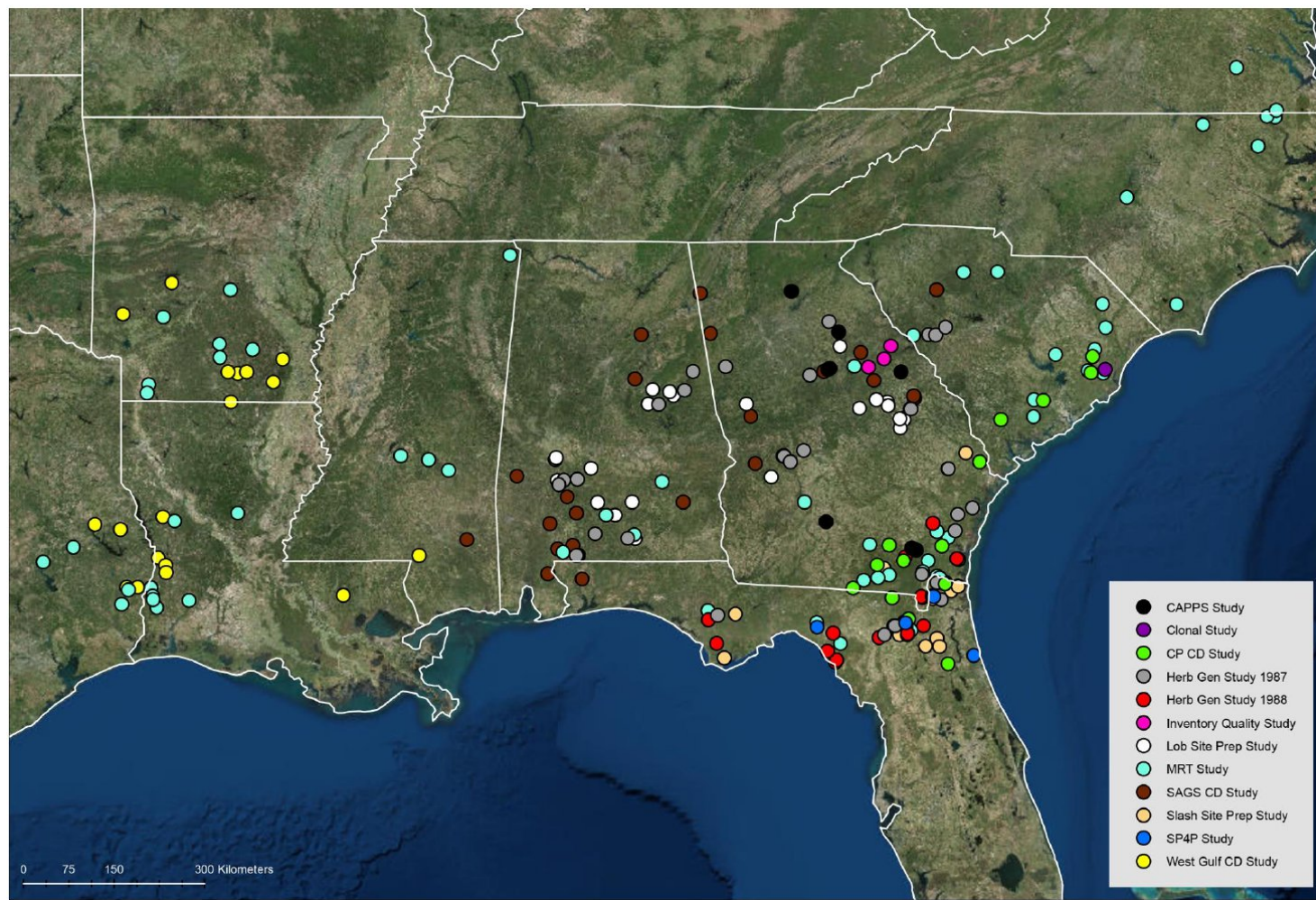
25.XXX. Quantifying wood property variation and carbon sequestration from different loblolly pine families – Joe Dahlen



# UGA CAFS has dual emphasis

Growing trees from seedlings to the end of the rotation

Harvesting trees at the end of the rotation and 'growing' them backwards



# Active Research Trials

- Mid-rotation Treatment Study (MRT)  
Coastal Plain (CPCD), South Atlantic Gulf Slope (SAGS CD),  
Western Gulf (WGCD) Culture Density Study
- Consortium for Accelerated Pine Production Studies ver. 2  
(CAPPS2)
- Guyton Enhanced Genetics Trial
- PineMap – Tier III site
- Silviculture and Herbicide Cooperative SP4P Study

## NEW Region-wide Research Studies

- Operational G&Y Validation Study
- Silviculture x Genetics G&Y Research Study

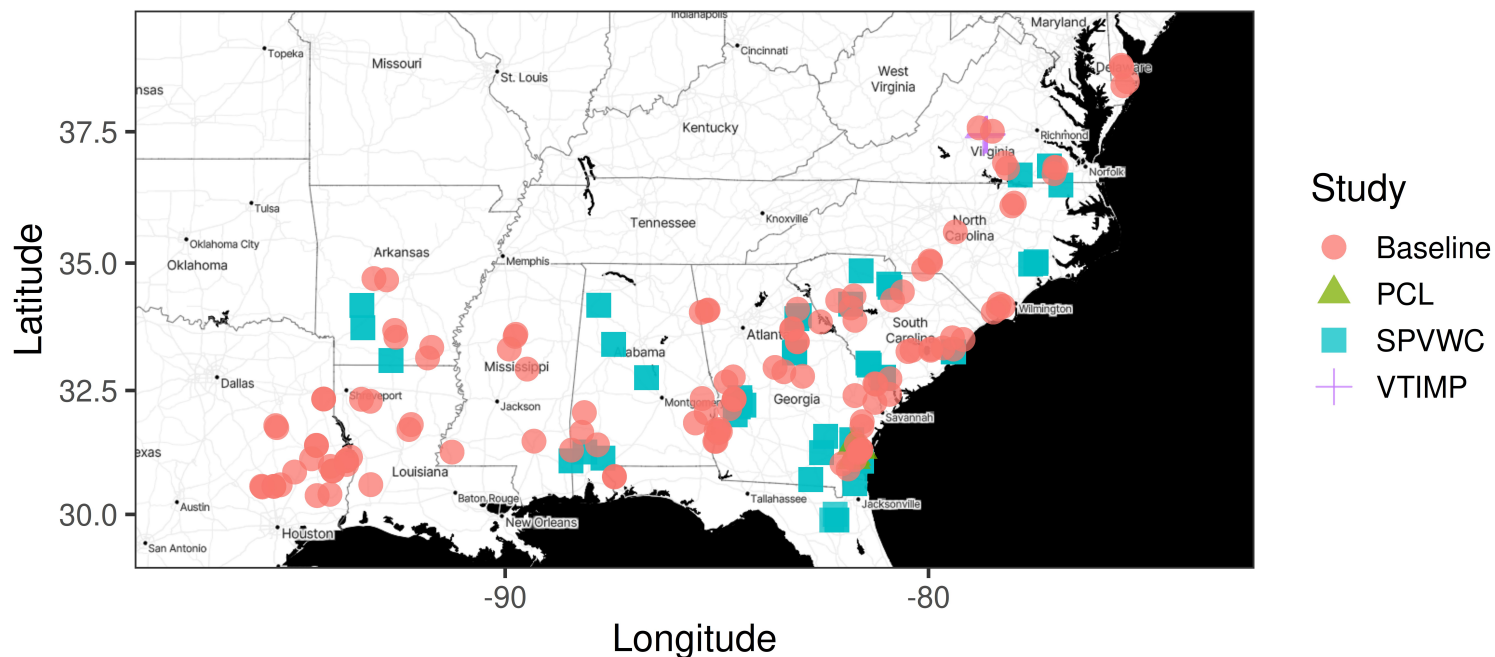




# UGA CAFS has dual emphasis

Growing trees from seedlings to the end of the rotation

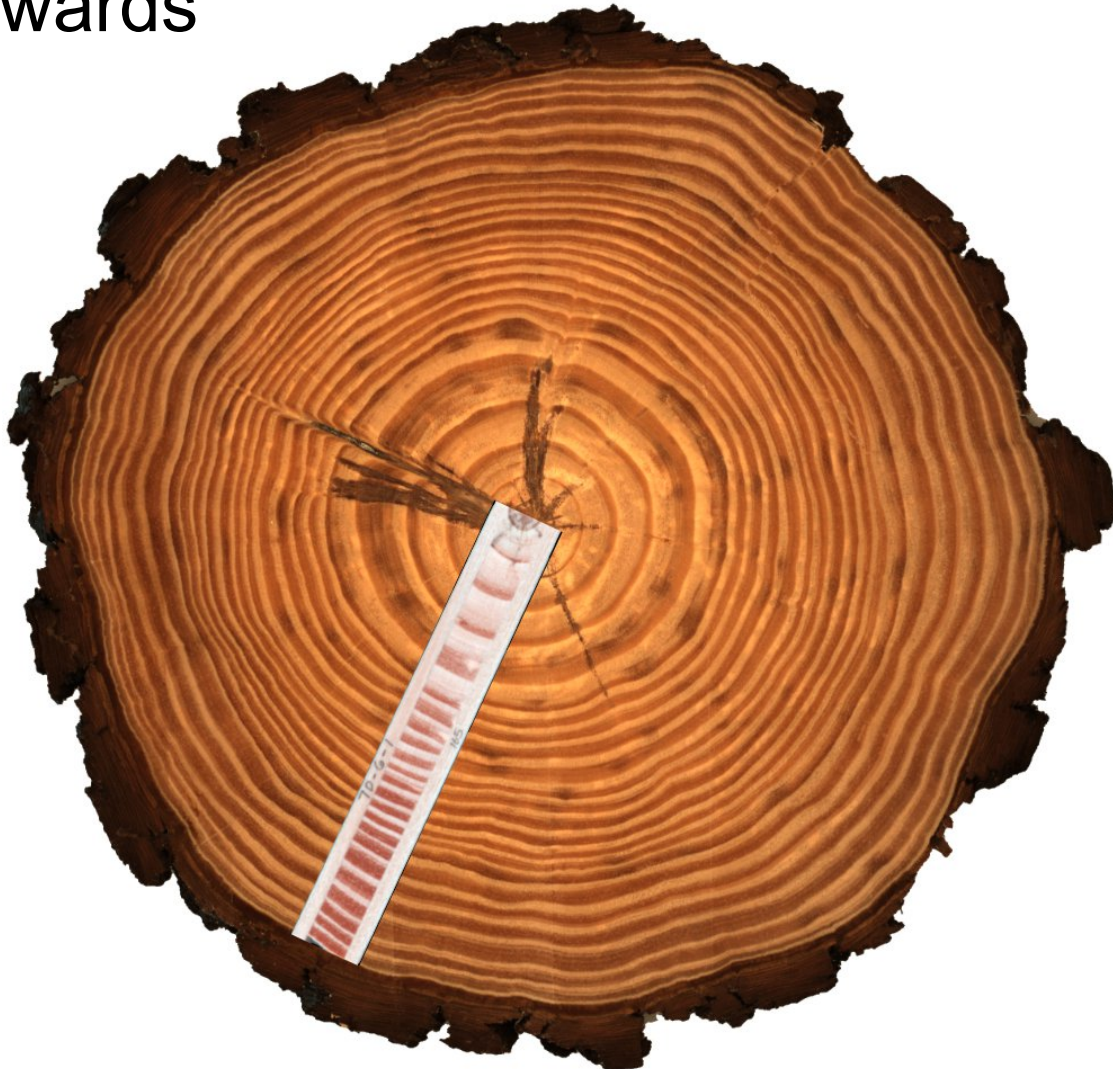
Harvesting trees at the end of the rotation and 'growing' them backwards



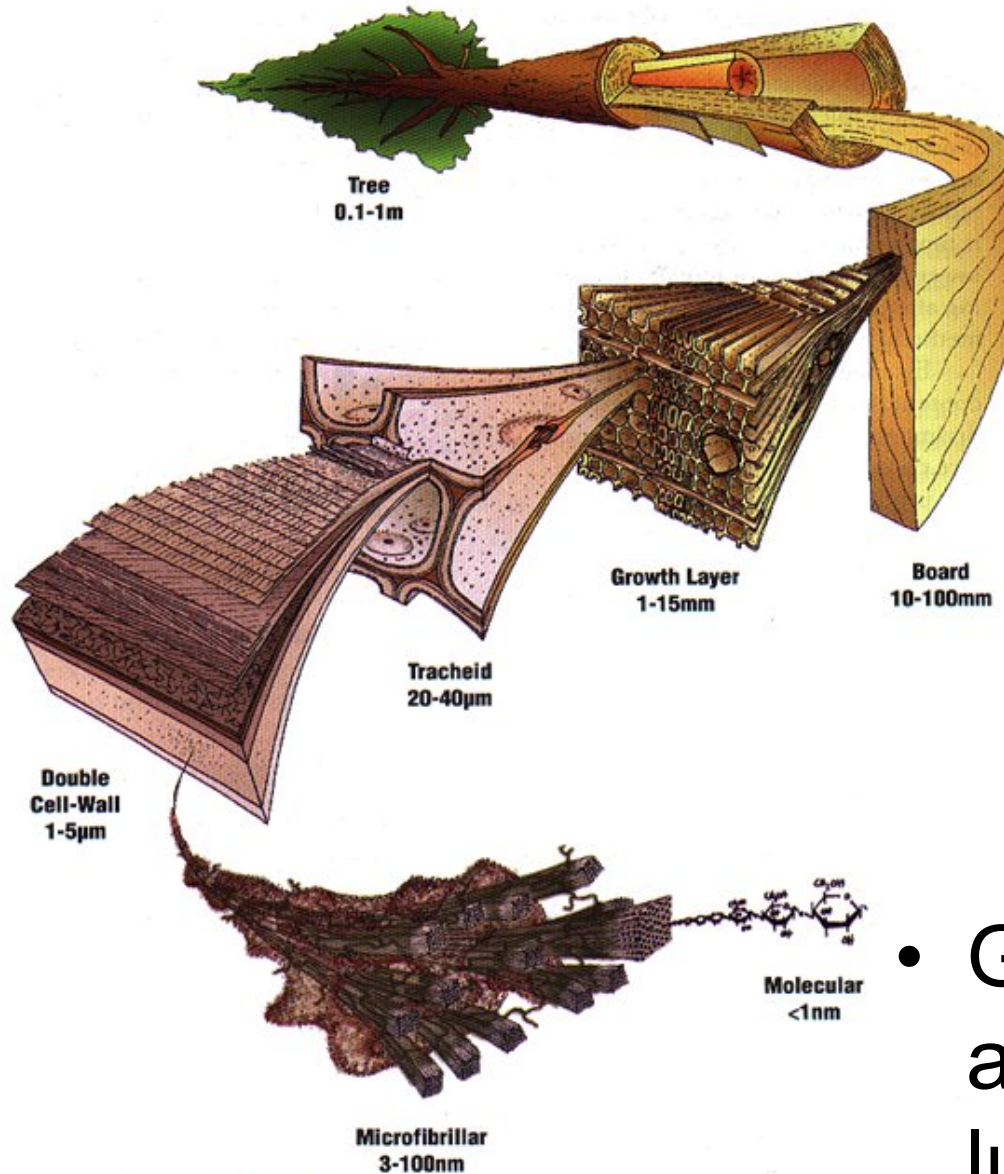
UGA CAFS has dual emphasis

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Harvesting trees at the end of the rotation and 'growing' them backwards



# Wood properties measured



Jonathan Harrington

- Growth
- MC%
- Specific gravity
- Acoustic velocity
- Stiffness (MOE)
- Tracheid length
- Tracheid width
- Extractives
- Cellulose
- Lignin
- Carbon %
- Grade, MOE, and MOR from lumber trials

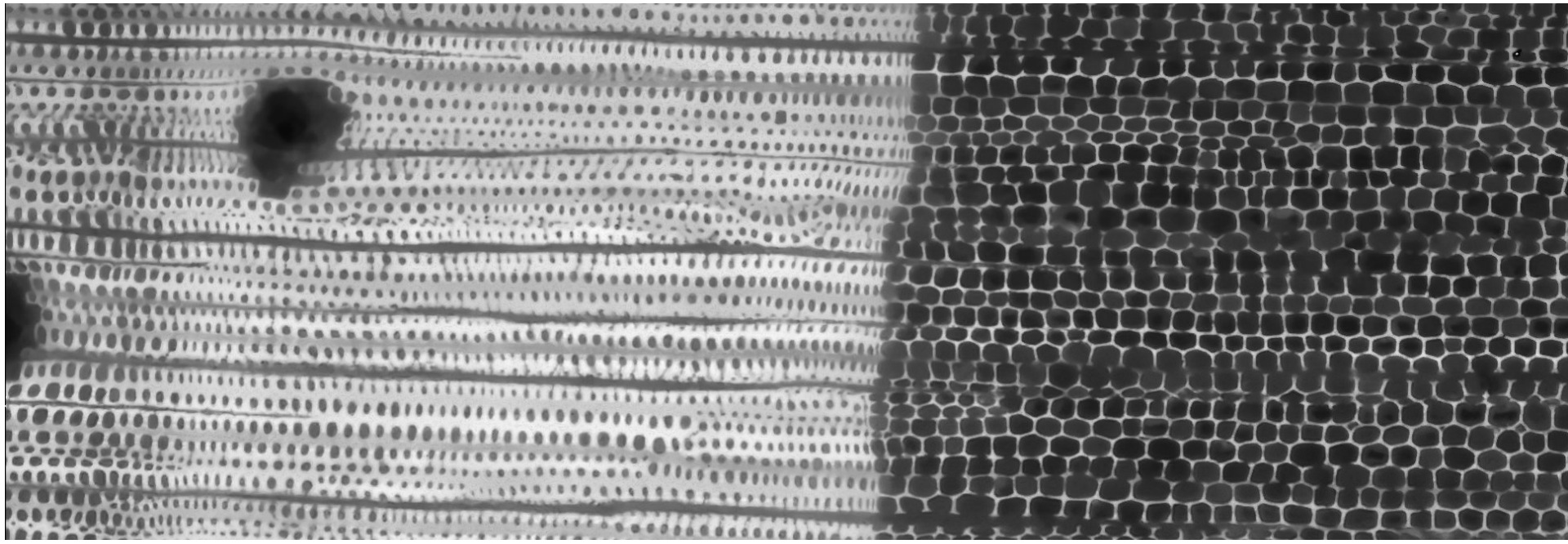




# NSF INTERN, START

NSF INTERN supplemental with Rayonier

NSF START supplemental with Athens Technical College

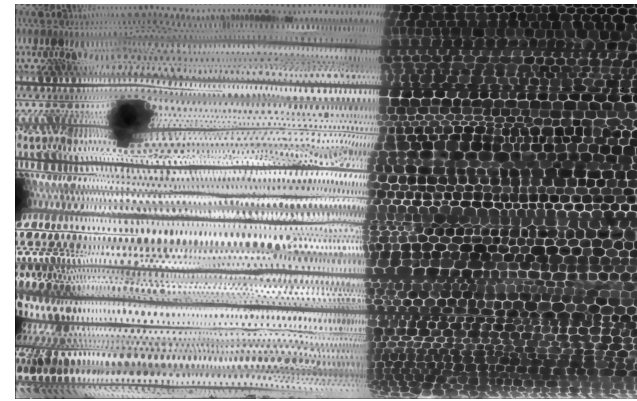


# Culture by Density Sampling

21.89 – Quantifying carbon sequestration as a function of silvicultural treatment in loblolly pine

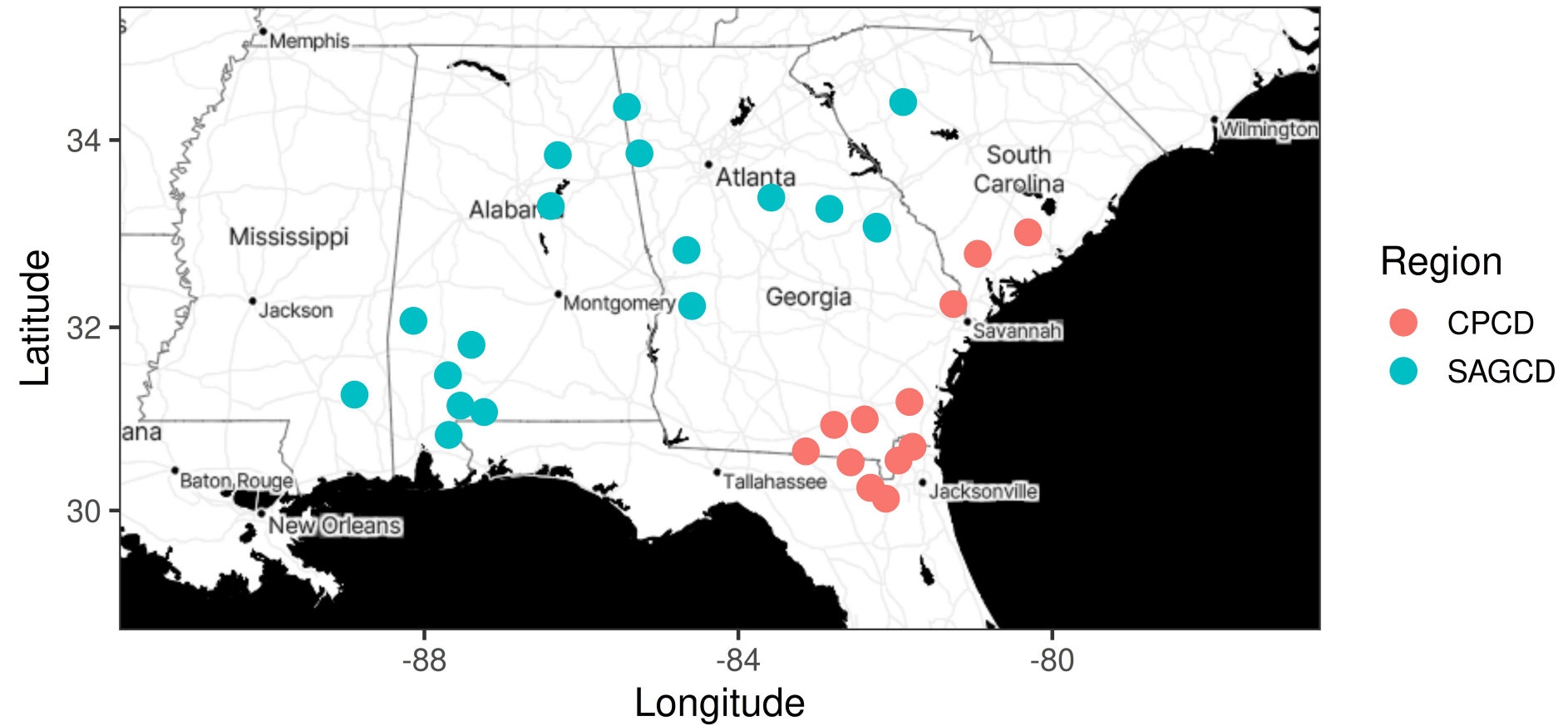
Coastal Plain Culture Density Study (CPCD)

South Atlantic Gulf Slope Culture Density Study (SAGS CD)





## Culture By Density Unthinned Stands





# Density = 300 TPA





# Density = 600 TPA

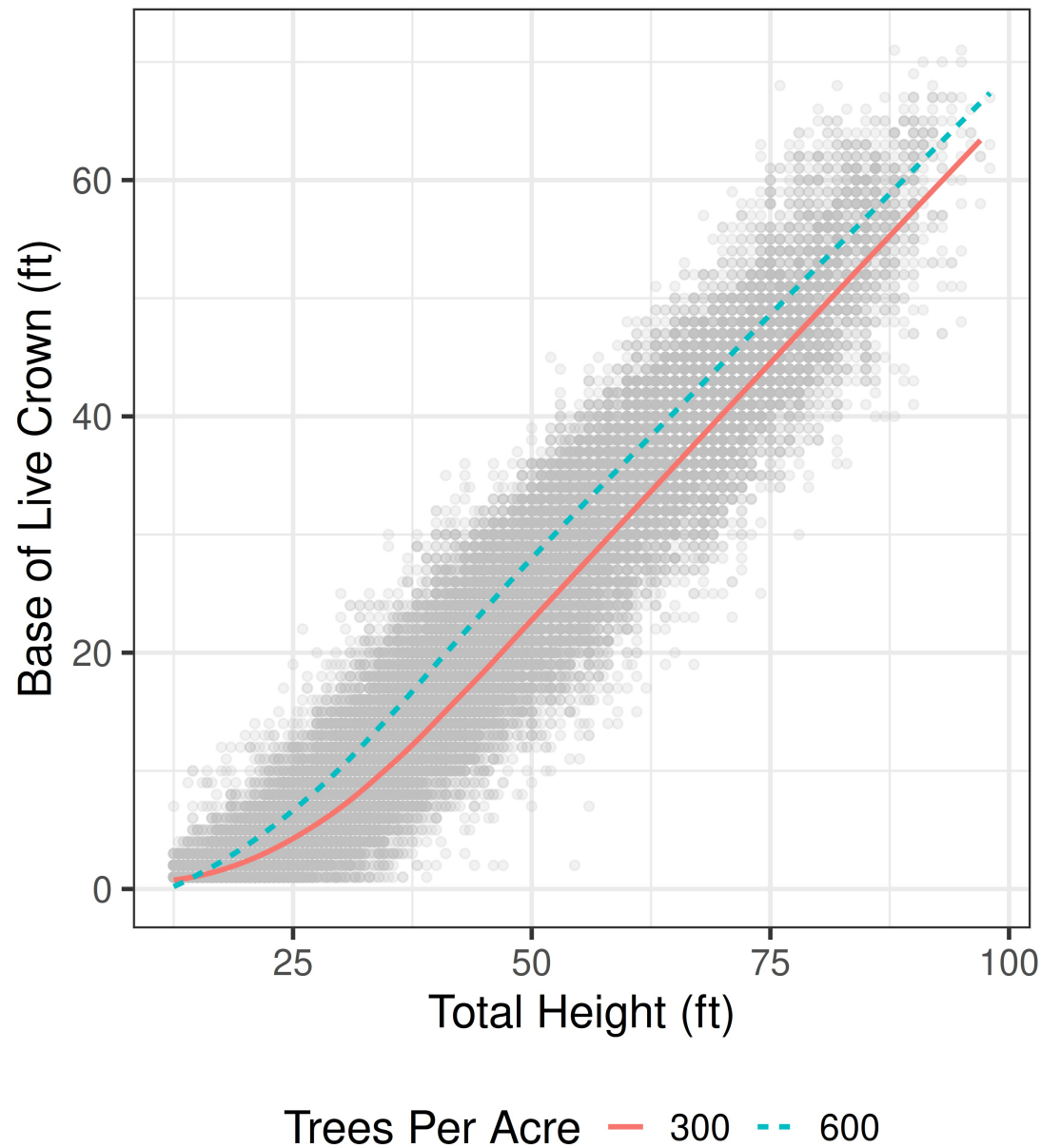




# Hypotheses

~5 feet longer crown for  
300 tpa vs 600 tpa

Longer crown = larger  
diameter knots



# **A framework for modeling the dynamics of first-order branches and spatial distribution of knots in loblolly pine trees**

**Guillermo Trincado and Harold E. Burkhart**

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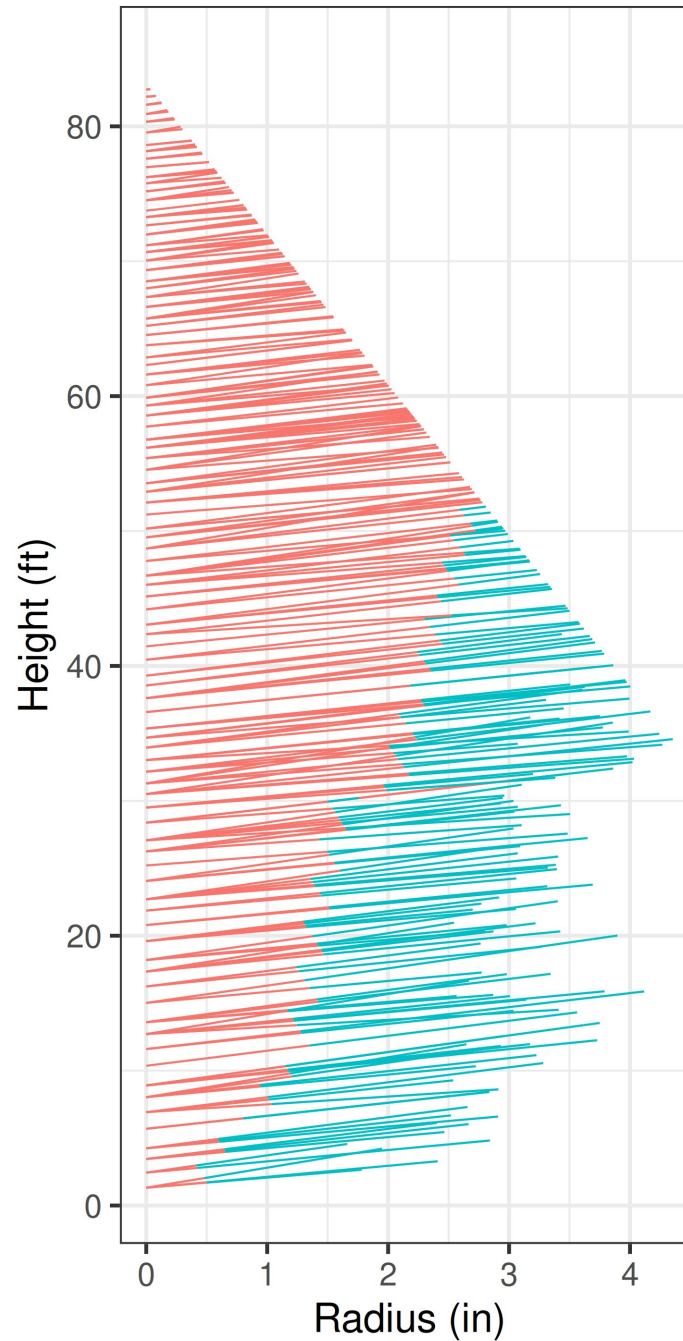




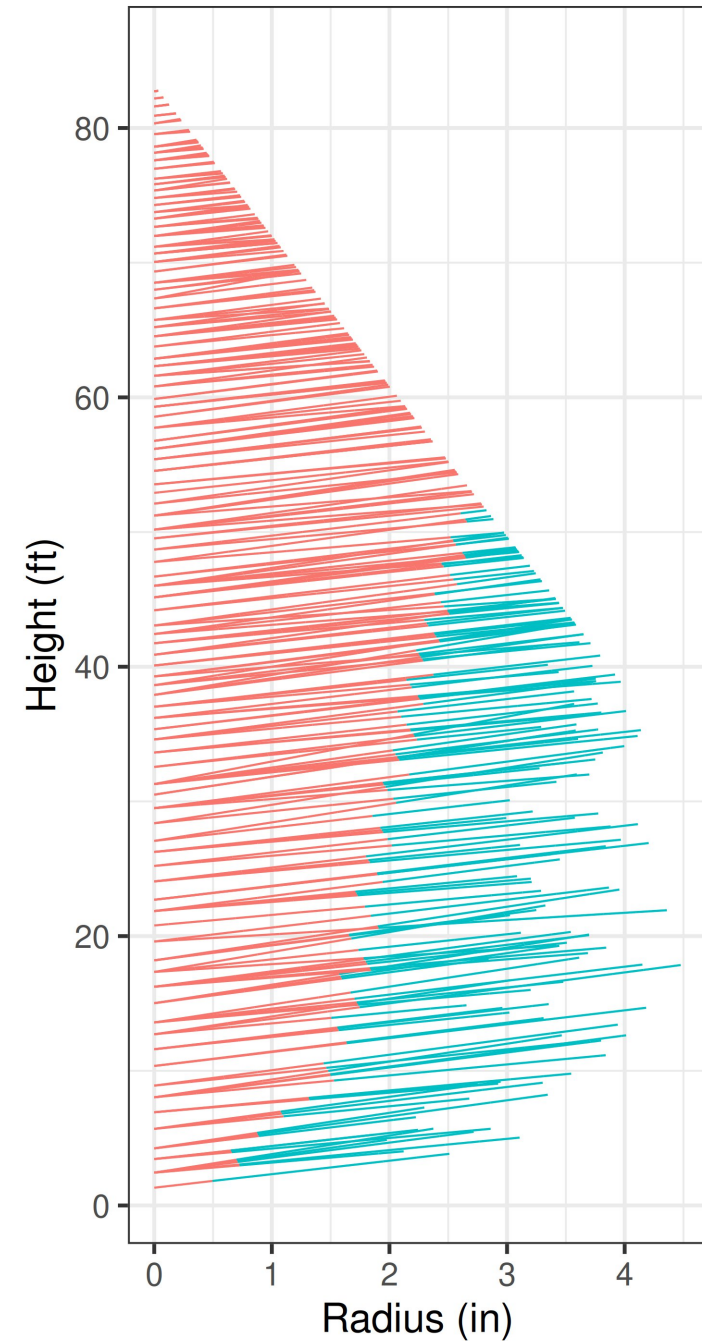
# A frame order b loblolly

Guillermo T

600 TPA to 300 at 13



300 TPA, No Thinning



# A framework for modeling the dynamics of first-order branches and spatial distribution of knots in loblolly pine trees

Guillermo Trincado and Harold E. Burkhart

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# General updates from UGA and Warnell







# University of Georgia Warnell School of Forestry and Natural Resources

October 23 at 9:24 AM · 🌐

We are excited to announce a series of new faculty positions!

Several of these positions are part of a cluster hire in the general area of sustainable forestry and innovations in forest-based economies. Successful candidates will have opportunities to collaborate in several cross-campus initiatives including Precision Agriculture and Forestry, Precision One-Health, Artificial Intelligence, Sustainability and Advanced BioMaterials, and Resilient Infrastructure.

- Assistant/Associate Professor of Natural Capital and Supply Chain Modeling
- Assistant/Associate Professor of Sustainability Sciences
- Assistant/Associate Outreach Professor of Wildlife Management
- Assistant/Associate Outreach Professor of Natural Resources Science Communication
- Assistant/Associate Professor of Precision Forestry
- Assistant/Associate Professor of Biomaterials

Learn more about the current openings and links to the application portal at <https://warnell.uga.edu/careers>

[#Warnell](#) [#GoDawgs](#) [#UGA](#)

# ***We're Hiring!***



UNIVERSITY OF  
**GEORGIA**  
Warnell School of Forestry  
& Natural Resources







**University of Georgia Warnell School of Forestry and Natural Resources**



**UNIVERSITY OF  
GEORGIA**

**Warnell School of Forestry  
& Natural Resources**

## **Position Announcement Assistant/Associate Professor – Forest Biomaterials**

- Assistant/Associate Professor of Natural Capital and Supply Chain Modeling
- Assistant/Associate Professor of Sustainability Sciences
- Assistant/Associate Outreach Professor of Wildlife Management
- Assistant/Associate Outreach Professor of Natural Resources Science Communication
- Assistant/Associate Professor of Precision Forestry
- Assistant/Associate Professor of Biomaterials

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[#Warnell](#) [#GoDawgs](#) [#UGA](#)

***We're Hiring!***



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Warnell School of Forestry  
& Natural Resources



# A push for more materials research at UGA



S. Jack Hu, Ph.D.

Provost and UGA Foundation Distinguished Professor, [University of Georgia](#)  
Verified email at uga.edu - [Homepage](#)

[Assembly](#) [Manufacturing Systems](#) [Quality](#)

## TITLE

### [Mechanics of sheet metal forming](#)

Z Marciniak, JL Duncan, SJ Hu  
A Butterworth-Heinemann Title

### [Evolving paradigms of manufacturing: From mass production to mass customization and personalization](#)

SJ Hu  
Procedia Cirp 7, 3-8

### [Joining of dissimilar materials](#)

K Martinsen, SJ Hu, BE Carlson  
Cirp Annals 64 (2), 679-699



# A push for more materials research at UGA

## Dean Todd Petty



S. Jack Hu, F

Provost and UGA Fo  
Verified email at uga.

[Assembly](#) [Manufac](#)

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# Forest Biomaterials

## Lili Cai

Assistant Professor of  
Forest & Sustainable  
Products  
University of Idaho

PhD Sustainable  
Bioproducts at  
Mississippi State





# Forest Biomaterials

Lili Cai

Research in:  
Development of green  
wood preservatives

Bio-based fire retardants

Wood modification and  
functionalization





UNIVERSITY OF  
**GEORGIA**  
New Materials Institute

ABOUT ▼

RESEARCH ▼

INDUSTRY PARTNERSHIP ▼

# About Us

## Join our waste-prevention revolution

An estimated 6.8 million metric tons of trash is generated globally every day. Much of that waste originates from single-use packaging—used for shipping materials, water bottles, food, pharmaceuticals and cosmetics. Worldwide, packaging designed for immediate disposal comprises the largest market sector for plastic resins.

A lot of the global waste problem is due to plastics, but not all of it. Whether you are looking at materials used to build homes, businesses, textiles, or staring down into an empty paper coffee cup, a lot of materials you think are recyclable are actually not. That's where we come in.



# Urban Forestry Ignazio Graziosi

Program coordinator  
Urban Forest Initiative  
University of Kentucky

PhD Entomology at the  
University of Kentucky





# Urban Forestry Ignazio Graziosi

Research in:  
Tree Health and  
Diseases





# Sustainability Sciences

## Jaana Korhonen

Research Fellow at Oak  
Ridge Institute for  
Science and Education  
U.S. Forest Service

PhD Forest Economics  
and Marketing at  
University of Helsinki



# Sustainability Sciences

## Jaana Korhonen

Research in:  
Bioeconomy and  
innovation

Forest investment,  
prices, etc.

Sector trends

Workforce development



# Science Communication

## Ginger Orton

Postdoctoral Associate in  
College of Agriculture  
and Environmental  
Sciences at UGA

PhD at Texas Tech in  
Agricultural  
Communications and  
Education





# Science Communication

## Ginger Orton

Research in:  
Science Communication  
Climate Smart Agriculture



# Precision Forestry TBD



# Natural Capital TBD

????????





# A push for more materials research at UGA



S. Jack Hu, F

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05.29.2025

## S. Jack Hu to depart UGA after six years as provost

Following a six-year tenure as the University of Georgia's Senior Vice President for Academic Affairs and Provost, S. Jack Hu has been named chancellor of the University of California, Riverside, effective July 15. "With his strong background of experience at both the University of Georgia and the University of Michigan, I have no doubt that [...]"





05.29.2025

## Ayers named UGA senior vice president for academic affairs and provost

Benjamin C. Ayers, dean of the C. Herman and Mary Virginia Terry College of Business, has been named the University of Georgia's next senior vice president for academic affairs and provost, President Jere W. Morehead announced Thursday. Ayers, who holds the Earl Davis Chair in Taxation, has led the Terry College of Business since 2014. [...]



Center for Advanced Forestry Systems 2025 IAB Meeting





# Aspect: South vs North Facing

South with North in background

North





# Thank you!

## Questions?



Koa! Photos: Wildwood, Eddies

