

**New industry and  
partnership with cross  
laminated timber.**

# My Background



FOREST PRODUCTS DEVELOPMENT CENTER  
SCHOOL OF FORESTRY AND WILDLIFE SCIENCES

INTERNATIONAL  PAPER



- Resume
- International Paper
  - Wood Quality Project Leader
  - Chemometric Characterization
- Louisiana Pacific
  - New Product Development
  - Statistical Modeling
  - Development of cost effective and green adhesives
- Auburn
  - Combines these areas

# Dr. Maria Soledad Peresin Background



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SCHOOL OF FORESTRY AND WILDLIFE SCIENCES

**Dr. Maria Soledad Peresin**

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School of Forestry and Wildlife Sciences, Auburn University



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UNIVERSITY

SCHOOL OF FORESTRY  
AND WILDLIFE SCIENCES

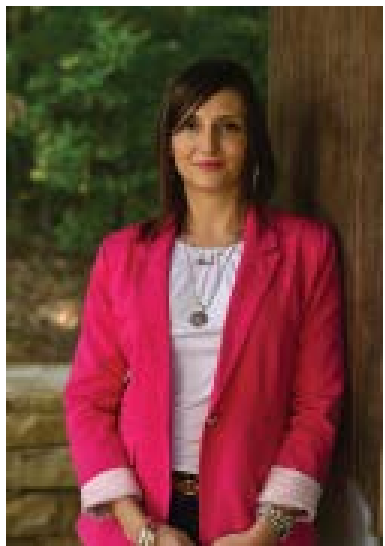
Vesa Kunnari, Panu Lahtinen, Tekla Tammelin  
VTT Technical Research Centre of Finland



Orlando Rojas  
Aalto University, Finland




Aalto-yliopisto  
Teknillinen korkeakoulu



# Relevance of Industry to Alabama



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## ALABAMA FORESTRY COMMISSION


PROTECT • SUSTAIN • EDUCATE


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### Alabama Forest Facts

[Click Here for Print Version](#)

- Alabama forests generate over \$21 billion in timber production & processing revenue. ([source-aces](#))
- Alabama forests provide over 122,000 jobs in timber production & processing. ([source-aces](#))
- There are 23 million acres of timberland in Alabama, accounting for 69% of the total land area in the state.
- Alabama has the third most timberland acreage in the 48 contiguous states, behind only Georgia and Oregon. As far as private timberland acreage is concerned, Alabama ranks second behind Georgia.
- Of timberland acreage, 87% is owned by non-industrial private landowners.
- The single most prevalent forest type is "loblolly pine" which occupies 8.5 million acres.
- The most prevalent hardwood forest type is the "mixed upland" of which there are 2.5 million acres. Ranking second is the "white oak/red oak/hickory" forest type which comprises 1.55 million acres.
- Approximately 31% of Alabama's timberland is comprised of pine plantations.
- Although Alabama has a robust forest industry, more timber is being grown than is being harvested. According to 2014 FIA data, the timber "growth-to-removals" ratio for softwood species is 1.48. This means that for every cubic foot of softwood timber harvested, 1.48 cubic feet are grown. The growth-to-removals ratio for hardwood species is 1.80. In 2000, the growth-to-removals ratio was 1.00 for softwoods and 1.47 for hardwoods.



Forest Type Groups (USDAFS, FIA 2008)

Non-Forest	Oak / Gum / Cypress
Longleaf / Short Pine	Oak / Gum / Ciderwood
Loblolly / Shortleaf Pine	Maple / Birch / Birch
Oak / Pine	Wetland
Oak / Hickory	Other Ecoregions (3/4)

# Blending Education and Research Blending Industry and Academia



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Future of Tall Event Program.pdf - Adobe Acrobat Reader DC

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#### Sponsoring Organization Committee:

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#### Sponsors



**Panelists:** *Packaging:* Marko Hakovirta, Department Head of Forest Biomaterials at North Carolina State University (pending) • *Nanotechnology:* Kim Nelson, VP of Nanocellulose Technology Development at American Process Inc. • *Structural Products:* Sherry Mundell, WoodWorks Regional Director for the South Central U.S. • *Bioenergy & Chemicals:* Dilpreet Bajwa, Associate Professor, North Dakota State University

**Auburn University Moderators:**  
Brian Via, Regions Professor of Forest Products, School of Forestry and Wildlife Sciences  
Maria Soledad Peresin, Assistant Professor of Forest Biomaterials, School of Forestry and Wildlife Sciences  
Maria Auaad, Professor of Polymer and Fiber Engineering, Samuel Ginn College of Engineering  
Sushil Adhikari, Alumni Professor and Interim Department Head, College of Agriculture, Department of BioSystems Engineering

AUBURN UNIVERSITY

## School of Forestry & Wildlife Sciences

WELCOMES YOU TO

### The Future of Tall: Building a Wood High-Rise in the U.S.

Seminar & Reception • Wednesday, October 4, 2017 • 2:00 p.m.



Cross laminated timber (CLT), a newly engineered wood product system, is gaining popularity in mid- and high-rise residential and non-residential construction. Robinson will share how this material is revolutionizing sustainable construction with details about his firm's pioneering use of CLT in "Framework" – a project slated to become the first mass timber high-rise in the U.S.



Presented by  
Thomas Robinson  
founder and principal  
LEVER Architecture



in partnership with:  
Office of Vice President for Research & Economic Development •  
College of Architecture, Design and Construction • Office of Sustainability •  
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# Auburn University is gearing up for CLT



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Kronos Workforce x Georgia-Pacific, LP x Forest Products Sc x LP Why LP | About LP x Lab2701 x Innovative CLT pro x Wood construction x International Beams x

www.madeinalabama.com/2017/06/international-beams/

MADE IN ALABAMA

Do Business in Alabama

All Stories Enterprise Infrastructure Innovation Manufacturing Rural Development Workforce

MANUFACTURING

**International Beams to invest \$20M in Alabama manufacturing facility**

WEEK: 3

GLULAM COLUMN SIZES

265 x 265 mm on LEVELS 2-9

215 mm

# Is CLT an Opportunity?



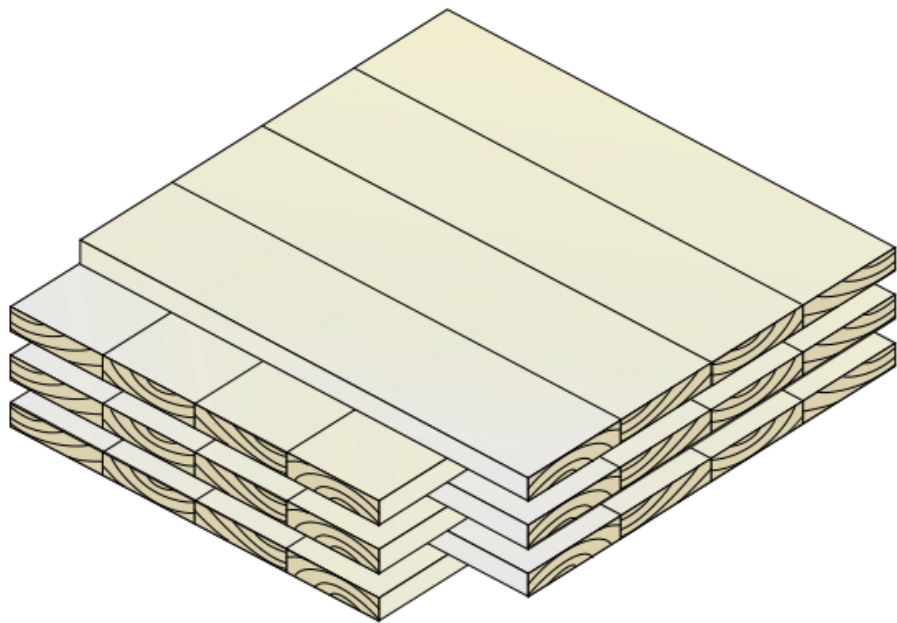
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# What is CLT?



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- <https://youtu.be/jEmcJer3AUM>



Transverse Planks

Longitudinal Planks

# Reminder of My Engineered Wood Background



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SCHOOL OF FORESTRY AND WILDLIFE SCIENCES

Forest Products Society | Corrugated Packaging

products/na/corrugated-packaging

English | Careers | Locations | Newsroom

**INTERNATIONAL PAPER**

Search

COMPANY | PRODUCTS | PEOPLE | PLANET | PERFORMANCE

## Products

Products | North America | Corrugated Packaging

### Corrugated Packaging

We link people to products and companies to communities by creating the packaging that brings fresh fruit to faraway places, protects priceless objects, showcases new technologies and safeguards goods that enhance the lives of consumers around the globe.

- Cellulose Fibers
- Containerboard
- Corrugated Packaging
  - Corrugated Packaging Products
  - Markets
  - Services & Solutions
  - Practical Innovation
  - Locations
- Papers
- Recycling

Can't find what you are looking for?

**BROWSE PRODUCT FINDER**

**Corrugated Packaging Products**

**Market Segments**

**Services & Solutions**

Georgia-Pacific, LLC | Forest Products Society | Why LP | About LP | LP B

Secure | https://lpcorp.com/about-lp/why-lp/

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**LP**

Products | Resources | Community | Sustainability | About LP

**BUILDING PRODUCTS** For more than 40 years, LP products have been engineered to perform in a variety of applications.

<b>FRAMING</b> Build a stronger home with superior walls, floors and support. <ul style="list-style-type: none"><li>LP SolidStart LSL</li><li>LP SolidStart LVL</li><li>LP SolidStart I-Joists</li><li>LP SolidStart Rim Board</li><li>LP SolidGuard LSL</li></ul> <b>Architect's Corner</b> <small>NEW</small>	<b>PANELS</b> The world's best-selling OSB helps build high-performance structures. <ul style="list-style-type: none"><li>LP TechShield Radiant Barrier Sheathing</li><li>LP FlameBlock Fire-Rated OSB Sheathing</li><li>LP LongLength And LongLength XL OSB Sheathing</li><li>LP OSB Sheathing</li><li>LP TopNotch Sub-Flooring</li><li>LP Legacy Sub-Flooring</li></ul>	<b>SIDING</b> Engineered strength with the style and beauty of traditional lumber. <ul style="list-style-type: none"><li>LP SmartSide Trim &amp; Siding</li><li>LP CanExel Prefinished Siding</li><li>LP ArmorStrand Substrate</li></ul>	<b>OTHER APPLICATIONS</b> <ul style="list-style-type: none"><li>LP Outdoor Building Solutions</li><li>LP SuperStruct Furniture Panels</li><li>LP PurposeBuilt Overlays</li><li>Design Software</li></ul>
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everything we do.

# More than CLT is at Stake



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Video:

<https://lpcorp.com/about-lp/why-lp/>

# Auburn University is gearing up for CLT



FOREST PRODUCTS DEVELOPMENT CENTER  
SCHOOL OF FORESTRY AND WILDLIFE SCIENCES

## About Auburn University

For 25 consecutive years, Auburn has been a fixture on *U.S. News & World Report's* list of the top 50 public universities in the country. Auburn's academic offerings are outstanding, and its students benefit tremendously from the academic and social support provided by the university. The university fosters a unique atmosphere and cultivates a connection between students and the campus community, a feeling that has been described as just like home for more than 160 years.

### A personal approach

SFWS students enjoy a low faculty-to-student ratio, and they are afforded numerous hands-on and experiential learning opportunities. In addition, students are supported by dedicated professional advisors and glean knowledge from world-class faculty members, who are committed to helping students build a solid foundation for a successful career.

### An industry authority

With nine research centers and faculty from around the world, SFWS is a nexus of industry knowledge and experience. Our areas of research and expertise include climate change, water resources, urban-rural interface, ecosystems, invasive species, applied economics, and the interaction of the natural world—both plant and animal—with human civilization.

### Opportunities for financial aid

In addition to university-wide financial aid, SFWS offers several competitive scholarships to talented and motivated students. Historically, every SFWS student who qualifies and applies receives aid at some level.

THIS IS MAKING AN IMPACT.  
THIS IS A SUSTAINABLE FUTURE.

**THIS IS AUBURN.**

For more information, email  
[workingwithnature@auburn.edu](mailto:workingwithnature@auburn.edu).

 [ausfws](#)  [@ausfws](#)  [@ausfws](#)  [auburn.edu/sfws](#)

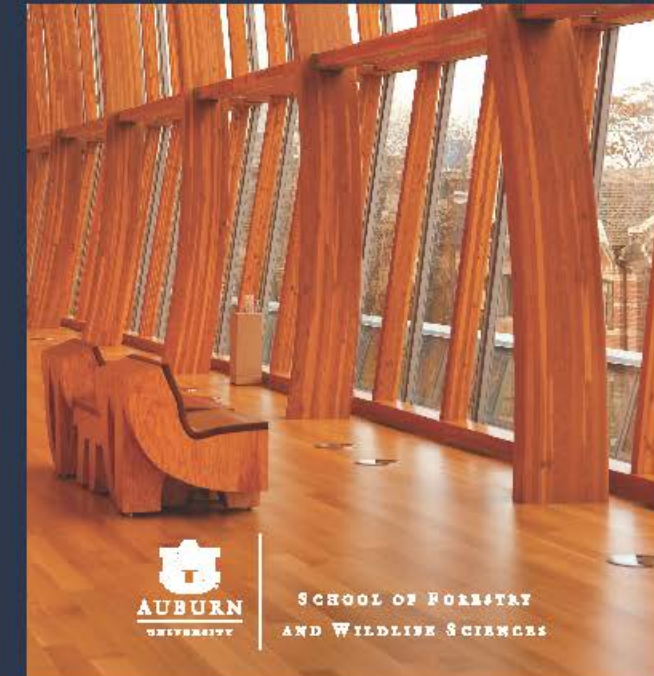


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AUBURN UNIVERSITY

## Sustainable Biomaterials & Packaging

*Careers in Logistics and Development  
of Bio-based Products*



SCHOOL OF FORESTRY  
AND WILDLIFE SCIENCES

# Auburn University is gearing up for CLT



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A U B U R N U N I V E R S I T Y

## School of Forestry & Wildlife Sciences

INVITES YOU TO



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Seminar • Wednesday, October 4, 2017 • 2:00 – 3:15 p.m.  
Telfair B. Peet Theatre • Reception Immediately following.

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Presented by  
**Thomas Robinson**  
founder and principal  
LEVER Architecture

Also join us for:  
**Moving Toward a Sustainable Bio-based Economy**  
*Panel Discussion & Round Table Luncheon*

Wednesday, October 4  
10:00 – 1:00 p.m.  
School of Forestry & Wildlife Sciences  
1101 Conference Room  
602 Duncan Drive  
Auburn, AL  
RSVP by Sept. 25 to:  
[mcabeac@auburn.edu](mailto:mcabeac@auburn.edu)

*Parking available for these events on the 3rd & 4th levels of the South Quad & Stadium Parking Decks. Passes are not required.*

in partnership with:  
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College of Architecture, Design and Construction • Office of Sustainability •  
Facilities Management • Samuel Ginn College of Engineering •  
College of Agriculture • Alabama Cooperative Extension System

# Thomas Robinson combats CLT misconception



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<https://www.cbsnews.com/video/wood-construction-catching-on-but-could-be-dangerous/>

# Other capabilities



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Auburn University Assistant Professor David Roueche analyzes damage after Hurricane Irma in Florida. Roueche and fellow researchers are collecting data from more than 900 buildings after hurricanes in Texas and Florida to determine why some structures failed and others didn't.

# Other capabilities



FOREST PRODUCTS DEVELOPMENT CENTER  
SCHOOL OF FORESTRY AND WILDLIFE SCIENCES



**Maria L. Auad**

Director

Center for Polymer and Advanced Composites

Associate Professor, Chemical Engineering

# New Undergraduate Curriculum



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SCHOOL OF FORESTRY AND WILDLIFE SCIENCES

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## Sustainable Biomaterials & Packaging

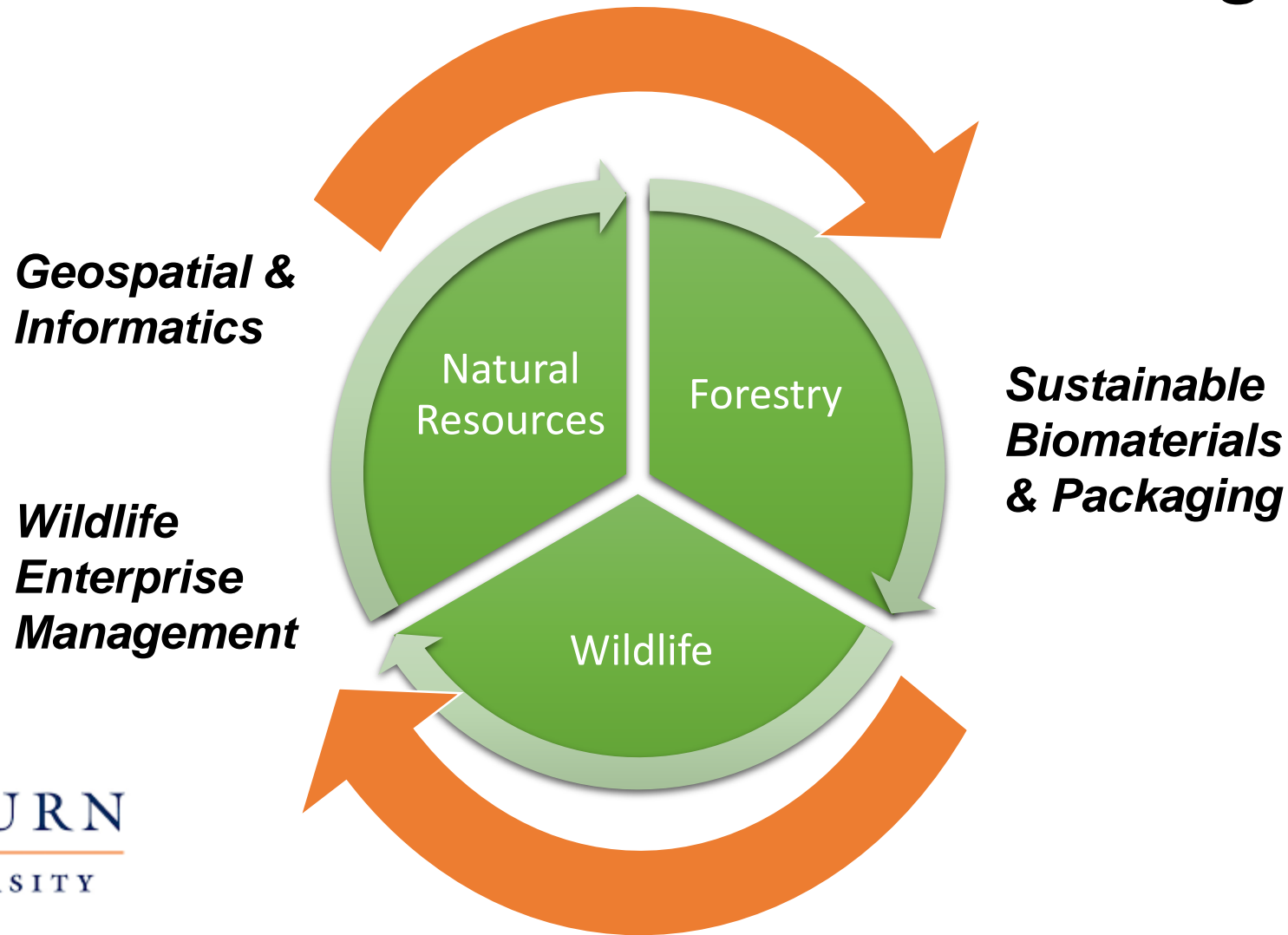
*Careers in Logistics and Development  
of Bio-based Products*



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# Rationale for an undergraduate program

## ***"Sustainable Biomaterials & Packaging"***



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# Rationale for an undergraduate program

## ***Sustainable Biomaterials & Packaging Themes***

### Biomass & Logistics

- Planting (Seedling)
- Feedstock Quality
- Harvesting, Transportation
- Supply Chain Management
- Distribution & Logistics

### Processes & Products

- Traditional Forest Products
- Forestry Materials Packaging
- CLT, Wood Composites
- BioBased Polymers for Packaging
- Bioenergy
- Pulp & Paper for Packaging
- QC Control & Testing

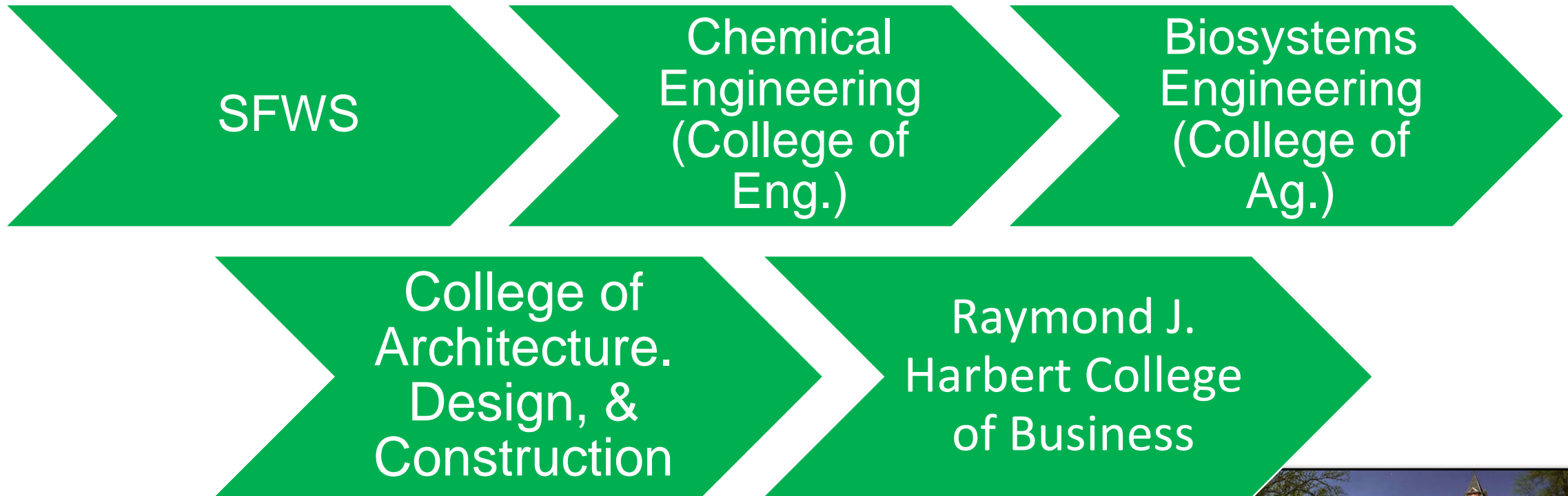
### Sustainability & Business

- Marketing & Business
- LCA
- Eco-Design
- Economics
- Product Development
- Recycling



# Rationale for an undergraduate program

## *Interdisciplinary Team*



# Rationale for an undergraduate program

## ***Case: Sustainable Biomaterials & Packaging: VT Enrollment***

Editorial Manager@ x 5 Finance - AU Access x Report A x autime.auburn.edu x huber corporation - G x Data Center | FAEIS x FAEIS 2015 - USDA's x

faeis.ag.vt.edu/FAEISPub1.cfm?S=0&ri=2818&rg=0&ry=18&m=218&c=106

### 2004-2015 Combined Enrollment for College of Natural Resources at Virginia Polytechnic Institute and State University

CIP	Discipline	Undergraduates											
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
03.0101	Natural Resources/Conservation, General			15	11	11	14	13	6	6	13	15	21
03.0301	Fishing and Fisheries Sciences and Management	49	44	41	49	41	51	64	65	53	48	49	41
03.0501	Forestry, General	74	65	54	49	50	56	75	80	102	101	109	106
03.0508	Urban Forestry	9	10	11	10	10	10	6	6	9	8	4	5
03.0509	Wood Science and Wood Products/Pulp and Paper Technology	38	7	33	27	37	20	37	48	60	74	91	130
03.0510	Forest Resources Production and Management		15	11	11	12	5	12	20	24	16		0
03.0601	Wildlife, Fish and Wildlands Science and Management	137	97	109	120	107	148	155	148	160	165	158	156
13.1202	Elementary Education and Teaching			12	8	8	6	10	5	5	7	4	5

faeis Food and Agricultural Education Information System

**Approximately 30% of  
packaging  
Students are minority  
or female**

# Rationale for an undergraduate program

## *Where is Industry Headed?*



# Rationale for an undergraduate program

## ***Sustainable Biomaterials & Packaging Equipment***



Dynamic Mechanical Analysis  
(Strength testing of polymer at  
Various temperatures)

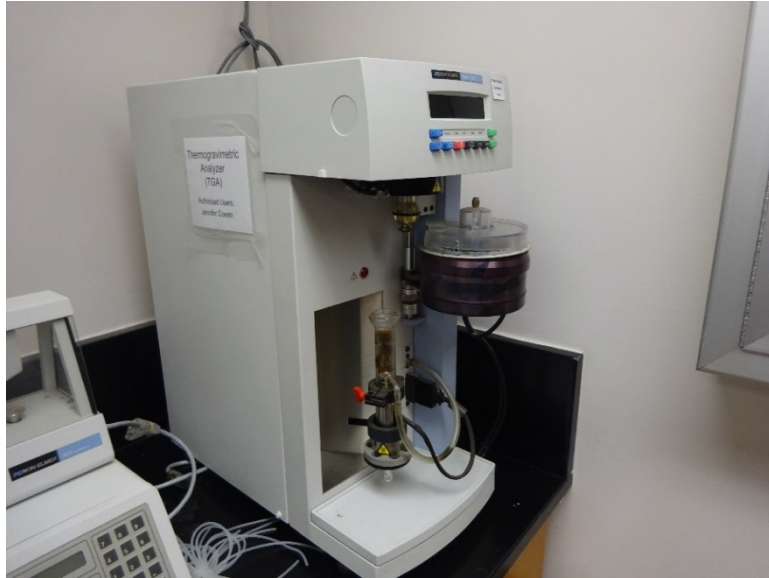


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# Thermo-mechanical analysis

# Donation of Used Thermal Analysis Equipment

## ***Sustainable Biomaterials & Packaging Equipment***



Thermal Gravimetric Analysis (TGA)



TGA + Infra Red Spectrometer



Differential Scanning Calorimeter (DSC)



# Thermo-mechanical analysis

# Conclusions

- *Cross Laminated Timber is the new industry in town.*
- *New Undergraduate Curriculum has 12 students!*
- *This program is sustainable with 17 trees grown for every 10 harvested.*

