Updated 1/12/25

THE UNIVERSITY OF TENNESSEE KNOXVILLE

SCHOOL OF NATURAL RESOURCES

PROSPECTUS

DATA SCIENCE INSTITUTE

https://agdatascience.tennessee.edu/

Contents

Contacts:

Donald G. Hodges, PhD & CF
James R. Cox Professor and Director
School of Natural Resources
dhodges2@utk.edu or 865-974-2706

Timothy M. Young, PhD
Professor Emeritus and Interim Director
Data Science Institute
School of Natural Resources
tmyoung1@utk.edu or 865-356-1151

The University of Tennessee
427 Plant Biotechnology Building
2505 E.J. Chapman Drive
Knoxville, TN 37996-4563

Preface

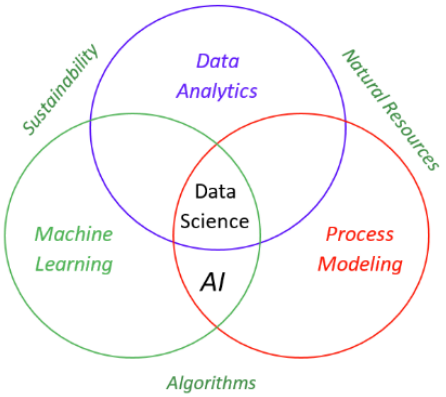
This prospectus outlines the mission, objectives, and organization of the University of Tennessee, School of Natural Resources '*Data Science Institute*'. The UT SNR Data Science Institute will focus on advancing education and research in the data sciences for industries that grow, manage, harvest, and utilize wood and fiber resources. The value proposition for companies as members of the Data Science Institute will be to leverage profitability and sustain competitiveness through advanced optimization by discovering unknown sources of variation that limit target size reduction and cost savings.

The Data Science Institute is a virtual institute within the UT. Focus areas will be:

- Webinars, training and workshops on data analytics, machine learning, and AI;
- Graduate and undergraduate student education;
- Applied research in data science, machine learning, and AI.

Members of the Data Science Institute will enjoy additional benefits by interacting with UT faculty, staff, and students. Member companies will also be able to engage in confidential research projects with graduate student support. An executive board will govern the Institute and ensure that the UTDSI$_{SNR}$ mission is upheld.

Data Science Institute
School of Natural Resources



Some attendees at the inaugural 2024 fall conference of UTDSI$_{SNR}$ take a break to enjoy the festivities of 'AgDay' at UT

Current Company Members (alphabetical order)

Bakelite Chemicals **Liaison**: ***Darrell Parker*** darrell.parker@bakelite.com	https://bakelite.com/	BAKELITE SYNTHETICS
Egger Wood Products **Liaison**: ***Bernhard Ebner*** Bernhard.Ebner@egger.com	https://www.egger.com/en/?country=US	EGGER
Hexion **Liaison**: ***Mike Malmberg*** *michael.malmberg@hexion.com*	https://www.hexion.com/en-US/	HEXION
Huber Engineered Woods **Liaison**: ***Terry Liles, PhD*** Terry.Liles@huber.com	https://www.huberwood.com/	HUBER ENGINEERED WOODS
Louisiana-Pacific Corp. **Liaisons**: ***Alex Scott*** Alex.scott@lpcorp.com ***Chris Andrews*** Chris.Andrews@lpcorp.com	https://lpcorp.com/	LP BUILDING SOLUTIONS
Roseburg Forest Products **Liaisons**: ***Mike Reardon*** MikeRe@rfpco.com ***Jeff Vaughn*** Jeff.Vaughn@rfpco.com	https://www.roseburg.com/	Roseburg

Mission

The UT SNR Data Science Institute aims to promote and advance the education and research of data science, machine learning, and AI for companies engaged in forest management, cellulosic fiber utilization for forest products manufacturing, and biomaterials processing. **The primary goal of the Institute is to assist companies in learning, adapting, and effectively implementing the latest data science, machine learning, and AI technologies to optimize processes and facilitate cost reduction.** The Institute will function as an expansion of a company's innovation group by providing access to the most current technologies in the rapidly evolving field of data science, machine learning, and AI.

Education and Research Objectives

The value proposition for companies will be:

- *Expand the knowledge of a company's workforce in statistical (SPC) and data analytical methods as applied to manufacturing for the purpose of variation reduction;*
- *Enhance a company's knowledge of analytical software to support continuous improvement efforts in data analytics;*
- *Promote learning and networking with virtual webinars, in-person workshops, and an annual conference;*
- *Have the **'Machine Learning (ML) Cooperative' (Coop4ML)** advance the direct application of ML algorithms for real-time prediction of processes;*
- *Conduct applied research in data science, machine learning, and AI to support the enhanced optimization of processes.*

Three Annual Industry Training Events

Three industry-focused, in-person training events are offered annually as part of the **UTDSI$_{SNR}$**. Dr. Timothy Young will offer the following industry-training events that have been ongoing for 25 years at the University of Tennessee:

- ***'An Introduction to Data Analytics, Statistical Process Control, and Lean Methods'** (two sessions 40 hours – 4.0 CEU credits and 3.0 undergraduate or graduate credits as applicable);*
- ***'Design of Experiments for Rapid Innovation'** (two sessions 40 hours – 4.0 CEU credits and 3.0 undergraduate or graduate credits as applicable);*
- ***'Advanced Analytics and Machine Learning'** (two sessions 40 hours – 4.0 CEU credits and 3.0 undergraduate or graduate credits as applicable).*

2024 Inaugural Fall Conference

The inaugural fall conference of the UT SNR Data Science Institute was held from September 12-13, 2024 on the UT Agricultural Campus in the new 'Agriculture and Natural Resources' building. Thirty-four attendees from seven companies participated in the conference. Member companies included Hexion, Huber Engineered Woods, Louisiana-Pacific Corp., and Roseburg Forest Products. Non-member companies by special invitation were Dieffenbacher, Hood Industries, and West Fraser.

The first day of the conference included **four keynote speakers**:

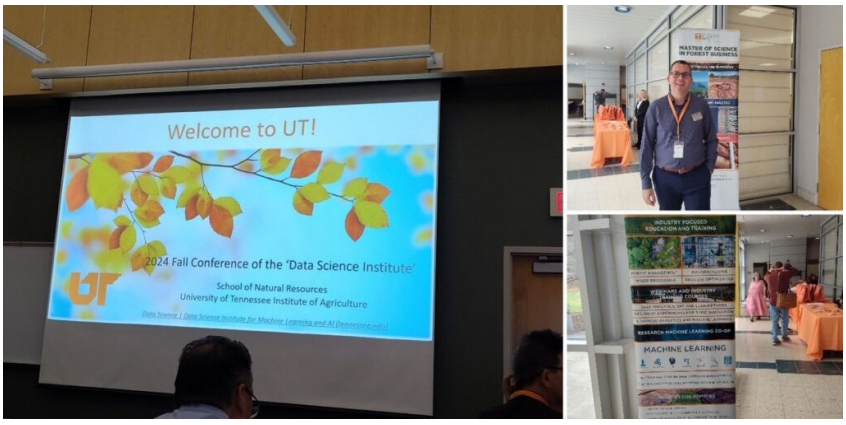

Dr. Marianne Wanamaker, Dean UT Baker School,
https://baker.utk.edu/person/dr-marianne-wanamaker/
Talk: *'Labor Markets and Future Employees in the Era of Data Science'*


Mikhail Golovnya, Senior Advisory Data Scientist – Minitab
http://www.mikhailgolovnya.com/
Talk: *'Data Science and Future for Machine Learning and AI'*


Ross Metusalem, Senior Systems Engineer - JMP Statistical Discovery
https://www.jmp.com/en_us/bios/metusalem-ross.html
Talk: *'Data Science for Manufacturing Excellence: From Six Sigma t Deep Learning'*


Bob Muenchen, Creator of 'r4stats'
https://r4stats.com/
Talk: *'Open Source Data Science User Interfaces'*

Members also showcased their companies with presentations to UT students. A networking dinner was held at the end of day one with the UT students' and staff at the annual fall 'Welcome Back Barbecue'.



Day two of the conference included technical workshops on ***JMP, Minitab*** and ***R***. The conference concluded with the 2024 Executive Board Meeting.

Attendees of the '*Software Applications in Data Analytics'* workshop at the 2024 fall conference at UT.

Organization

The UT SNR '*Data Science Institute*' will be virtual where faculty, staff, and students from The University of Tennessee will support its mission under the direction of a Director and an Executive Board. Given that machine learning technologies and software capabilities are the core element of AI and are advancing at almost an exponential rate (*e.g., random forests, boosted trees, Bayesian additive regression trees - BART, multivariate adaptive regressions splines – MARS, etc.*), the **'Coop4ML'** will conduct highly specialized webinars, trainings, and research projects with sole purpose of successful ML application in manufacturing and forestry.

The education component of the institute will establish a curriculum for students and industry focused on the general aspects of data analytics, which will be a combination of well-established statistical principles and contemporary methods for continuous improvement. The academic curriculum will be structured to support the **MS Forest Business** program. The **MS Forest Business** program is open to students at UT and industry personnel willing to expand their education while working full-time, and will consist of a mostly virtual curriculum, see https://naturalresources.tennessee.edu/.

The **MS in Forest Business** is a three-semester, non-thesis program that prepares students to assume leadership roles within forest industry in three separate tracks: *Analytics & Data Science; Forestland Investment & Finance; and Logistics & Procurement*. Students who are currently employed in the industry can use their current work experience for the internship and project requirements. Beyond the core, students select from a suite of courses at UT within any of the three tracks.

International Partner

The UT SNR Data Science Institute has a strategic partnership with '***I****nstitute for* ***D****ata Sci****e****nce and* ***A****I for* ***Holz***' (**IDeA Holz**) at Salzburg University of Applied Sciences in Kuchl, Austria. The mission of **IDeA Holz** is almost identical to the UT SNR Data Science Institute but will focus on European companies and have longitudinal impact with other universities, *e.g.,* BOKU, TUM, and University of Ljubljana. Some global companies that have business operations in both North America and the EU may wish to join both institutes. This strategic partnership will allow for the exchange of students and researchers which will enhance the overall knowledge and applications for the Institute's clients.

FH Salzburg

https://www.fh-salzburg.ac.at/en/

Executive Board

The Executive Board of the UT SNR Data Science Institute will consist of three members from industry. The three board members will have a demonstrated record of accomplishment within industry and a breadth of knowledge to accomplish its mission. The Executive Board will be selected based on willingness to be directly engaged in the Institute and serve a minimum three-year term. The Executive Board will meet virtually every quarter and attend the annual conference at UT. The board will review the annual budget, organizational structure, and help define the research and teaching agendas of The UT SNR Data Science Institute.

2024 Board Members

Mike Reardon
Director of Optimization and Technology
Roseburg Forest Products

Chris Andrews
Sr. Director of Engineering, Technology & Quality
Louisiana-Pacific Corp.

Terry Liles, PhD
Director of Adhesives Technology
Huber Engineered Woods

2025 Board Members

Mike Reardon
Director of Optimization and Technology
Roseburg Forest Products

Alex Scott
Process Engineering Manager
Louisiana-Pacific Corp.

Terry Liles, PhD
Director of Adhesives Technology
Huber Engineered Woods

Annual Membership Fees

Executive Board Member:	$25,000/Yr
North American Company Member:	$12,000/Yr
Global Company Member:	$20,000/Yr
ML Coop Member:	$ 6,000/Yr (Executive Board, or Company membership required)

Member Benefits

Executive Board Member	**Member Only**	**Machine Learning Coop Member**
Direct organizational structure and design of institute		
Quarterly budget reviews		
Direct input in setting research agenda of institute		
Review and inputs of teaching curriculum for MS in Forest Business		
Two company liaisons to communicate directly with DSIMLA staff	One company liaison to communicate directly with DSIMLA staff	Additional company liaison assigned to machine learning staff
Monthly webinars on data science and software applications for company	Monthly webinars on data science and software applications for company	Monthly webinars on machine learning and software updates on machine learning
Analytical software review updates	Analytical software review updates	ML software review updates
10% discount on industry training programs	10% discount on industry training programs	10% discount on industry training programs
Direct support in implementing data science and analytics problems	***Direct support in implementing data science and analytics problems***	***Direct support in implementing machine learning applications problems***
		Open access to machine learning source code in Python and R by graduate students and associated universities