Center for Advanced Forestry Systems Lead Site Updates

Aaron Weiskittel
Director

Meeting Agenda

Center for Advanced Forestry Systems

Semi-Annual CAFS IAB Meeting & Field Tour
June 21-22, 2023
21C Louisville, KY
https://maine.zoom.us/j/3914609418

Hosted by the University of Maine, Center for Research on Sustainable Forests

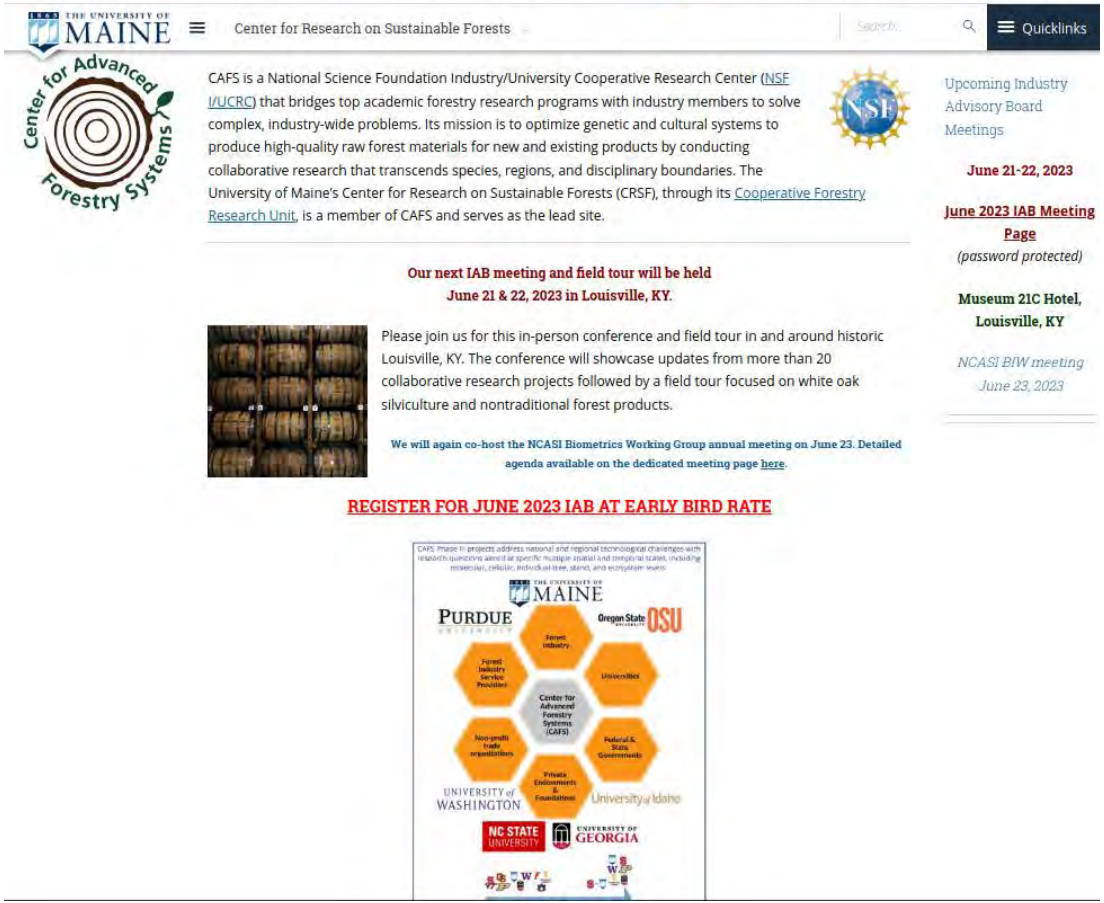
Field tour June 22, 2023: White Oak Initiative, Genome Tree, and Barrel Aging

IAB Meeting Agenda
Wednesday, June 21, 2023, Eastern Standard Time

Time	Item	Presenter
7:00 AM	Breakfast in Meeting Room	-
8:00 AM	Welcome/Overview	Aaron Weiskittel, UM
8:10 AM	CAFS Lead Site & Phase III Updates	Aaron Weiskittel, UM
Continuing Project Updates		
8:45 AM	16.69. Stand and tree responses to late rotation fertilization	Kim Littke, UW
9:00 AM	19.75. Assessing and mapping regional variation in site carrying capacity	Jaslam Poolakkal, UI
9:15 AM	19.76. Assessing and mapping regional variation in potential site productivity	Rachel Cook, NCSU
9:30 AM	20.78. Intraspecific hydraulic responses of commercial tree seedlings to nursery drought conditioning	Andrei Toca, PU
9:45 AM	20.79. Multi-regional evaluation of new machine learning algorithms for mapping tree species distribution and abundance	Kasey Legaard, UM
10:00 AM	**Break**	
10:15 AM	20.80. Using hyperspectral imaging to evaluate forest health risk	Sylvia Park, PU
10:30 AM	20.81. Resilience of soil organic matter to harvesting: A global study of long-term soil productivity experiments	Carlos Gonzalez, OSU
10:45 AM	20.82. Stand response to thinning: Enhancing response prediction through modeling	Eric Turnblom, UW
11:00 AM	20.83. Using predictive analytics to decompose site index	Jason Cross, UW
11:15 AM	20.84. Physiologic response to commercial fertilization programs in Pacific Northwest forest plantations	Kim Littke, UW
11:30 AM	21.85. Variation in productivity, wood quality and soil carbon of nine conifer species across a gradient in water deficit	Emily Von Blon, OSU
11:45 AM	Continuing Projects Review, Discussion and Vote	IAB
12-1 PM	**Lunch Break**	
Continuing Project Updates		
1:00 PM	21.87. Linking leaf area index and remote sensing across different forest types	Andrew Trlica, NCSU
1:15 PM	21.88. Quantifying silvicultural treatment effect on lumber quantity and quality in loblolly pine	Joe Dahlen, UGA
1:30 PM	21.89. Quantifying carbon sequestration as a function of silvicultural treatment in loblolly pine	Joe Dahlen, UGA
1:45 PM	21.91. NCSU START	Rachel Cook, NCSU
2:00 PM	21.92. UMaine/UMFK START	Ned Kennedy and Stephanie Landry, UMFK
2:15 PM	22.97. Tree Dominance from Remotely Sensed Data: A comparison of site trees derived from traditional and digital means	Noel Daugherty, UI
2:30 PM	22.98. Center for Advanced Forestry Systems Interactive Mapping Platform (CAFSIMP)	Okan Pala, NCSU
2:45 PM	22.99. The effects of dominant tree height definition on loblolly pine growth and yield model outputs	Bronson Bullock, UGA
3:00 PM	Continuing Projects Review, Discussion and Vote	IAB
3:15 PM	**Break**	
New Projects		
3:30 PM	Use of carbon isotopes for assessing tree response to thinning	Mike Premer, UM
3:45 PM	Site-stand dynamics and pine beetle mortality in ponderosa pine ecosystems – implications for density management	Haley Anderson, UI
4:00 PM	?	Abby Ferson, UI
4:15 PM	Determination of crown morphological traits using laser scanning in Douglas-fir and loblolly pine genetics trials	Doug Mainwaring, OSU
4:30 PM	Interplay between sampling design and small area estimation to improve timberland inventory	Temesgen Hailemariam, OSU
4:45 PM	New Projects Review, Discussion and Vote	IAB
Concurrent Business Meetings		
5:00 PM	IAB Closed Door Business Meeting	IAB Members
5:00 PM	Site Directors Business Meeting	CAFS Site Directors
5:25 PM	IAB/Site Meeting follow-up	All
5:30 PM	Adjourn	
6:00 PM	**Dinner**	

CAFS Website

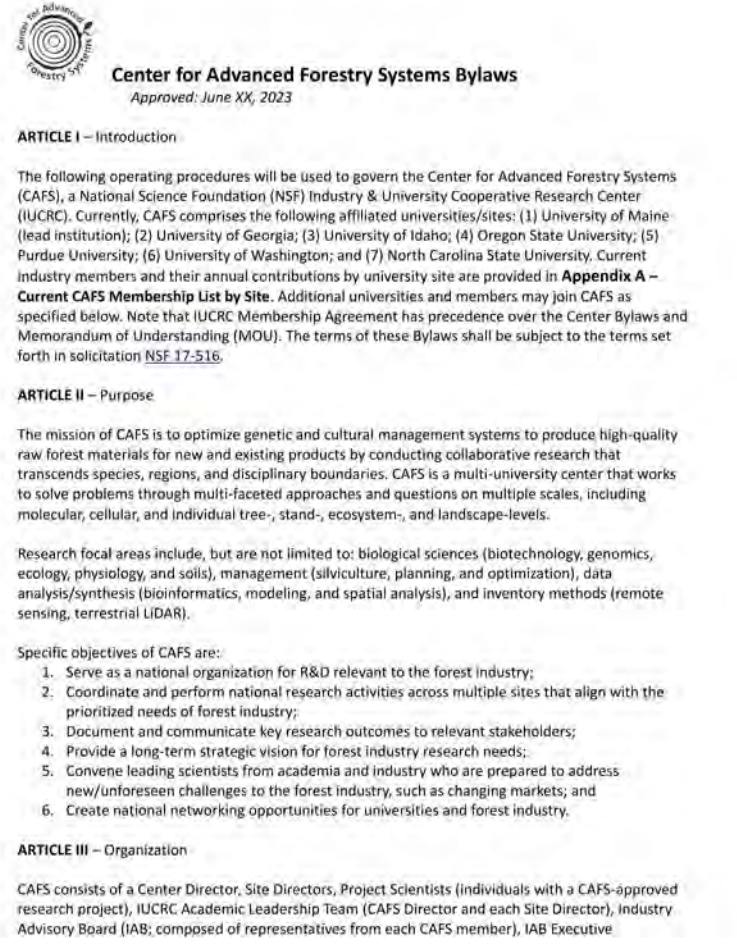
- Resources
  - Strategic Plan & Technology Roadmap
  - Bylaws
  - Assessment Coordinator Reports
- Past/Current meeting materials
  - PW = “CAFS3”



https://crsf.umaine.edu/forest-research/cafs/

CAFS Bylaws

- Bylaws need to be annually reviewed and approved by the IAB
- Revised version shared with IAB Executive Committee on May 31, 2023
- Key revisions in current version:
  - -Quorum redefined as 51% of voting membership “contributions” rather than “organizations”
  - -Robert’s Rules of Order only invoked in cases of conflict or lack of clarity



Center for Advanced Forestry Systems Bylaws

Approved: June XX, 2023

ARTICLE I – Introduction

The following operating procedures will be used to govern the Center for Advanced Forestry Systems (CAFS), a National Science Foundation (NSF) Industry & University Cooperative Research Center (IUCRC). Currently, CAFS comprises the following affiliated universities/sites: (1) University of Maine (lead institution); (2) University of Georgia; (3) University of Idaho; (4) Oregon State University; (5) Purdue University; (6) University of Washington; and (7) North Carolina State University. Current industry members and their annual contributions by university site are provided in **Appendix A – Current CAFS Membership List by Site**. Additional universities and members may join CAFS as specified below. Note that IUCRC Membership Agreement has precedence over the Center Bylaws and Memorandum of Understanding (MOU). The terms of these Bylaws shall be subject to the terms set forth in solicitation NSF 17-516.

ARTICLE II – Purpose

The mission of CAFS is to optimize genetic and cultural management systems to produce high-quality raw forest materials for new and existing products by conducting collaborative research that transcends species, regions, and disciplinary boundaries. CAFS is a multi-university center that works to solve problems through multi-faceted approaches and questions on multiple scales, including molecular, cellular, and individual tree-, stand-, ecosystem-, and landscape-levels.

Research focal areas include, but are not limited to: biological sciences (biotechnology, genomics, ecology, physiology, and soils), management (silviculture, planning, and optimization), data analysis/synthesis (bioinformatics, modeling, and spatial analysis), and inventory methods (remote sensing, terrestrial LiDAR).

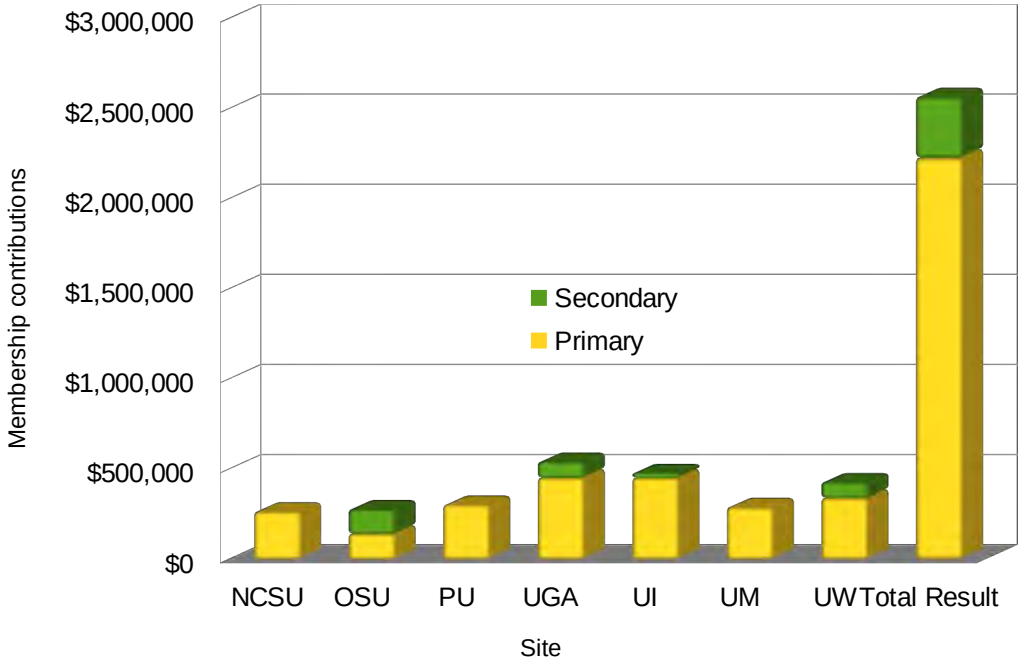
Specific objectives of CAFS are:

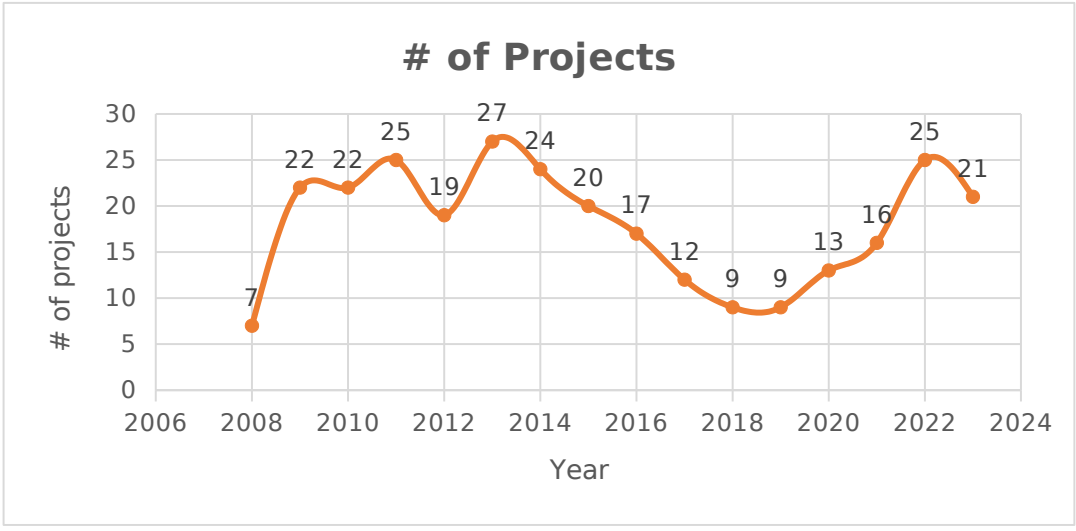
1. Serve as a national organization for R&D relevant to the forest industry;
2. Coordinate and perform national research activities across multiple sites that align with the prioritized needs of forest industry;
3. Document and communicate key research outcomes to relevant stakeholders;
4. Provide a long-term strategic vision for forest industry research needs;
5. Convene leading scientists from academia and industry who are prepared to address new/unforeseen challenges to the forest industry, such as changing markets; and
6. Create national networking opportunities for universities and forest industry.

ARTICLE III – Organization

CAFS consists of a Center Director, Site Directors, Project Scientists (individuals with a CAFS-approved research project), IUCRC Academic Leadership Team (CAFS Director and each Site Director), Industry Advisory Board (IAB; composed of representatives from each CAFS member), IAB Executive

Center Funding & Projects





Funding and membership remains stable, while projects have continued to increase and similar to Phase I

NSF OIG Audit

- NSF OIG has prioritized assessment of IUCRCs and CAFS was one of the first to be selected

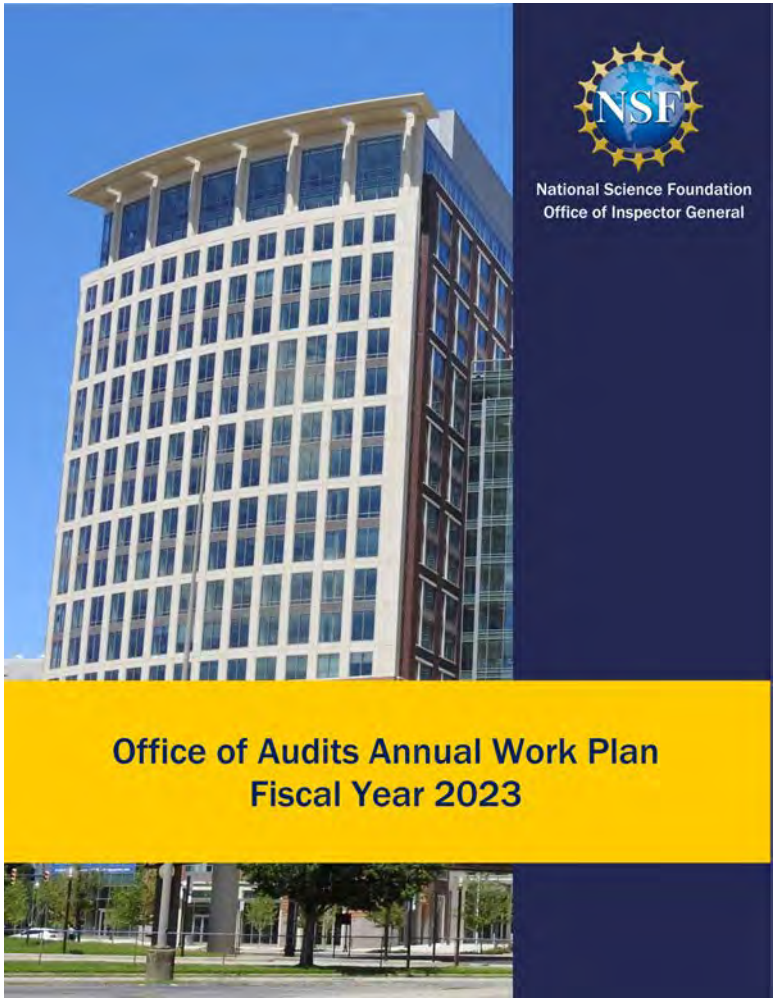
- Audit started September 2022 and findings issued in May 2023

- University of Maine and NCSU were selected as CAFS Sites to be audited

- Three primary findings
  -Improper accounting of membership contributions and approved projects (e.g. need to separate between CAFS and regional co-op)

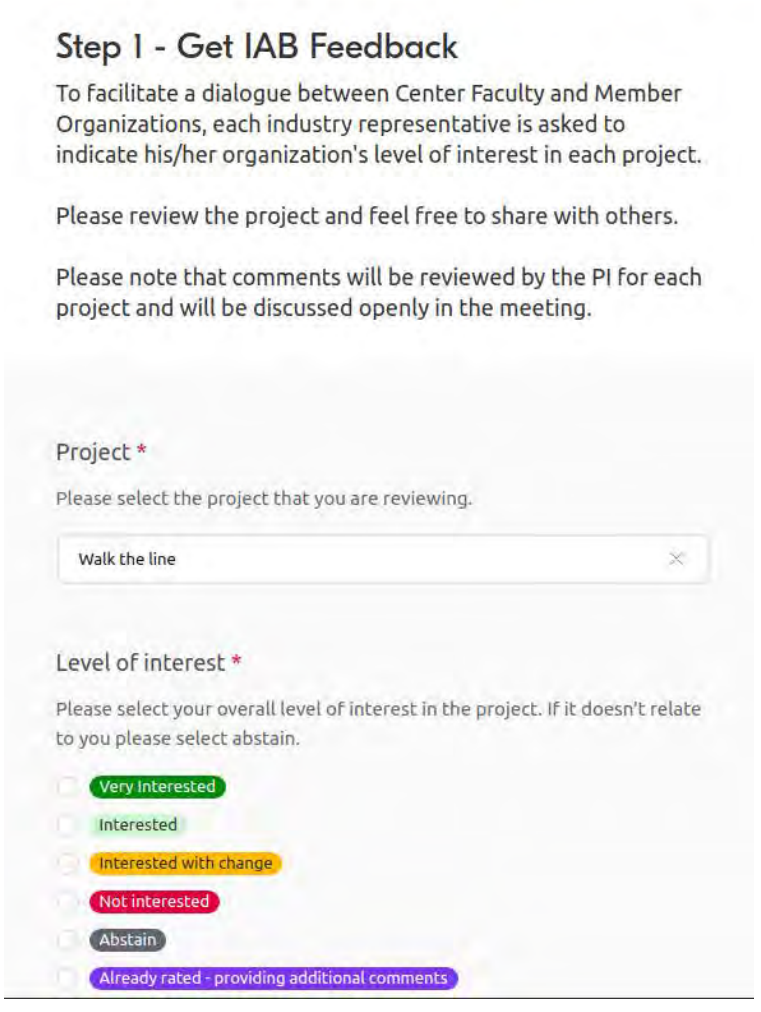
  -Misalignment of bylaws and SOP (e.g. quorum, Robert's Rules of Order, voting)

  -Unallowable expenditures (<2%; promotional awards, non-guest travel)



IAB Voting

- All IUCRC matters and projects need IAB approval
- New projects should be ranked for priority of funding
- IAB comments and suggestions for improvement are welcomed
- All voting done online via AirTable



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NSF 21-013

Dear Colleague Letter: Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity

October 8, 2020

Dear Colleagues:

Fostering the growth of a globally competitive and diverse research workforce and advancing the scientific and innovation skills of the U.S. is a; strategic objective of the National Science Foundation (NSF). U.S. global competitiveness depends critically on the readiness of the Nation's Science, Technology, Engineering and Mathematics (STEM) workforce and NSF seeks to continue to invest in programs that directly advance this workforce. As part of this effort, a supplemental funding opportunity is available in fiscal years FY 2021 and beyond to provide graduate students with experiential learning opportunities through research internships to acquire core professional competencies and skills to support careers in any sector of the U.S. economy. NSF currently invests in a number of graduate student preparedness activities and has historically encouraged principal investigators (PIs) to include such activities in research proposals to NSF. This Dear Colleague Letter (DCL) describes funding opportunities at NSF to ensure graduate students are well prepared for the 21st-century STEM workforce.

BACKGROUND

With rapidly accelerating changes in technology-driven global and national economies, today's graduate students will have a wide choice of career paths to pursue over their professional lives. NSF's 2020 Science and Engineering Indicators report reveals 81 percent of master's level STEM graduates and 57 percent of doctoral degree holders in STEM, work in industry or government. Graduate students have the potential to make important contributions in careers outside academia, in organizations that include: startup businesses, small and large corporations, government agencies, and non-profit organizations. In addition, the National Academies Graduate STEM Education for the 21st Century (2018) report further highlights the need for graduate students to acquire core professional competencies and transferable skills through experiential learning opportunities such as internships. It is therefore important that graduate students supported by NSF grants be provided training opportunities to develop skills that prepare them to be successful for a broad range of academic and non-academic career paths. In addition to deep and broad preparation in their technical areas of expertise, experience working in collaborative teams and with diverse individuals, skills and knowledge in communication, innovation and entrepreneurship, leadership and management, policy and outreach are becoming increasingly valuable for all sectors of the workforce.

National Science Foundation

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NSF 23-093

Dear Colleague Letter: A New Supplemental Funding Opportunity for Skills Training in Advanced Research & Technology (START)

April 25, 2023

Dear Colleagues:

Fostering the growth of a globally competitive and diverse research workforce and advancing the scientific and innovation skills of the U.S. is a strategic objective of the National Science Foundation (NSF). U.S. global competitiveness depends critically on the readiness of the Nation's science, technology, engineering, and mathematics (STEM) workforce. To achieve this goal, the NSF invests in programs that directly advance this workforce. As part of this effort, this Skills Training in Advanced Research & Technology (START) Dear Colleague Letter (DCL) announces an updated supplemental funding opportunity for awardees of the Advanced Technological Education (ATE) Program, the Industry-University Cooperative Research Centers (IUCRC) Program and the Engineering Research Centers (ERC) Program.

INTERN 21-013

START 23-093

Phase III Research Roadmap

	2019	2020	2021	2022	2023	Outcomes
Theme 1: Forest Modeling & Decision-Support Tools **Primary IAB Partners: American Forest Management, Green Diamond, and Campbell Global**						Provide IAB members with improved tools that allow better and more precise forest management and planning
Project 1: Assessing and mapping regional variation in potential site productivity Lead Partners: NCSU, UI, UGA, UW, PU	■	■	■			Better understand how potential site productivity differs across the key forest regions in the US, the most influential factors, and produce high-resolution maps for IAB members to aid planning
Project 2: Assessing and mapping regional variation in site carrying capacity Lead Partners: UI, UM, OSU, VT, UGA, UW	■	■	■			Derive consistent estimates of maximum stand density index, evaluate most influential factors, and provide high-resolution maps to aid management
Project 3: Evaluation and refinement of regional GY models Partners: UM, VT, UGA, OSU, PU			■	■	■	Using the outcomes from Projects 1 and 2, evaluate regional growth and yield behavior and refine as possible
Theme 2: Effective Use of Remote Sensing Technologies **Primary IAB Partners: JD Irving, Rayonier, and Weyerhaeuser**						Evaluate and leverage emerging remote sensing technologies to improve planning
Project 4: Mapping species composition and past disturbance using optical sensors Partners: UI, UM, UGA	■	■	■			Optimal sensors like Landsat and Sentinnel-2 offer the ability to annual map species composition and past disturbance, but have yet to be tests across the US
Project 5: Improving efficiency and accuracy of Enhanced Forest Inventories derived from LiDAR Partners: UW, OSU, UGA, UM	■	■	■	■	■	LiDAR is becoming increasingly used to produce Enhanced Forest Inventories, but uncertainties on ground data, necessary metrics, and modeling method remain.
Project 6: Using hyperspectral imaging to evaluate forest health risk Partners: VT, NCSU, OSU, UM			■	■	■	Forest health risks are extensive and difficult to detect. Hyperspectral imaging from terrestrial and/or airborne sensors can help detection and quantification

Phase III Research Roadmap

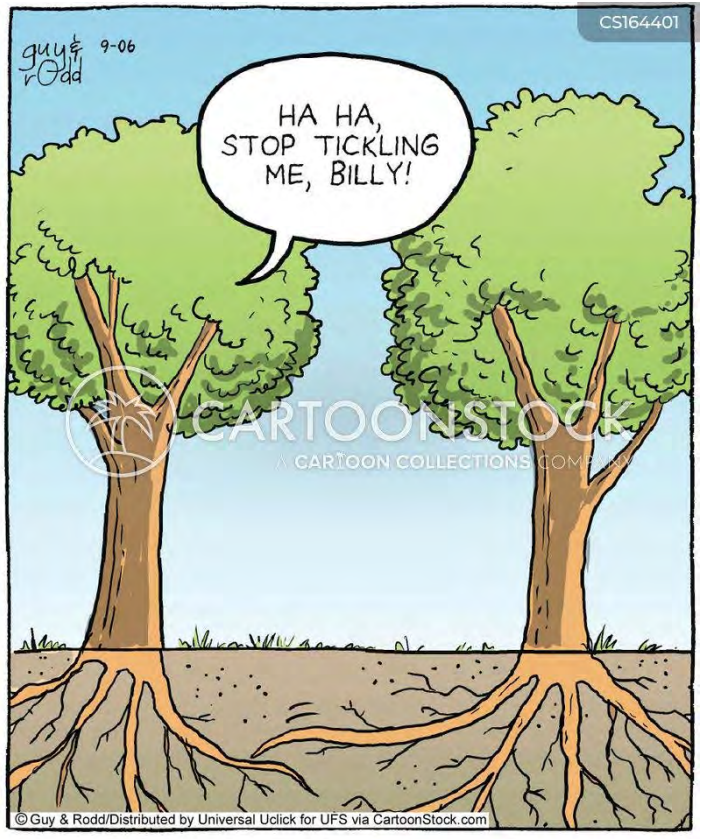
	2019	2020	2021	2022	2023	Outcomes
Theme 3: Improved Silvicultural Practices **Primary IAB Partners: Hancock Forest Management, International Forest Company, and Molpus Timberlands**						Forest managers have a variety of silvicultural regimes to select from, but it is often unclear on selecting the best practices for each site
Project 7: Quantifying long-term gains using advanced genetics Lead Partners: PU, UGA, OSU, NCSU	■	■	■			Tree genetics has seen significant advances in recent years due to better breeding practices and cloning, but a synthesis of the long-term potential effects of these practices across multiple species has yet to be presented
Project 8: Modeling forest response to early stand treatments Lead Partners: UW, UI, NCSU, VT	■	■	■			Vegetation management is critical to successful rotations, but its prediction is complicated by a variety of factors such as the type and extent of competing vegetation. Leveraging long-term datasets, the outcomes of contrasting treatments would be assessed and modeled.
Project 9: Identifying type and level of response to forest fertilization Lead Partners: UW, UI, NCSU, PU			■	■	■	Forest fertilization is a widely used silvicultural practice that is difficult to predict. Using long-term and newly available data, methods to improve predictions of forest responsiveness would be evaluated.
Project-wide activities informed by Research Plan	• **Incorporation of advanced and emerging technologies** • **Delivery of multi-platform, decision-support tools** • **Harmonization, and synthesis of available regional datasets to generalize trends** • **Multi-disciplinary, knowledge to action, and stakeholder-drive framework**					

IAB meetings, evaluation, undergraduate education, publications, attendance at national meetings, securing of additional research support

CAFS Field Tour

- Coach leaving 21C at 9 am and returning ~6:30 pm
  - Maker’s Mark campus in Loretto, KY (~1.5 hr drive)
- Proper footwear is recommended
- Three primary stops
  - White oak management
  - Genome tree
  - Distillery and barrel aging

Questions/Comments?



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