



Team Profiles

Jack Hastings

PhD Student

University of New Hampshire

Research Interests: Remote sensing,
forest ecosystem modeling



JACK HASTINGS is excited to be working on the terrestrial side of things in his home state of New Hampshire. A first-year Ph.D. student in Natural Resources and Earth System Sciences at the University of New Hampshire (UNH), with a B.S. in Environmental Science and an M.S. in Natural Resources (both from UNH), Hastings is advised by Scott Ollinger (UNH Professor of Ecosystem Ecology and Remote Sensing).

Hastings has worked in Ollinger's Terrestrial Ecosystems Analysis Lab (TEAL) since 2014. As a lab technician during his bachelor's, Hastings started maintaining eddy flux towers, which measure environmental variables such as CO₂, water, and land atmosphere change.

Hastings joked, "That's probably the reason I stuck around because Dr. Ollinger let me climb up 100 ft. towers."

While working on his master's degree, Hastings was part of an NSF-funded macrosystems project that tried to understand if there are links between biodiversity and ecosystem function and productivity in forested ecosystems. While working with LiDAR data (used to create high-resolution models of forest canopies), Hastings was introduced to remote sensing.



Now on his third UNH degree-seeking program, the NSF-funded INSPIRES project factored into his decision to continue his education and work with Ollinger, who is a Co-PI on INSPIRES.

"The work Jack is pursuing will fulfill a decades-long goal of including spatial canopy nitrogen estimates in predicted growth rates for northeastern forests," reports Ollinger.

Hastings was interested in INSPIRES because of its cross-institutional approach provided him with the opportunity to build strong connections across New England. He works on Theme 2 of INSPIRES, which focuses on remote sensing.

"I'm currently working with others to develop regional estimates of canopy nitrogen. I'm using satellites to create a relatively fine scale thirty-meter resolution map. The nitrogen

Jack Hastings on the flux tower at Thompson Farm to maintain instrumentation. The instruments on this tower provide environmental measurements (e.g., CO₂ and H₂O land atmosphere change) that the INSPIRES team is/will be using.

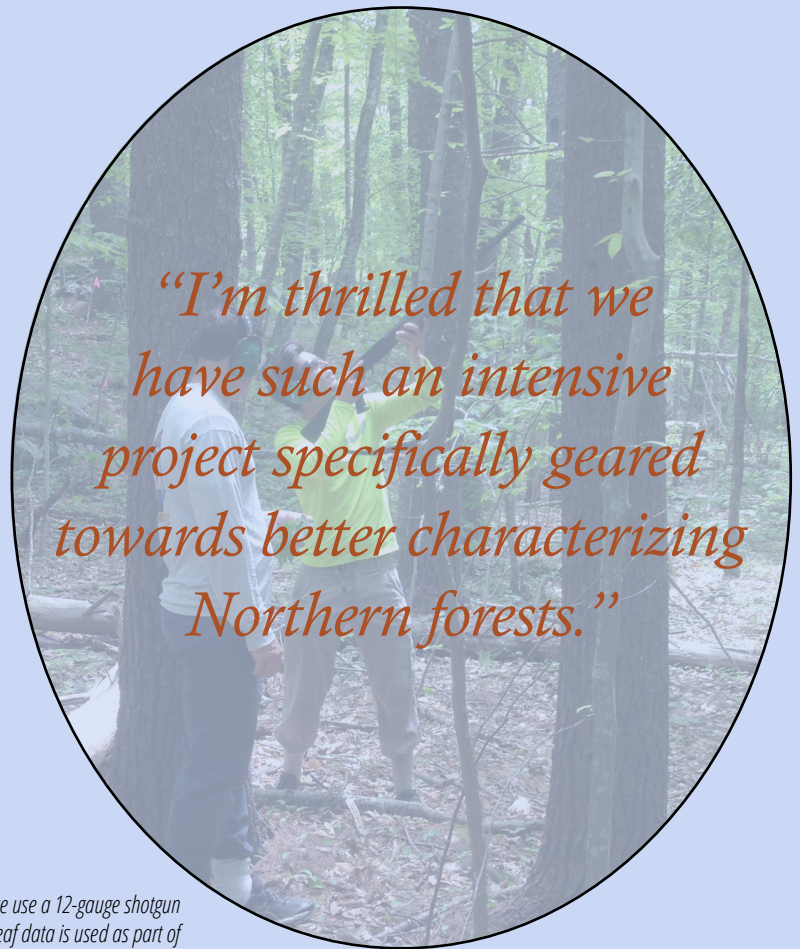
layer will be an important input parameter for several of the models created by Theme 3,” Hastings explained.

Hastings is also working on Ollinger’s NASA theory of remote sensing project, which has a direct link to Hasting’s work on INSPIRES. The two projects create a link between remote sensing (generating products) and ecological theory.

“With the NASA project, we are examining the links between photosynthesis, nitrogen, and canopy structure, and how this interplay allows us to do what we’re doing (using remote sensing to make regional estimates of nitrogen),” Hastings said.

This field season, Hastings is collecting more validation data for the canopy nitrogen map. Hastings is also collecting chemistry data (e.g., nitrogen, carbon, chlorophyll) for both the INSPIRES and NASA projects in the Harvard forest. This data will hopefully provide valuable insight that will improve the researchers’ ability to remotely estimate nitrogen in the first place.

Hastings, who hails from New Hampshire, is excited to focus on work in this region:



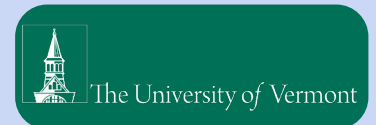
“I’m thrilled that we have such an intensive project specifically geared towards better characterizing Northern forests.”

INSPIRES team members Jack Hastings and Andrew Ouimette use a 12-gauge shotgun to collect leaf samples from the tops of tree canopies. This leaf data is used as part of the work to develop regional estimates of foliar nitrogen from satellite imagery.



INSPIRES interviews and profiles by Stefania Irene Marthakis, University of Maine Center for Research on Sustainable Forests

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Smart Data for Resilient Forests

INSPIRES: Leveraging Intelligent Informatics and Smart Data for Improved Understanding of Northern Forest Ecosystem Resilience is an NSF-supported project that leverages unique expertise from the University of Maine, University of New Hampshire, and University of Vermont to construct a digital framework to better assess, understand, and forecast this complex forest at a resolution relevant to scientists, land managers, and policymakers.

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