



Daryl Yang

Liane B. Russell Fellow

Where and when did you earn your PhD?

I earned my PhD in October 2023 from Stony Brook University.

What was the subject of your dissertation?

My PhD research focused on the development and use of novel, multiscale remote-sensing technologies (i.e., ground observations, drones, airbornes, and satellites) to understand the spatial and temporal complexity of high-latitude ecosystems and their response to climate change.

What was your dissertation's major contribution to your field?

The remote location, limited site access, vast spatial coverage but extraordinary heterogeneity in both physical and biological environments, have limited our ability to measure, understand, and predict the future of the Arctic, where it is warming more than four times faster than the rest of the Earth. My PhD research designed novel remote-sensing platforms, including drones and time-lapse cameras with advanced sensing technologies (e.g., optical, hyperspectral, and thermal) to enable accurate and autonomous measurements of vegetation distribution, function, and seasonality from leaf to landscape scales, and developed computational tools to scale them up to large airborne and satellite platforms. My results provided new, cross-scale understandings of the fundamental mechanisms and processes that drive vegetation dynamics and change in the Arctic and its high spatial and temporal variability across the landscape.

Who is your ORNL mentor and which group and division are you working in?

My ORNL mentor is Colleen Iversen, Plant–Soil Interactions group leader in the Environmental Sciences Division and principal investigator for DOE's Next Generation Ecosystem Experiment Arctic (NGEE Arctic).

What will your fellowship research focus on?

My fellowship research will focus on combining multiscale remote-sensing, fundamental ecology, and ecosystem models to understand fire-driven ecosystem transition and its impacts on soil–land–atmosphere interactions across Arctic and boreal ecosystems.

What is your project's expected contribution to your field?

Wildfires play a major role in reshaping terrestrial ecosystems. Rapid climate change has led to an unparalleled increase in fire activities across the circumpolar Arctic. But our ability to anticipate postfire ecosystem transition and its impacts on land–atmosphere interactions remains poor. My DSF work will develop new capability to monitor ecosystem transition after fires across scales using multiscale remote sensing and combine new cross-scale data and numerical models to understand the fundamental processes that control the complex ecosystem change after fire and its impacts on energy and carbon fluxes. The output of my DSF project is expected to improve our ability to monitor and model fire-impacted ecosystems in the circumpolar Arctic.

What are your research interests?

My overall research interest is to integrate novel Earth observations, fundamental ecological theories, and process models to advance our understanding of the interconnections between ecosystem dynamics and climate change.

What led you to science and your specific discipline?

I grew up in an agricultural town. When I was a kid, I spent most of my time after school in the field with crops and trees, where I got to know various plant species and their usage and also watched how plants germinate from seeds, produce flowers and fruits, and change colors in the fall. From elementary to high school, climate change hit my hometown significantly just like every else in the world. I started to see weird things happening, like rapidly dropping groundwater levels, reduced crop productivity, and cherry trees flowering in the fall. This stirred an interest in me to discover how climate is impacting plants and terrestrial ecosystems.

What did you do before coming to ORNL?

Before joining ORNL, I was a PhD student and NASA FINESST (Future Investigators in NASA Earth and Space Science and Technology) fellow at Stony Brook University and Brookhaven National Laboratory.

Could you share an interesting fact or two about yourself?

I am a drone hobbyist. Besides being an important tool for my science, I have been using drones to record the rhythm (e.g., phenology) and changes of nature. I am a firm believer that curiosity and observation will lead to tomorrow's big discoveries. During my free time, I like walking in forests with my wife and son, looking for the amazing things happening in nature and sharing my science with them.

What nonscience topic or activity is important to you and why?

I think physical health is as important as being a good scientist. When I am off work, I like playing basketball, fishing, and hiking. If you need friends for outdoor activities, please contact me.

