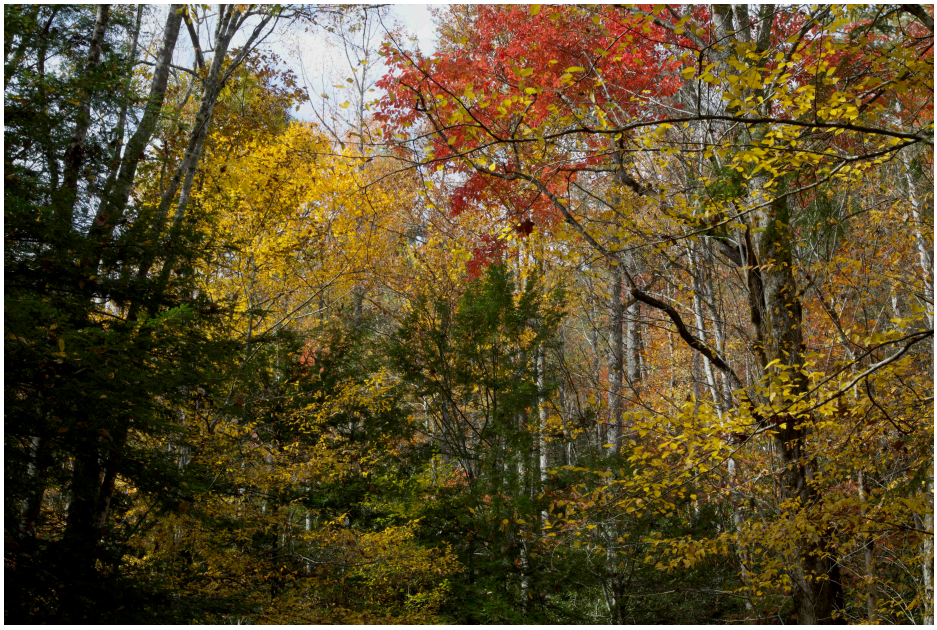
About the Project



Project Abstract

There have been prominent and widespread calls for high school science students to work with data in more complex ways that better align with and support the work of professional scientists and engineers. However, high school students' analysis and interpretation of scientific data is often limited in scope, complexity, and authentic purpose. This project aims to support and advance students' work with ecological data in high school biology classrooms by embracing a new approach: Bayesian data analysis methods. Such methods involve expressing initial ideas or beliefs and updating them quantitatively with data that students access or record. This project will empower 20 high school teachers and their approximately 1,200 students to make sense of data within and beyond classroom contexts. It also will involve sharing research findings, an educational technology tool for Bayesian data analysis, and curricular resources in open and accessible ways.

Teachers commonly desire to plan and carry out more data-intensive classroom activities. However, there needs to be more connection between students' work with data and the core science ideas teachers want their students to understand. The result is that students' work with data can be isolated from the sense-making students are doing about science. Because of advances in cognitive science, data science and Bayesian data analysis tools and methods, and science curricular standards, there is an opportunity to provide science teachers with practical tools and teaching strategies for students to use data in science classrooms more ambitiously. This project involves designing and carrying out a multi-year professional development program for 20 high school biology teachers focused on ecosystems-related core science ideas and locally-relevant ecological phenomena and questions. The program includes a collaboration with the Great Smoky Mountains Institute at Tremont, an experiential and outdoor education center in the nation's most biodiverse national park. The program focuses on strategies and a specially designed and developed statistical software tool to make Bayesian data analysis more accessible for high school learners. This study also involves a field experiment that assesses several teacher and student outcomes using quantitative and qualitative measures over multiple years of classroom implementation. This project has the potential to provide a set of research findings and strategies for making the science practice of analyzing and interpreting data more empowering for both science teachers and learners.

The original proposal for the project is here.

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