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Nalini Nadkarni

Extreme Research: Evergreen Edition

By Anthony Sermonti

Hanging by a thin rope at the top of a 30 story, 900 year old tree is just another day in the office for Evergreen professor Nalini Nadkarni. It's a world that few see, and it takes tough work to get there.

"It's a magical feeling...you can't even see the ground," Nadkarni says. "The sounds and sights are amazing."

In August, Dr. Nadkarni and other researchers from The Evergreen State College hosted the Canopy Confluence, a research and outreach project focusing on the upper forest canopy, a world that, until recently, was largely unexplored.

The confluence, set in the Cedar Flats Natural Area, a remote part of southwest Washington in the shadow of Mt. St. Helens, is a one of a kind research event that brings together scientists, artists and writers – and the media, who showed a keen interest in the work. The project includes undergraduate and graduate students, and the researchers say it's globally important research that will connect with everyday people though art. The cutting edge science being carried out, the unique joining of scientists and artists in the field, and the rich possibility of materials that the venue and participants create make it a unique research program – one of many for which The Evergreen State College is widely known.

Janet Foley and Nate Nieto, two researchers from the University of California at Davis, spent 10 days at the site studying the ecology of how pathogens move from rodents to humans.

Dr. Foley, a veterinarian and epidemiologist, and Nieto, a Ph.D. candidate, set 110 deer mouse traps on the ground as well as hundreds of feet up in the forest canopy to gather data to bring back to UC Davis. Studying the DNA of the animals is important work for animals and humans, Foley says. Tagging and gathering blood from the mice, who spend much of their lives in the hard to reach canopy, allows the pair to more closely examine how diseases are spread to humans, and which animals are most likely to spread them.

The work is humane and the rodents are released, but Nieto says the squirrels have their way of letting them know they could do without the interruption. "The squirrels tell us to get out of their trees…after all, the trees are like a giant kitchen for them," she explains. "Much of science doesn't translate to anyone but scientists; the confluence is a great way to translate it to others."

That's where the "translators" come in.

Poets, dancers, songwriters and painters, funded by the National Geographic Society, joined the cadre of ecologists in the field to interpret the ecology of the forest canopy and the way scientists work, which they can disseminate to their audiences at poetry readings, dance performances, music concerts and art exhibitions. "The size of the trees and the feeling of the forest is wonderful," says John Calderazzo, a professor of English at Colorado State University. "We have nothing like this in Colorado."

During his time at the confluence, Calderazzo wrote poetry inspired by the experience. "These are poems I could not write unless I came here," he explains. "This is spiritually moving." Calderazzo says that only good things happen when you bring different disciplines together to study a subject, and he feels it is vital to take his work back to students at Colorado State. "I have the opportunity to share this experience with my students and to explain the world of the canopy in unique ways."

It's a busy time in this remote forest with science, art and words all coming together to achieve a common goal.

Nadkarni was one of the first researchers to study the forest canopy and made some of the first major discoveries about its functions, like how trees extend their roots hundreds of feet above the "ground" into the arboreal soil which is generated by the 70 different species of moss growing on tree branches. "The world of the canopy is different than the forest floor," Nadkarni says. "One tree can host up to 60 or 70 species of moss, whereas there are only 15 or 20 species of ground rooted plants."

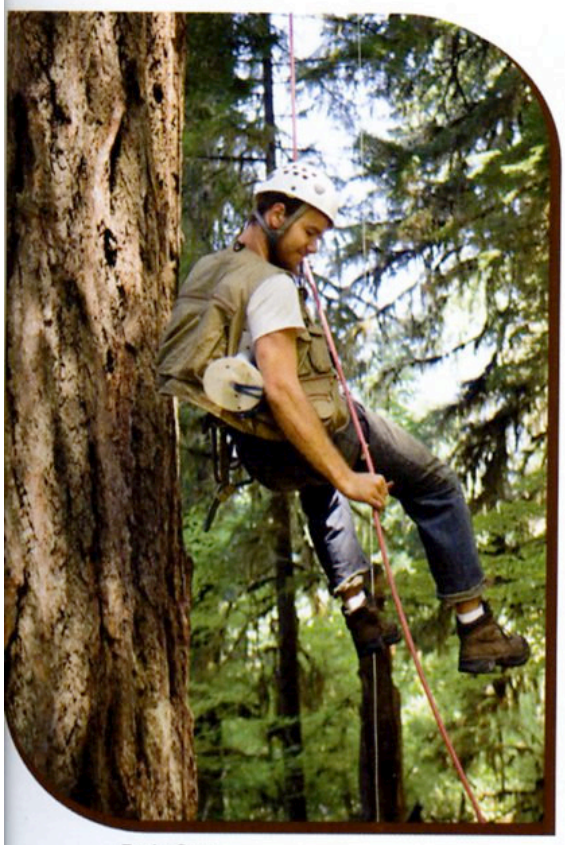
Nadkarni's work has also contributed greatly to the development of new drugs from plants that only grow in the treetops. But her work isn't only about roots, moss and medicine.

Canopy research has huge implications for the study of global climate change, since a significant amount of carbon, a gas critical to Earth's biosphere, is stored in the canopy. From climate change to bird behavior and sustainability, the team's work has broad meaning for the public – one of the things that researchers document and study for the National Science Foundation, which has awarded the group more than $1.4 million in supporting grants.

Along with Evergreen students, Nadkarni and co-principal investigator Dr. Judy Cushing, a computer science faculty member at Evergreen, and staff member Anne Fiala are developing a Canopy Database system so that data collected around the world about forest canopies can be centralized and standardized – work that will only help the relatively new study of canopies. Fiala was a key organizer of the confluence. "It's a pretty powerful experience," she says. "There's a lot of adrenaline when you're that high up."

Throughout the month, the group collected data on a variety of scientific projects from field sites on the western side of the Washington Cascades, with trees ranging from 100 to 1000 years old at Wind River, 60 miles east of Portland, Ore., and in the Cedar Flats area.

Among other aspects, researchers quantified and made visualizations of the "air space" in the forest using new technology that links laser rangefinders with palm pilots to enhance data collection efficiency when hanging on ropes in the canopy. The technology helps to assess the effects of host tree species on the biodiversity of moss communities and relate bird diversity to forest structure as stands develop through time.



D.J. Cox

D.J. Cox, an Evergreen junior and an expert climber, finally puts his boots on the ground after spending hours 300 feet up in a Douglas Fir. For a junior who grew up on the southwest side of Chicago, it's a momentous experience. Cox's commitment to his work and the college's commitment to undergraduate research allowed him to take such a key role after only being at Evergreen for one quarter before the confluence. "To be able to be this close to trees and to look down on them is beautiful," he says. He is deeply interested in studying the forest canopy as well as myrmecology, the study of ants. "The canopy is where the biosphere interacts with the atmosphere," Cox says. "It's the cleanest air in the world."

Evergreen students also carried out projects involving ash from the 1980 eruption of Mt. St. Helens that can still be found under moss, and performed a census of tree branches, comparing that to a census from five years ago.

Nadkarni is also working to build a forest canopy walkway system in the treetops of Evergreen's campus forests so that everyone – from toddlers to octogenarians – will have access to this amazing world. Progress on that project is dependent on private fundraising, and there is growing momentum from the college and others to make that happen.

She still enjoys being one of the pioneers in forest canopy research. "I make sure my climbing harness is on correctly and I'm all ready to go."

Learn more about Evergreen's canopy research at: www.evergreen.edu/canopylab, www.researchambassador.com or www.evergreen.edu/walkway.