

Linking Forestry to the Next Generation

Enrollment and Diversity Challenges Faced by
University Forestry and Natural Resources Programs

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College of Natural Resources and Environment
Virginia Tech



[2016 SFI Annual Conference](#)

September 27-29, 2016 | Clearwater Beach, Florida



Alternative Titles/Approaches to the Topic:

- Reading the Tea Leaves at Virginia Tech
- Building a Stronger-Wider Foundation for the Future
- Looking Out to the Horizon to See What You Can See
- Placing Your Bets
- Having a Business Acumen in an Academic Setting

Knowing Your Context is Critical for Success



Virginia Tech Today – Our Context, Our Challenges, Our Opportunities

- One of Our Nation's Leading Land Grant Institutions – we have many and are blessed with a model of higher education that is inextricably woven into the fabric of our nation
- Comprehensive programs ranging from engineering, to liberal arts, to Vet Med
- A new medical school - A new medical research institute
- Top 50 in NSF Research Expenditures in the nation
- A new presence in the National Capital Region
- International locations in Switzerland, India, and Chile
- Drone delivery of burritos in a partnership with Project Wing (Google)



Today, Virginia Tech receives over 24,000 applications for 6,000 freshman seats. Total UG enrollment is about 25,000 students; total enrollment is about 31,000 students.

65% of all applications are for the College of Engineering.

Enrollment by colleges, descending order:

- Engineering
- Liberal Arts
- Business
- Agriculture
- Science
- Architecture and Urban Studies
- Natural Resources and Environment

314 applications were received from students
wanting to study in the
College of Natural Resources and Environment
for fall 2016.

293 offers for acceptance were tendered.

226 offers for first choice majors were made.

128 acceptances were received.

113 first choice acceptances were received.

~160 enrolled fall 2016 (includes transfer students)

$$314/24,000 = 1.3\%$$

$$160/24,000 = 0.66\%$$

CNRE yielded 0.66% of all VT applications for fall 2016!



Virginia Tech Today – Our Context, Our Challenges, Our Opportunities

Private Property Rights – the right to practice forestry.

I want the right to practice forestry at a Research Intensive, Land Grant Institution, with an unlimited diversity of opportunities for faculty, students, and most importantly unlimited choices for the president and provost of the institution.

How do we (did we) do this??



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How do we (did we) do this??

Embracing Our Student's Needs/Societies Needs with the Willingness to Move Forward (treating the root cause and not the symptom)

Changed College name to: College of Natural Resources and **Environment**

Changed 3 of 4 academic department names:

- ✓ Forest Resources and Environmental Conservation (formerly Forestry)
- ✓ Sustainable Biomaterials (formerly Wood Science and Forest Products)
- ✓ Fish and Wildlife Conservation (formerly Fisheries and Wildlife Sciences)





“Don’t throw the baby out with the bathwater”

“You will lose your forestry program and industry support for it”

“Your are diluting your core business”

The most aggressive posture on new courses, curriculum, majors, minors, and degree programs at Virginia Tech over the period 2010-2015. “If you can’t reach them – you can’t teach them.”

Forestry Resources and Environmental Conservation

B.S. Forestry

- Urban Forestry
- Natural Resources Conservation
- Environmental Resource Management
- Environmental Informatics/GIS

B.S. Water: Resources, Policy, and Management

Sustainable Biomaterials

B.S. Sustainable Biomaterials

- Sustainable Enterprise
- Creating Sustainable Society
- Sustainable Residential Structures
- Biomaterials Science

B.S. Packaging Systems and Design

Fish and Wildlife Conservation

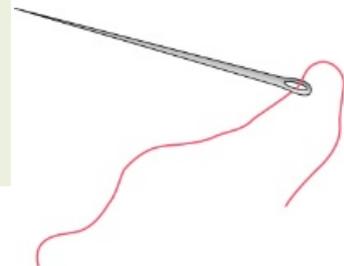
B.S. Fish and Wildlife Conservation

- Fish Conservation
- Wildlife Conservation

Geography

B.A. Geography

B.S. Meteorology/GIS



Thinking inclusively – not exclusively about academic programs

Environmental Informatics

ADVANCING THE SCIENCE OF SUSTAINABILITY



Opens a
World of
Opportunity

 VirginiaTech
Invent the Future®

Environmental Informatics major approved Spring 2013 for offering Fall 2013.

Environmental Informatics is a major within the forestry degree program.

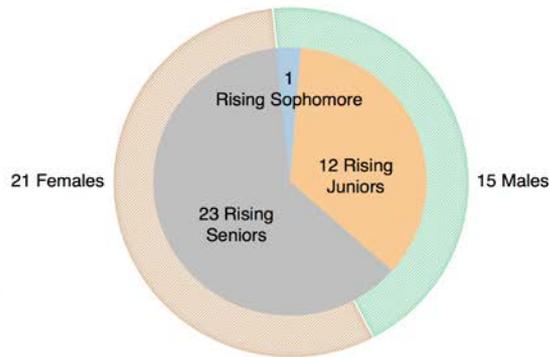
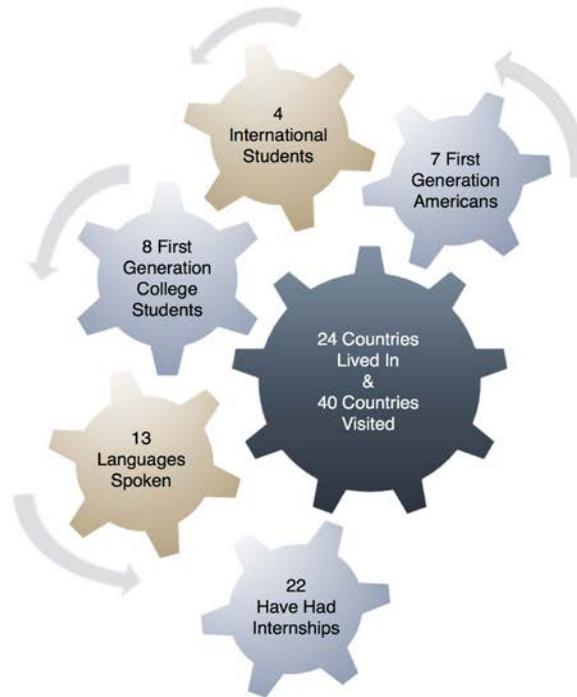
An exciting STEM-oriented career path for students with quantitative skills and interests.

Conservation of natural resources, sustainability, impact assessment, planning, and management are increasingly reliant on computer-based approaches. Dynamic-simulation modeling, statistics, database management, geographic information systems, and remote sensing are utilized in many environmental applications, ranging from forestry and landscape mapping, to pollution monitoring and watershed ecology, and many more.

Trainees represent 28 different majors:

- Aerospace Engineering*
- Applied Economic Management**
- Architecture**
- Biochemistry**
- Biology*
- BIOLOGICAL SYSTEMS ENGINEERING*
- Business Information Technology*
- Civil Engineering*
- Communications*
- Engineering Science & Mechanics*
- ENVIRONMENTAL INFORMATICS*
- Environmental Resource Management***
- Environmental Policy & Planning***
- Environmental Science*
- Fish Conservation*
- Geology*
- Geosciences****
- Humanities, Science & Environment
- MATERIAL SCIENCE & ENGINEERING*
- Mechanical Engineering**
- Multimedia Journalism*
- NANOSCIENCE***
- Natural Resource Conservation**
- Political Science*
- Public Relations****
- Sustainable Biomaterials***
- WATER: RESOURCES, POLICY, & MANAGEMENT*
- Wildlife Conservation*

* Denotes number of students with major



Leading the campus with programming serving all VT students, from all colleges, and many departments.

Why can't forestry and natural resources be a leader/convener in the sustainability conversation on our campus? We can, and we can work effectively with others in this space.

Student feedback is extremely positive about this experiential learning environment.





ADVANCING THE SCIENCE OF SUSTAINABILITY

CNRE.VT.EDU

GETTING DOWN TO BUSINESS



Wood Enterprise Institute Students Learn Entrepreneurship Firsthand

It's the day before graduation — exams are finished, and the semester is essentially over. But a group of students still labors away in the Wood Enterprise Institute (WEI) lab at the Brooks Forest Products Center. They're intently wood strips on tabletops, compiling reports, and feeding instructions into a computerized milling machine.



This year's coffee table proved to be a formidable challenge. Here, (L-R) Andrew Corbin, Eoghan O'Connor, Professor Earl Kline, and Jeremy Withers meticulously apply the sycamore inlay.

"This may be the only class where students work more than required," said senior Jeremy Withers of Christiansburg, Va., president of the student-managed entrepreneurial venture. "I've averaged 8-10 extra hours a week here; most of us have."

Lured by the excitement of running their own business, using "cool" machines to create products, and being an integral part of a team, the students are putting theory into practice through experiential learning. And the experience isn't just about the process. It has tangible benefits as well — virtually all WEI alumni have jobs waiting for them after graduation.

"I learned that communication is very important," said Andrew Corbin, a junior from Pennington, N.J. "You must make an effort to communicate with 17 other people to make them a team."

"These students have to get things done through people," said Professor Earl Kline, WEI's faculty advisor. "They have to motivate others, keep them accountable, help them do their jobs. These are things they say they learned when the course is over."

WEI is a concept-to-market venture run by the students as a two-semester course sequence. They design and develop prototypes of wood products, select one to produce, manufacture it in a sustainable manner, and sell it on the open market. Throughout the process, they learn to plan, delegate, and develop their leadership skills.

Past WEI teams have produced bookshelves, coasters, salt and pepper shakers, and decorative boxes. This year's product design — an elegant coffee table with curved legs and inlaid wood designs created from the Henderson Lawn sycamores — was the most difficult a team has attempted, requiring precision machining on

Professor Earl Kline, shown with some past Wood Enterprise Institute products, initiated the WEI in 2007.

numerous parts. Modifications to improve product quality slowed production. The team produced fewer tables than planned, which significantly cut into the profit. "How the team responds to the challenges is where the true learning occurs," said Kline.

Most WEI students are wood science and forest products majors, but few come in with advanced manufacturing skills. Fortunately, the college's ongoing partnership with the Galway-Mayo Institute of Technology in Letterfrack, Ireland, one of Europe's leading furniture design programs, has brought students to Blacksburg to complete their program's on-the-job placement requirement. This past spring, Eoghan O'Connor was on hand to help the WEI team with the complexities of computer-aided manufacturing.



Professor Earl Kline (L) and Josh Hertzler (2013-12 WEI) inspect part quality to ensure that work methods are set up properly.

Kline initiated the WEI six years ago after searching unsuccessfully for a company willing to support students eager to try out new product ideas. "Companies aren't set up to allow students to experiment," he said, "so Paul Winstorfer and I came up with the idea of allowing students to start their own business." Enrollment in the WEI had remained fairly steady at about nine students, but doubled in the 2012-13 academic year.



In 2013-12, the WEI students produced a selection of university-themed coasters.

"Coordinating the work effort of so many students into effective results was a challenge, but it ended up being a tremendous learning experience for both the students and instructors," Kline added. "We are now better prepared to handle increased enrollment in the future."

With financial assistance from donors, WEI has been able to buy materials and equipment, including software to run a CNC (computer numerical control) automated router that is the envy of most local woodworking companies. Donor Brooks Whitelurst, a 1951 Virginia Tech chemical engineering alumnus who holds 25 patents, attends the WEI presentations each year to give students critical feedback.

By the time the students deliver their final presentations, they have spent a collective hundreds of hours setting up their team structure, preparing a business plan, developing their product, writing computer code for the machinery, and creating marketing tools. This year they developed shop safety protocols that will be used by future WEI groups.

"The hands-on experience was by far the most exciting aspect," said Michael Bauman, a senior from Marion, Va. "I don't know of any other course in any major that allows students complete control of a business. Study of theory is necessary, but it doesn't truly capture the raw excitement of actually solving problems in real scenarios."

- ✓ Innovation
- ✓ Entrepreneurial
- ✓ Think Tank
- ✓ Team Work
- ✓ Problem Solving
- ✓ Real World
- ✓ Critical Thinking

Experiential Learning via the Wood Enterprise Institute continues to get rave reviews from the students.

"Hands On – Minds On"

Career Fair

Thursday, September 29, 2016

10:00 a.m. - 4:00 p.m.
 Owens Banquet Room

Download this event to your calendar.

Information for Students

Pre-event	<p>Key to success at a fair</p> <p>How to prepare for a career fair what to do there</p> <p>Employers attending [will be posted in September] List will include majors sought, types of jobs, links to employer websites for your preparation. Research employers in advance to prepare!</p> <p>Resume guide</p> <p>Interview skills and preparation [be ready, just in case!]</p> <p>Workshops / events for students include career fair prep, resumes, interviewing.</p>
Career fair Business attire	<p>Thursday, September 29, 2016 Owens Banquet Room 10:00 a.m. - 4:00 p.m.: Career fair open to students</p>
Next-day interviewing IF scheduled by employer Business attire	<p>Friday, September 30, 2016 Location(s) TBA</p> <p>Some employers at the fair may schedule next-day interviews. If they wish to interview you, they will speak directly with you about this to schedule. Each employer will make their own arrangements. LISTEN CAREFULLY for details to make sure you understand BEFORE you commit.</p> <p>Arrive at least 15 minutes before your interview. Interviews can occur between 8:30 am - 5:00 pm.</p> <p>Interview DOs and DON'Ts</p>
After the event	<p>Thank-you letters follow-up</p>

Information and Registration

Employer Information and Registration

Look Who's Attending

Check out the list of employers attending the 2016 CNRE Career Fair.

List of Employers

NSF highlights sustainable forest management



The NSF Center for Advanced Forestry Systems is an innovative partnership between Virginia Tech and other leading university forestry research programs across the U.S. that is working to improve the sustainability and productivity of planted forests.

Watch the video

Trane first to partner with Sustainability Institute



Trane, a worldwide provider of heating, ventilating, and air conditioning systems, is lending its expertise and support to establish the Sustainability Institute at Virginia Tech. The company has recruited Virginia Tech graduates to its workforce for several decades.

Are You a First-Generation College Student?



CNRE Career Fair
 September 29, 2016
 Owen's Banquet Hall

50 Employers/Agencies/Businesses

Linking employment opportunities to our students is key in efforts to link forestry to the next generation.

Students want opportunities!



How students see us is important in forestry and natural resources.



The College of Natural Resources and Environment

SCIENCING | SUSTAINABILITY

Because weather is impacted by the terrain over which it occurs, the Department of Geography's meteorology program combines expertise in geography and geospatial technology with traditional atmospheric meteorology. Storm chasing is the first portion of meteorology study, as students and scientists build the science of prediction.

The College of Natural Resources and Environment

SCIENCING | SUSTAINABILITY

Natural resources conservation includes managing lands for access and suitable recreation so that people can enjoy natural environments. Courses in ecological, natural, and social sciences, and planning, tourism, and business management are combined to bring about an understanding of recreational resources.

The College of Natural Resources and Environment

SCIENCING | SUSTAINABILITY

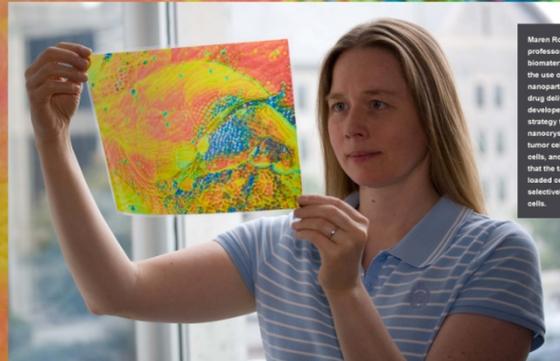
The Frederick Meade Conservation Center is a conservation center and interpretive facility located in natural areas. From the protection of property through the use of natural resources, the center has been able to provide a wide range of services. From the protection of property through the use of natural resources, the center has been able to provide a wide range of services.



The College of Natural Resources and Environment

SCIENCING | SUSTAINABILITY

Maren Roman, associate professor of biocatalysis, is also the use of cellulose nanoparticles in drug delivery. She developed a chemical strategy to target cancer cells to its tumor cells, bypass cells, and has demonstrated that the targeted attached cellulose is selectively eradicate cells.



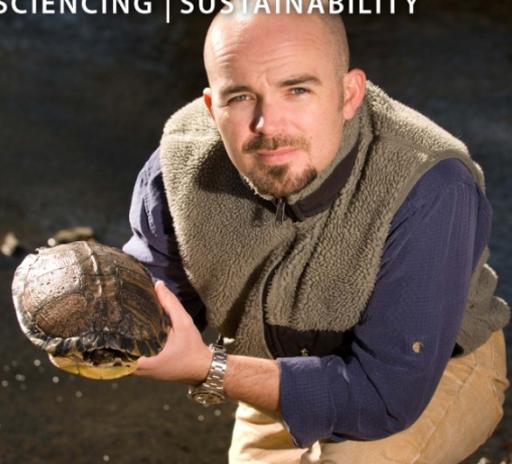
Scott Reinhardt, associate professor of wood science, is using cellulose nanocrystals derived from plants for such diverse applications as transparent films, paper additives, membranes for high-strength polymer extractions, tissue scaffolds, high-end inks, and pigments. They also substituted wood-based panels to create high-end fabrics and other products.



The College of Natural Resources and Environment

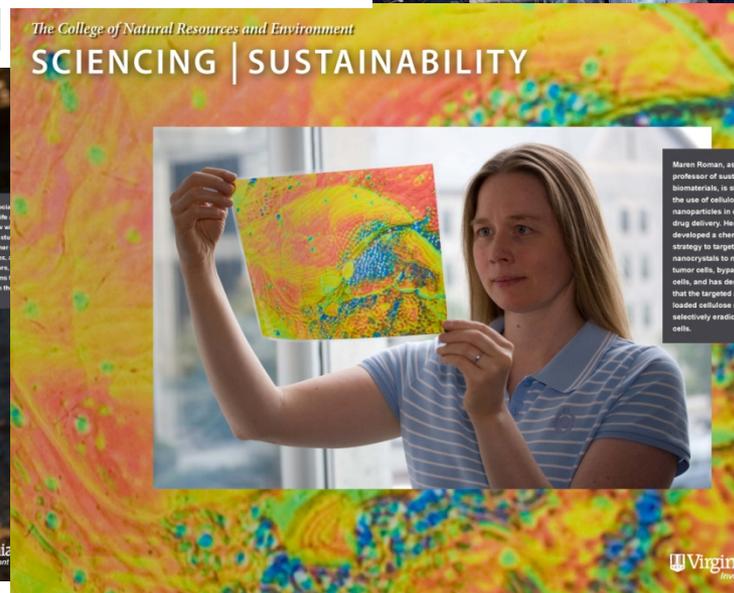
SCIENCING | SUSTAINABILITY

Bill Hopkins, associate professor of wildlife, of the nation's top ecologists, the pollutants and other natural stressors, ability of organisms to adapt to their environment.



The College of Natural Resources and Environment

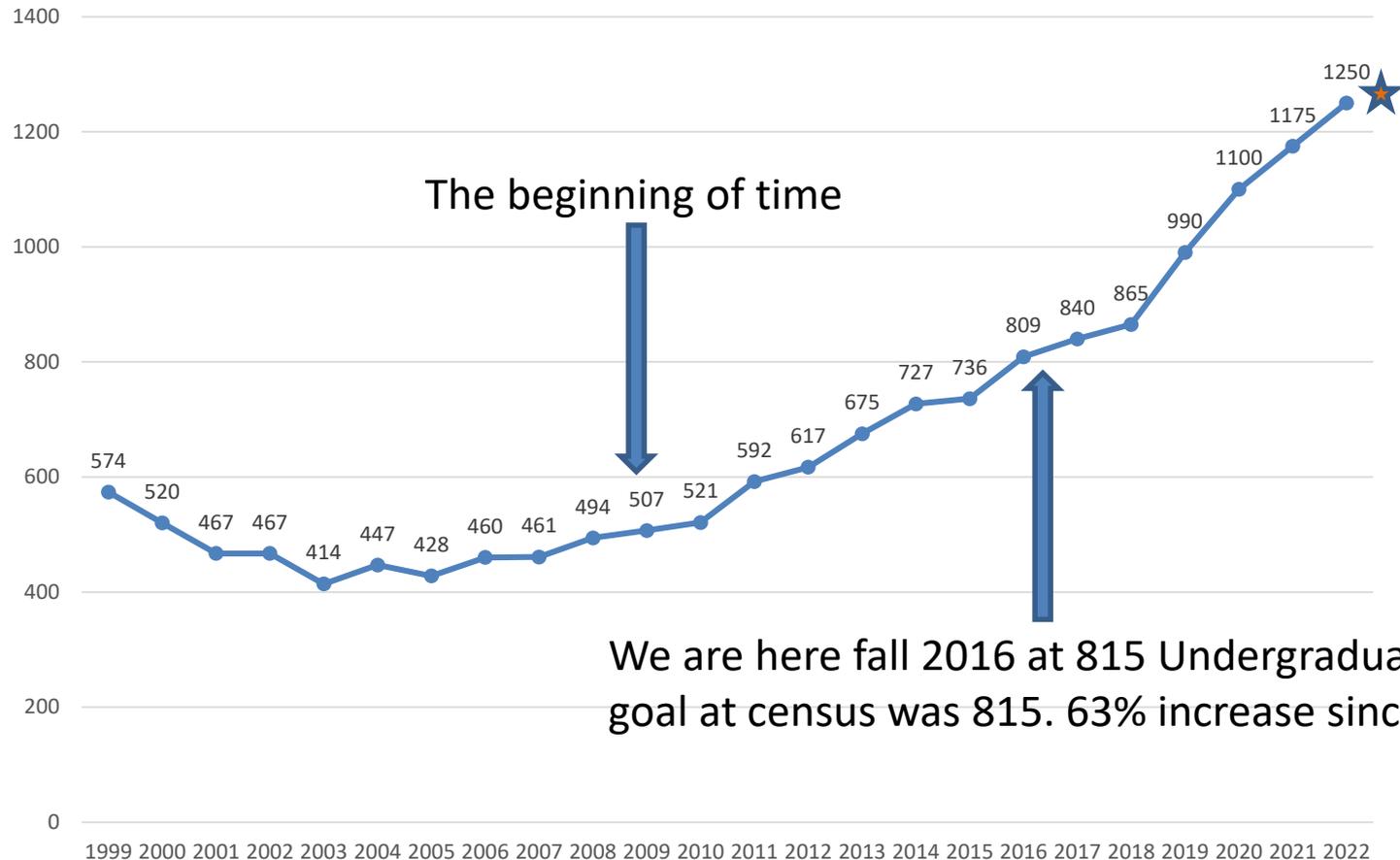
SCIENCING | SUSTAINABILITY





Portraying our work in an honest, genuine, rich visual imagery and contemporary language – ceiling banners and wall posters

CNRE UNDERGRADUATE ENROLLMENT 1999-2016 (2009-2016 ARE FALL CENSUS DATA)



Undergraduate enrollment is important to our future at Virginia Tech

* These are numbers as of 8/15/16; enrollment will increase with internal transfers in the fall

Will we need new or additional degree offerings to reach our goal by 2022? How do we scale faculty, collegiate faculty, instructors, GTA, and staff support? We must be proactive.



CNRE hosted National Diversity Conference June 19-21, 2013



Over 100 participants
22 presented papers
4 keynotes speakers

"Inclusion is the message"

Women in Natural Resources: Leading, Mentoring, and Connecting

October 27-28, 2016



Virginia Tech.

College of Natural Resources
and Environment

REGISTRATION NOW OPEN!

Registration is now open for the **“Women in Natural Resources: Leading, Mentoring, and Connecting”** conference, Oct. 27-28 at the Inn at Virginia Tech. Hosted by the College of Natural Resources and Environment, the conference will offer tools, resources, and inspiration for professional success and personal growth, and provide a venue for alumni, colleagues, and guests to connect with faculty, staff, and students.

The conference will offer a range of presentations, concurrent sessions, activities, and opportunities for networking. Keynote speaker Dr. Carolyn Finney of the University of Kentucky is a writer, performer, and cultural geographer who is deeply interested in issues related to identity, difference, creativity, and resilience. Lunchtime speaker Kathy Abusow is president and CEO of Sustainable Forestry Initiative Inc.

Concurrent session topics include creating an inclusive environment, exploring diversity, negotiation skills, money management, forging career pathways, and mentorships. Optional activities include visits to several sites around campus for presentations and demonstrations, an evening campfire and networking session, and even a morning yoga class.

There is **no cost** to attend, but registration is required. Visit cnre.vt.edu/womensconf to register today. Please join us for what is sure to be an exciting event!



Carolyn Finney

Photo by Lynnly Laborvitz



Kathy Abusow

Women
in **Natural**
Resources

Leading, Mentoring, and Connecting



Knowing Your Context is Critical for Success

How do you see into the future of
forestry and natural resources?

Thank You!

