



ADVANCING THE SCIENCE OF SUSTAINABILITY

CNRE.VT.EDU

LEADERSHIP INSTITUTE

College's signature program trains future leaders

The students in the College of Natural Resources and Environment's Leadership Institute comprise a select group. Twelve students are selected each year to participate in this two-semester course — the nation's only intensive undergraduate program aimed at honing the leadership skills of future natural resources professionals.



The students benefit from personal interaction with key leaders of state and federal agencies and private-sector and nongovernmental organizations during their weeklong trip.

"This field requires people with strong leadership skills because of the way our Earth and its resources are changing," said Sierra Steffen, a member of the 2013-14 cohort. "Learning how to interact effectively with people is integral if we want to make a difference. This course has given me the confidence to take on leadership roles."

Students explore aspects of natural resources leadership such as leadership theories, public service, profit motives, teamwork, change management, conflict resolution, and success in the political arena. They assess their own personality types and learn how personality type affects interpersonal communication and leadership styles. They then practice their leadership and team skills through service-learning projects.

"Any personality type can be a leader; we make that clear," said Institute Director Steve McMullin, who helped establish the program in 2009 and has been developing the leadership skills of natural resource



professionals for more than 20 years. "But their strengths and styles may differ. Having confidence in your own leadership style is important."

"I learned leadership doesn't come in one particular style, but in a diverse array of equally successful personalities," said current cohort member Sterling Pino-DeGale. "The Myers-Briggs assessment we take in class exemplifies this and has been instrumental in my growth as an effective leader."

"The Myers-Briggs has raised my self-awareness and has given me a scope for introspection," said fellow cohort member Ilia Donner.

Over winter break, the students and faculty take a weeklong trip to Charlottesville, Richmond, and Washington, D.C., to visit with state and national leaders and policymakers. Accompanied by McMullin, Associate Director Brian Bond, and Dean Paul Winistorfer, the students meet staff members for elected officials, state and federal agency heads, nongovernmental organization directors, and private-sector principals to hear firsthand about the issues and challenges leaders face.



Kaylyn Duda of the 2014-15 cohort waits outside U.S. Sen. Mark Warner's office for a meeting with one of the senator's staffers.

This year's trip included meetings with staffers for U.S. Sens. Tim Kaine and Mark Warner, and representatives from the Virginia Department of Forestry, U.S. Fish and Wildlife Service, U.S. Forest Service, and a number of other state and federal agencies.

"The students prepared well and asked good questions," McMullin said. "They were impressed that these powerful, important people were eager to spend time with students and that they confirmed what we're teaching. Moreover, the leaders we met were extremely impressed with the students and our Leadership Institute program."

Cohort alumna Katy Battle, now a graduate student at North Carolina State, noted that effective communication, relationship building, and networking were emphasized repeatedly. "I also realized that the best leaders not only align their colleagues toward a common goal but selflessly find ways for these people to shine," she said.

Paul Decker noticed major differences in the way agencies balanced public opinion with hard science. "Some organizations try very hard to do things on the side of science for the best of the environment, while

The students navigate through the streets of Washington, D.C., on their way to Capitol Hill.



The weeklong trip is a test of endurance as the group navigates multiple stops in 12-plus-hour days. Here, the group holds a debriefing session at the National Conservation Training Center in Shepherdstown, West Virginia.

others feel public support is more important than following a hard-science management plan to the letter," he said. Now a graduate student at the University of Florida, Decker recently became the first Leadership Institute alumnus to support the program financially.

The trip helps students see the organizational leaders as "real people" and reassures them that these positions aren't totally out of reach. "Speaking with them showed me that they all started somewhere," said Steffen.

"I use what I learned in the Leadership Institute every day," said alumnus Turner Crawford, now a timber management consultant for South Rivers Forestry Consultants. "It has changed how I communicate, how I handle situations, and has given me a greater ability to understand what people want and need. I find myself taking leadership roles more often."

"We could not offer this unique co-curricular experience for our students without financial support from our Leadership Institute donors," said Dean Paul Winistorfer, who developed the initial concept for the program. "They are making an investment in the future through the lives and future career paths — and leadership potential — of our students. I feel very confident that we have future leaders in our midst."

[Read Leadership Institute student bios and learn more at cnre.vt.edu/students/leadership-institute/index.html.](http://cnre.vt.edu/students/leadership-institute/index.html)



Mealtimes on the trip offer a much-needed break and an opportunity to rest, relax, and connect.

The college's Leadership Institute, highlighted on the cover of this issue, is now in its fifth year. A total of 60 students, including the current student cohort, have participated in this yearlong academic experience in which they focus on learning about themselves and about leadership. Our vision was to create a signature program that would benefit our students in a very special way, and we have succeeded. I have personally witnessed the transformation and growth of our students, especially during the weeklong trip each January to visit with leaders from across the spectrum of state and federal agencies, private-sector and nongovernmental organizations, and the offices of Virginia's senators. I am most proud of our success and thankful to institute co-directors Steve McMullin and Brian Bond.

We are making a significant difference in the lives and future careers of the Leadership Institute students, and we are thankful for the generous contributions

"Leadership without vision is management. Vision without execution is blind."
— Paul Winistorfer, Dean

of the many donors who support our vision. The Leadership Institute may be the most significant and transformational student experience I've been involved with during my 30-year career in academia, and I have learned much while interacting with these students. Over and over, the leaders we meet with tell us they wish they had had this kind of experience in college — it took them years to develop their leadership skills on the job.

We are finalizing plans to create a Sustainability Institute co-curricular experience for undergraduate students in a framework similar to the Leadership Institute. Our goal is to prepare future sustainability professionals by equipping students with a sustainability lens for decision making. Don't let the jargon fool you — there is

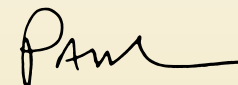
real substance, knowledge, and skills to be applied to sustainability challenges that impact the environmental, economic, and social well-being of current and future generations. Advancing the science of sustainability is the college brand, and I am confident that we are creating a student experience that will complement our rigorous and challenging curricula across the college.

Our new bachelor's degree titled Water: Resources, Policy, and Management has received final approval and will be offered in fall 2015. We view this degree as a leading academic effort and a national role model for the study of water. Faculty representing five colleges and 10 departments came together to create the degree platform. Please help us recruit students to this degree. Water quality and quantity is a challenge facing the entire planet.

We lost a forestry leader in late 2014. Alumnus Jim Mooney lost his yearlong battle with cancer in October (see article on page 7). Per Jim's wishes, a memorial scholarship has been established in the college to support students studying forestry. Thanks to those of you who have contributed in memory of Jim. He will be missed by many.

Best wishes for the spring. We have outstanding students entering the workforce with May commencement, so we welcome any employment opportunities for them.

Warm regards from our faculty, staff, and students.



Paul M. Winistorfer
Dean
pstorfer@vt.edu

@vt_cnre



The 2014-15 Leadership Institute students during their weeklong trip in January. Left to right, front row: Institute Associate Director Brian Bond, Kaylyn Duda, Samantha Hannabass, Eliza Demere, and Dean Paul Winistorfer. Middle row: Ashley Weston, Ilia Donner, Chandler Eaglestone, Benjamin Poling, and Sterling Pino-DeGale. Back row: Brendan Little, Charles Aquilina, Matthew Cunningham, Page Clayton, and Institute Director Steve McMullin.

Timothy D. Sands installed as Virginia Tech president

The formal installation of Timothy D. Sands as Virginia Tech's 16th president on Oct. 17 was part of a three-day celebration that engaged students, faculty, staff, and members of the community. Events ranged from a spirit rally and a pick-up basketball game to a Corps of Cadets pass review, ice cream social, and pizza party.

Several college faculty and students participated in "Experience Virginia Tech," an academic showcase highlighting innovative teaching and research through activities, displays, and lectures. Presentations included "The Water We Drink" by Stephen Schoenholtz and Kevin McGuire, "Contagion" by Kathleen Alexander and Korine Kolivras, and "Endangered Cats" by Marcella Kelly.



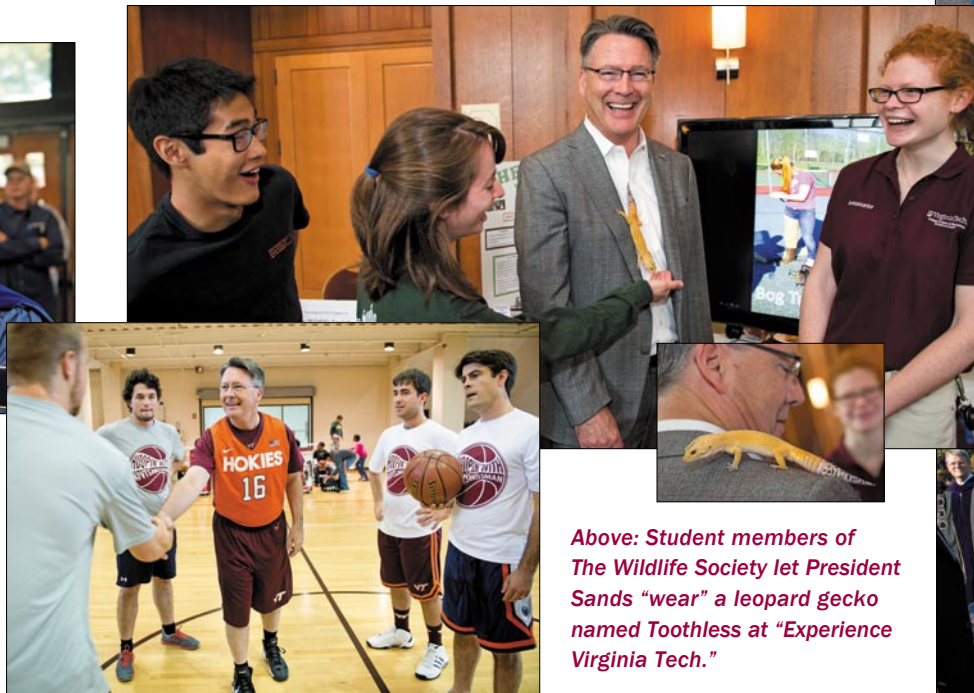
Above: Dean Paul Winistorfer (left) and son Soren (right) watch while twin Jonah Winistorfer tries out the VT Rally Team's custom off-road vehicle at "Experience Virginia Tech."

Below: President Sands greets his family members after the installation ceremony.



Above: President Sands and his wife, Laura, pause before the formal installation ceremony in Burruss Hall.

Right: Assistant Professor Tim Baird (far right) joined in the pick-up basketball game with President Sands (center).



Above: Student members of The Wildlife Society let President Sands "wear" a leopard gecko named Toothless at "Experience Virginia Tech."

CNRE NEWS
COLLEGE OF
NATURAL RESOURCES
AND ENVIRONMENT

cnre.vt.edu

@vt_cnre

VirginiaTech
Invent the Future®

Winter 2015 Quarterly Newsmagazine

Dean **Paul M. Winistorfer**

Editor **Lynn M. Davis** (davisl@vt.edu)

Associate Editor **Helen Thompson**

Assistant Editors **Nick Allen, Maya Chapman, Su Clauson-Wicker, Alycia Crall, Michelle Prysby, Susan Trulove**

Printer **Progress Printing of Lynchburg, Va.**

Designer **Joe Swope**

Photography Contributors **Chelsea Allder, Brian Bond, Lynn Davis, Jennifer Gagnon, Kai Gerrard, Andy Lavinier, Brendan Little, Sara Mascola, Lynn Resler, John Seiler, Logan Wallace**

Cover photo of Pandapas Pond by Engineering Dean **Richard Benson**



Virginia Tech does not discriminate against employees, students, or applicants on the basis of age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, veteran status, or any other basis protected by law. For inquiries regarding nondiscrimination policies, contact the executive director for Equity and Access at 540-231-8771 or Virginia Tech, North End Center, Suite 2300 (0318), 300 Turner St. NW, Blacksburg, VA 24061.

Department of Fish and Wildlife Conservation fishwild.vt.edu

Department of Forest Resources and Environmental Conservation frec.vt.edu

Department of Geography geography.vt.edu

Department of Sustainable Biomaterials sbio.vt.edu

Center for Geospatial Information Technology cgit.vt.edu

Center for Leadership in Global Sustainability cligs.vt.edu

Center for Natural Resources Assessment and Decision Support cenrads.cnre.vt.edu

Conservation Management Institute cmi.vt.edu

Virginia Water Resources Research Center vwrrc.vt.edu

Master Naturalist program grant to enhance training curriculum



Master Naturalist training happens in the classroom, in the field, and on the water. These volunteers are learning about marine life through hands-on investigation. Photo courtesy of Tidewater Chapter

The Virginia Environmental Endowment announced awards of nearly \$250,000 to protect and improve the region's natural resources, including \$20,000 for the Virginia Master Naturalist (VMN) program, which is based in the college. The program will use the award to compile existing and develop new educational materials to teach Virginia Master Naturalists and other relevant public audiences about the ecology of the major ecosystems in Virginia and connect them to volunteer projects that benefit the natural resources in those systems.

A new VMN curriculum will provide more consistent and high-quality basic training to the more than 550 trainees added each year to the program and will facilitate the dissemination of that knowledge to the communities those volunteers serve. Since the program's inception, Virginia Master Naturalists, whose volunteer time is valued at more than \$2 million annually, have educated more than 100,000 people and improved more than 15,000 acres.

The project will focus on four key curriculum areas — forest, wetland, aquatic, and coastal and estuarine environments — while promoting existing and new volunteer service projects that improve conservation efforts across Virginia.

"By investing in improving the knowledge and skills of existing and new VMN volunteers, we can increase their capacity to provide impactful, relevant educational programs across Virginia, as well as their capacity to conduct high-quality citizen science and stewardship projects," said Michelle Prysby, VMN special projects coordinator.

The VMN program also received a \$5,000 grant from the Virginia Department of Forestry to fund five service project mini-grants for volunteers and to enhance curriculum specifically focused on urban and developed systems and ecology.

A step back in time

In honor of Virginia Cooperative Extension's centennial in 2014, we present this brief history of Extension forestry, as drawn from a 1980 publication titled "College of the Fields." Read the complete history, which references a number of former college faculty members, at www.ext.vt.edu/about/extension-resources-history.pdf.

Virginia's Extension forestry legacy began at the University of Virginia in 1919 with the appointment of Wilbur O'Bryne from Yale. O'Bryne taught and served from Charlottesville for at least six years before he became a forestry professor and Extension forester at Virginia Agricultural and Mechanical College, now known as Virginia Tech. His forest management work focused on timber harvesting and erosion control.

The pressure of World War II ramped up the need for more forestry education in Virginia, and Extension hired its first district forester in 1942. The aptly named Forrest Patton was appointed to the Northeast District, and foresters were hired several years later to cover the Southeast, Central, and Piedmont regions. All were based in Blacksburg, the coordination center for programs and publications.

During the 1950s, forestry educational programs were broadened to include the many landowners who weren't farmers. Garden clubs and businesses sought forestry information, and the eastern counties organized forestry clubs to promote effective practices. Extension hosted field days and judging days that drew forest owners as well as FFA and 4-H youth.

Carl Holcomb became Extension forester in 1955 following O'Bryne's retirement, and Will McElfresh became assistant Extension forester three years later. Holcomb helped to organize the Lumber Manufacturers Association of Virginia. The first logging and sawmill show was held in Crozet in 1960; it evolved into the present-day Expo Richmond, America's largest forest products industry trade show.

Extension foresters started the Virginia Christmas Tree Growers Association in 1961. By the late 1960s, public interest in outdoor recreation spurred Extension foresters to help organize the Virginia Campground Operators Association. As environmental interest grew, Extension personnel also worked with towns and cities to establish recreation departments.

As wildlife programs developed in the 1960s and 1970s, requests for programs on stream and pond management for fisheries grew. In 1976 Louis Helfrich was hired to work with sport and commercial fisheries across the state.



Extension's popular annual bus tour series, which began in 1977, is the longest running program of its type in Virginia.

Extension faculty increasingly devoted research time to solving industry and consumer problems such as perfecting solar kilns and directing pallet research.

Specialists have continued working through local Extension agents to arrange tax assessment and forest finances short courses. They have also coordinated, in cooperation with many federal and state agency personnel, the popular resource management bus tours across Virginia.

XMNR's three-year legacy in China

Since 2012, the college's Executive Master of Natural Resources (XMNR) accelerated graduate degree program, based in the Center for Leadership in Global Sustainability, has sent a cohort of students on a 10-day international residency to Yunnan Province, China, to concentrate on sustainable development in the region.



Connecting with people on a personal level was key to the success of the program's international residency trips to China. Here, Claudia Thompson-Deahl of the 2014 cohort learns to sew from a local elder.

"For each cohort, we planned a distinctive international residency that allows students to work with global partners and apply lessons learned during the program to develop multi-scale strategies for global sustainability," said David Robertson, director of the XMNR program, located in the National Capital Region.

The cohorts tackled a variety of challenges facing China, including tourism and housing development, watershed management, and the creation of a sustainability network of government and community people. Each residency provided a layer of information for the succeeding cohort to build upon.

As reported in the fall 2012 issue of CNRE News, the program's inaugural cohort designed a sustainability strategy for the Linden Centre, a boutique hotel and historic landmark in the village of Xizhou.

The second cohort investigated the feasibility of using an agent-based participatory model for the Erhai Lake Basin to simulate impacts of various development decisions, with an emphasis on water quality and availability. Stakeholder perceptions, access to technology, language differences, and uncertain government support for citizen involvement required the

students to first develop long-range recommendations. "The project pushed our limits," said alumnus Jarrod Lichty. "We left China with a different perspective on the scientific, social, and cultural implications of natural resource management."

The third cohort split into teams to explore four strategies for sustainability: housing development, luxury tourism, heritage tourism, and networking best practices in China, including how to form partnerships and determine networking needs. Results ranged from identifying trends in sustainable housing to making recommendations on how to reduce environmental impacts and support the local cultural knowledge and traditions. "A group of visitors, no matter how well intentioned, cannot provide useful input without understanding the community as a whole and the motivating factors that drive the way a community forms and functions," said alumna Sally Parker.

Following its three-year run in China, the program's 2015 international residency ventured to Turkey to examine enterprise sustainability, including Coca-Cola's water-use strategies, and to Morocco to study development of an environmental services industrial cluster and a phosphate mining remediation project. The 2016 residency is planned for South Africa.



WEI 2015 product

The Wood Enterprise Institute (WEI), a student-run entrepreneurial venture, is taking orders for its 2015 product — custom wall-mount bottle openers. To order, visit vtwei.com, email vtwei1@gmail.com, or call 540-231-8841. Orders must be received by April 15, 2015. Last year's product sold out, so don't delay!

STAY IN TOUCH WITH VT NEWS

The Virginia Tech News Daily Email is your connection to Virginia Tech news and information. Delivered overnight, Monday through Friday, it includes the latest news, campus notices, and events, with extensive links for detailed coverage. To find more information about this service, see a sample email, or subscribe, visit www.vtnews.vt.edu/email/sign-up.html.

PINEMAP scientists work toward sustainably managing southern pine plantations

As previously reported in CNRE News, Virginia Tech is one of 11 southeastern land-grant universities conducting research, education, and outreach as part of the Pine Integrated Network: Education, Mitigation, and Adaptation Project (PINEMAP) funded by the U.S. Department of Agriculture. The following projects, now at their midway point, are being carried out by scientists in the Department of Forest Resources and Environmental Conservation to achieve PINEMAP's goal to manage southern forests for increased carbon sequestration, resilience, and sustainability in the face of climate change. A more detailed version of this article, with links to project reports, can be found at cnre.vt.edu/magazine.

New models enhance satellite images, coordinate databases to manage forests for climate change

Forests are the Earth's lungs — inhaling carbon dioxide and exhaling oxygen. Efficient forest management and healthy forests are more important than ever to counter climate change resulting from excess carbon dioxide. Virginia Tech scientists are improving the ability to use remote sensing to see important changes in forests and creating models to improve planning and management.



Master's student Brett Heim measures soil respiration to determine net ecosystem productivity.

Orbiting the Earth every 16 days, Landsat satellites provide photos that can be used to monitor forest health; however, there have been challenges. The most obvious is clouds, explained Professor Randolph Wynne. Another challenge is the difficulty of identifying minor changes, such as from thinning, said Evan Brooks, who earned his doctorate in forestry in 2013. Using images from a single Landsat scene from 2005 to 2011, treating each pixel independently, Brooks developed a model that compared satellite images to fill in for cloudy days and enhance detail.

"Evan used a chunk of time to develop the approach, but it is now applicable to the whole history of satellite images and into the future," said Assistant Professor Valerie Thomas. The most useful feature of the method is that it easily incorporates new images as they arrive. "In both applications — seeing past clouds and seeing changes in real-time — we are trying to get ready for an unknown set of climate effects," Wynne said.

Accurately predicting loblolly pine growth and yield under different future climate scenarios also requires models of pine stands that incorporate management practices, climate, geography, and biophysical variables as predictors. "In the past, we had assumed that the influences of climate would average out over 20 to 30 years," said University Distinguished Professor Harold Burkhart. "Now we are saying climate will not necessarily average out, and we wish to make predictions for alternate future climate scenarios."

Burkhart and Research Associate Charles Sabatia are examining several modeling approaches. Using daily climate data from 1980 to 2011, they are comparing approaches to modeling the effect of 24 biophysical variables, such as temperature and moisture.

The college has developed models of forest growth as a function of the kinds of seed stock and silviculture (management practices) used. Burkhart and his colleagues are putting the forest growth, climate, and soils databases together for the first time. "We have databases of climates, soils, and plots all over the region and can layer the data and interpolate values," said Burkhart.



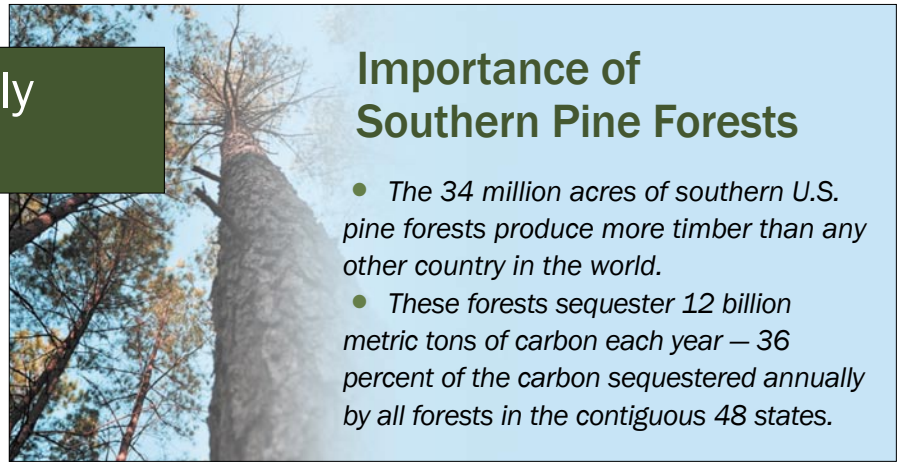
Virginia Tech wildlife science senior Bethany Gregory uses a tree cookie to show high school students which parts of tree trunks transport water from roots to leaves.

Photo by April Addington, Twin Springs High School, Nickelsville, Virginia

"Extracting a climate signal out of historical data in a useful way to project future productivity is extraordinarily difficult because genetic improvement and management practices, as well as environmental influences, are all simultaneously varying. The aim is to develop useful predictions for planning rather than just describe the data," said Burkhart. "We can now make some credible predictions, although with fairly wide error bands."

Importance of Southern Pine Forests

- The 34 million acres of southern U.S. pine forests produce more timber than any other country in the world.
- These forests sequester 12 billion metric tons of carbon each year — 36 percent of the carbon sequestered annually by all forests in the contiguous 48 states.



"We can anticipate what to expect in terms of product yield and carbon sequestration," said Wynne. "We also want to be able to advise property owners regarding management to make their stands less sensitive to climate, in particular water availability. Drought, rather than temperature, is what has the biggest impact on forests. Stressed forests are susceptible to disease and insect damage."

New technique improves measurement of forest carbon sequestration

Forests scientists want to quantify carbon sequestration — the removal of carbon dioxide from the air — and understand how this process changes due to factors like drought and forest management. To measure how much carbon loblolly pine plantations store in soil and trees, scientists model the carbon captured by plants during photosynthesis and produced by both plants and microbes during respiration.

A challenge has been separating the carbon dioxide removed from the soil by microbes compared with that removed by roots. Master's student Brett Heim, Assistant Professor Brian Strahm, and Alumni Distinguished Professor John Seiler have developed a procedure that makes this possible. A surprising finding was that the roots accounted for only about 20 percent of respiration — it had been assumed that microbes and roots were about equal. This changes the understanding of the carbon balance of these forests and how they might respond to climate and land use.

Enhanced fertilizers, tree genotypes keep forests healthy

In addition to carbon sequestration, PINEMAP goals are pine plantations that are more efficient at nutrient uptake and that adapt across a range of climate conditions. Doctoral student Jay Raymond, Professor Tom Fox, and Assistant Professor Brian Strahm tracked nitrogen uptake in trees to determine the best times for application and whether enhanced efficiency fertilizers reduce the carbon dioxide and ammonia emissions of traditional urea-based fertilizer. Urea enhanced with time-release chemistry performed the best of all the treatments in winter and summer.



Solar radiation is one of many environmental variables measured at the PINEMAP research site in Appomattox County, Virginia.

Forest scientists would also like to know why some trees adapt well across a range of climate conditions. "Determining how genetic variation shapes climatic adaptation will help guide pine breeding programs to mitigate the impact of climate change," said Assistant Professor Jason Holliday. He and researchers at Texas A&M and North Carolina State compared two methods for detecting genetic variation. One is more expensive but yields more information; the other is less expensive and lends itself to high throughput analysis of the large number of trees in breeding programs.

Undergraduates engage secondary school students on climate change and forest ecosystem issues

A final step in preparing for climate change is education. A novel undergraduate fellowship program provides students with research experiences that demonstrate the impact of climate change and the importance of forest resources. Then, like dropping a pebble in a pond, the new scientists share their knowledge with hundreds of secondary school students.

Undergraduates are selected from across the country, and each is mentored for 12 weeks by a graduate student at a PINEMAP-affiliated university. The undergrads then return to their home universities to fulfill the second phase of the project — outreach. The transition is made possible by a distance-education Effective Communication Skills course team-taught by Virginia Tech faculty members.

The course teaches undergraduates skills related to science communication and education while also engaging them in educating secondary school students about climate change and forest ecosystems, said John B. Kidd, PINEMAP undergraduate fellowship program coordinator at Virginia Tech. In the first two years of the program, 17 undergraduates delivered 161 presentations to 3,689 public school students from 39 different schools.

Research is a critical component of the college's mission of Advancing the Science of Sustainability. The short summaries below provide a glimpse into the wealth of research for environmental sustainability being conducted by our world-class faculty members. Visit vtnews.vt.edu/feeds/natural-resources.html to read the full stories behind these summaries as well as other press releases pertaining to the college.

Surviving eastern hemlocks have a story to tell

Will the majestic eastern hemlock be wiped out by an invasive cousin of the aphid? The hemlock woolly adelgid, a native of Asia, was first found on eastern hemlocks in Richmond, Virginia, in the early 1950s and has since killed 95 percent of trees in the East. In the absence of hemlocks, deciduous trees take over, changing the forest ecosystem.

A research team found some surprising results by using tree-ring records to reconstruct how eastern hemlock growth had been altered by the infestation and examining its influence at the cellular level. "The differences in response are not simply a result of differences in infestation levels," said Associate Professor Carolyn Copenheaver.

"Because cold winter temperatures are simultaneously harmful to hemlock woolly adelgid and beneficial to eastern hemlock trees, unusually cold winters may be doubly beneficial to hemlock survival," explained Research Associate David Walker. Added Copenheaver, "We anticipate that the results of this study will eventually be used to better predict how eastern hemlock will adapt and change its ecological role in the forest after infestation." The research by Copenheaver, Walker, and Professor Audrey Zink-Sharp appeared in the *Annals of Forest Service*.

The rings displayed in tiny tree cores can tell researchers how a tree is faring year to year.



Social interactions among bats could contribute to resilience

Doctoral students Alexander Silvis and Andrew Kniewski applied graphic and spatial approaches to findings from Ohio State field studies suggesting that the endangered Indiana bat may be able to use social connections to survive a certain amount of roost destruction. "Social dynamics are important to bat roosting behavior," said Silvis. "And now, looking at results of a study of roosting and foraging activity in a new light, we have evidence that Indiana bats make social contacts during foraging."



Determining roosting and foraging patterns of the endangered Indiana bat will aid habitat management.

By studying the movement of radio-tagged bats in 2009 and 2010, they observed that the female bats didn't always return to the same roost. "We were able to map a network of connections between the roosts," said Kniewski. A comparison of network maps from both years revealed that only the most central roosts were reused in 2010, suggesting that bat populations may re-establish social connections and foraging areas, even when some roosts are lost due to their transitory nature or deforestation.

"The study raises questions about the resiliency of Indiana bats to roost loss," explained Associate Professor Mark Ford, who advises both students. The team's research appears in the May 9 issue of *PLOS ONE*.

Incentives slowing deforestation in Amazon

An international team of scientists reviewed published research about policy interventions and commodity market effects, and determined that positive incentives for farmers, counties, and states can be as effective for the preservation of Brazilian Amazon forests as public policies that enforce penalties. Suggestions for incentives include simplified regulatory requirements, discounts on environmental licensing procedures, better preharvest packages from commodity suppliers, and better loans for legally compliant landholders.

Deforestation, however, isn't the only threat to the region. "There is an urgent need to shift the Amazon conservation paradigm to encompass the freshwater ecosystems, which are being rapidly degraded by deforestation and the construction of hydroelectric dams," said Assistant Professor Leandro Castello, a member of the team. "Freshwater ecosystems could be managed through policy and supply chains in a manner similar to that which is being done with deforestation." The team's results appeared in the June 6 issue of *Science*.



Even though the rate of deforestation has declined, the immense canopy of the Amazon rainforest remains threatened. Image courtesy of the Earth Innovation Institute



Toronto's failed Olympic bids served as a catalyst to improving the city's waterfront.

Failed Olympic bids moved Toronto toward becoming a model city

Toronto lost its bid to host the Olympics Games five times during the past half century, yet the bidding process produced legacies for the city as well as lessons for other cities, according to Assistant Professor Robert Oliver, an urban geography expert. He examined bid documents, decades of government meeting minutes, interview data, and more than a century's worth of newspaper coverage. His results have been published in the journals *Urban Geography* and *Sports in Society*, and the textbook "Human Geography: People, Place, and Culture."

In Toronto, various interest groups have used the Olympic bids as an occasion to redefine the vision for the city's waterfront. The bidding process has also provided a window on the city's politics and the importance of public participation, and reintroduced sport and the "right to play" to the city's planning agenda, according to Oliver.

He attributes several key legacies to the city's most recent bid effort, in 2002, including a waterfront revitalization corporation that was created with an ability to acquire and dispose of property, raise financing, control development, and implement an agreed-upon overall plan. "Thinking about the competition over urban space during an Olympic bid is a useful means to get at questions concerning residents' 'right to the city' and to explore alternative arrangements, visions, and claims," Oliver concluded.

Grant aids compostable plastic bag development

Our summer 2014 issue included a story on Professor Emeritus Wolfgang Glasser's work with the start-up firm cycleWood Solutions Inc. to produce plastic bags that degrade within six months when composted. The firm has since received a \$741,221 Phase II National Science Foundation grant, which will allow the company to accelerate the commercialization of its Xylobag products. A few retail chains have already made commitments to stock the bags.

"This is a dream come true," said Glasser. "It is a first commercial success after the American Chemical Society published an article on the early work at Virginia Tech 30 years ago predicting that the use of lignin is

coming of age." Lignin, a compound of plant cell walls that is discarded in the papermaking process, is a key component in the production of Xylobags.



Professor Emeritus Wolfgang Glasser displays a Xylobag product.



Hokie Nation Network, a portal for alumni interested in professional networking opportunities, leverages social media, job listings, and other career resources designed to help Hokies connect with fellow alumni. Visit alumni.vt.edu/hnn to start networking today!

Student meteorology club named outstanding chapter

The Blue Ridge Chapter of the American Meteorological Society/National Weather Association, also known as the Virginia Tech Meteorology Club, was named as the American Meteorological Society's Outstanding Chapter of the Year for 2013-14.

Founded in fall 2011, the club was originally organized to spread the word about the new meteorology degree, which was first offered in 2012. It currently focuses on community outreach and career building for its members. "Public awareness is crucial when dealing with significant weather events, so any role that we can play in increasing awareness and educating the general public is a positive thing," said Senior Instructor Dave Carroll, the chapter's advisor.

The chapter hosted EPIC Storm Week, a weeklong community event at the Blacksburg Library. Members have made presentations at the Virginia Science Festival and judged meteorological entries at the Blue Ridge Regional Science Fair. They also participate in daily weather forecasts for the campus radio station and the Collegiate Times.

"I am extremely proud of this group of dedicated students," said Bill Carstensen, head of the geography department, in which the meteorology program is based. "Our meteorology students are well-known for their outreach activities in the region and their passion for weather. A new program could not ask for better ambassadors."

Guest speakers at chapter meetings have included National Weather Service forecasters, Virginia Emergency Management Office staffers, local television meteorologists, and a producer from The Weather Channel. "We also focus on networking within the meteorological community by attending national weather conferences around the country," said master's student Ashley Athey, the club's graduate student representative.

The Meteorology Club sets up a booth at Virginia Tech's annual Gobblerfest to educate visitors and attract new members.



Meade selected for Phi Beta Kappa

Taylor Meade of Wise, Virginia, a senior geography major, was selected for membership in Phi Beta Kappa, the nation's oldest and most widely known academic honor society. He joins a select and prestigious group — only about 10 percent of U.S. colleges have Phi Beta Kappa chapters, and only about 10 percent of students at those institutions are offered membership.

Meade credits his academic success to the figures in his life who encouraged the values of self-motivation, honesty, and steadfast quest of knowledge, including his uncle, Sterling Gilliam, a language teacher and world traveler; Bob Oliver, Virginia Tech professor of urban geography; and Simon Reeve, British author and traveling host for the BBC.



Taylor Meade visited Monaco on a 2012 study abroad trip to the French Riviera.

"I was honored when I found out about my selection into Phi Beta Kappa. Influential Americans like Theodore Roosevelt, George H.W. Bush, and Francis Coppola are members, and I hope to have a positive impact on people around me like these men," said Meade. "After graduation, I hope to continue my pursuit of knowledge of the world around me by traveling, studying geography at the master's level, and working in the shipping, intelligence, or humanitarian fields."

Packaging interns tour distribution facilities



Internships at the Center for Packaging and Unit Load Design offer students many opportunities for out-of-classroom learning. In June, the center's interns and staff visited two nearby design/warehouse/distribution facilities — Elizabeth Arden and Packaging Corporation of America — where they heard presentations about the importance of packaging to individual businesses and the economy at large, and learned about plant safety, material flow optimization, and the management systems and technology necessary to operate a global distribution center. These two firms actively recruit Virginia Tech students for in-house internships as well as full-time employment. The visit allowed the students to see how their on-campus internship experience and the testing methods they are learning at the center relate to their future careers in the field.

Cadets highlight colors at football games

In a continuing partnership between the Virginia Tech football team and the Corps of Cadets, players and cadets are selected to highlight the colors — the American flag, the state flag, and the team's spirit flag — during the pre-game ceremonies at each game. Three freshmen cadets are selected for home games, while one or two upper-class cadets travel with the team to away games. Based on their outstanding performance, two students in the college traveled with the team this fall. **Cadet 1st Lt. Wendy Zehner of Sykesville, Maryland**, a senior meteorology major, accompanied the team to Duke, while **Cadet 1st Sgt. Garrett Treaster of Carlisle, Pennsylvania**, a junior packaging systems and design major, went to Wake Forest.



Wendy Zehner



Garrett Treaster

Other students in the college awarded this honor in recent years include the following:

- 2013: **Cadet 1st Sgt. John Rogalo of Stanhope, New Jersey**, a junior environmental resources management major
- 2012: **Cadet Chase Campbell of Fairfax, Virginia**, a freshman geography major
- 2011: **Cadet Cody Wendelin of Martell, Nebraska**, a sophomore natural resources conservation major
- 2011: **Cadet Mark Foster of Goochland, Virginia**, a freshman wildlife science major
- 2010: **Cadet 1st Sgt. Jarrod Wilson of Huntingtown, Maryland**, a junior geography major

First Cultures Fair a great success!

The college held its first Cultures Fair in November to highlight the range of diversity in our college family — current faculty, staff, and students represent 25 different countries! Initiated and guided by Dean Stauffer, associate dean for academic programs, and carried out by a committee of select undergraduate students — Rachel Atkins, Kaylyn Duda, Eleonore Dupal, Eleanor Helton, Taylor Meade, French Price, and Brenden Sweeney — the eye-opening event drew in crowds with displays, food, and music.

The committee invited international students and faculty from across the college to participate in the open house event; representatives from eight countries responded. Each group custom-designed a display featuring photos, maps, and items from their home countries. Some brought food to share, and music from around the world added to

the festive atmosphere. A representative from the Global Education Office was also on hand to answer questions about study abroad and international exchanges.

"I loved talking to the participants and hearing about their experiences from the countries they were representing," said Atkins. "They had great pictures that helped convey their experiences, as well as information that explained the use of natural resources within their communities."

The committee also set up a world map in the Cheatham Hall lobby and invited students, faculty, and visitors to insert a pin indicating their hometown. "The map started out as a small idea but turned into a huge focal point that can be displayed and added to in the years to come," said Helton.

The event closed with a keynote presentation by Professor Tom Hammett titled "The Role of Cultural Understanding in International Resource Management," helping to highlight some of the themes represented during the fair.



Master's students (left to right) Abdullah Kaplan, Sevtap Erdogan, Atanu Satir, and Enis Kucuk shared baklava, kisir, Turkish delight candies, and Turkish coffee with visitors to the Cultures Fair.

Alumni Profile

Kathryn Prociv

At The Weather Channel's Atlanta headquarters, **Kathryn Prociv** ('11 B.A. and '12 M.S. geography) is known for her calm demeanor as a weather producer on the set of the channel's flagship program, "AMHQ With Sam Champion." By the time the show airs live at 7 a.m. each weekday, Prociv has been up for nearly six hours preparing and assembling graphics to tell the story of the day's weather.

"I'm right behind the wall in back of the host with my headset on, talking with producers, the on-air meteorologists, and the crew," Prociv said. "I've got all these people in my head, and it's my job to keep the weather stories on track. It can be crazy behind the scenes, but viewers don't see it."

Prociv secured her position after just four months of freelancing for the channel. Her colleagues often call her the morning cheerleader, complimenting her on her unflappable nature and passion for weather, even in the wee hours of the morning. She chalks it up to her five Virginia Tech storm-chasing trips, several of them as a field leader.

Prociv was teaching at a junior college and doing some weather blogging when an ad from The Weather Channel caught her eye. She had considered pursuing her doctorate but sent off her resume nonetheless. "I wasn't qualified at all," she said. "The only bullet point on the job description I had was that I knew about weather. But I figured, it's The Weather Channel, why not?"

Prociv's passion for weather — exemplified by her storm-chasing trips and her ground-breaking thesis work on Appalachian tornadoes — shone through enough in her application and interview that a recruiter passed her resume down the line. When the channel offered her the



freelance job, she jumped at the chance. She packed her belongings, moved to Atlanta, and quickly proved herself by producing for Stephanie Abrams' early-morning show "On the Radar."

Prociv attributes her research skills honed at Virginia Tech as the extra edge that got her the permanent position. "I'm a storyteller," she said. "Each day I try to make the weather into a story. Say it's warm and sunny. How do I make people want to hear more? I do research. I find out we're experiencing near record-breaking temperatures. I talk about that, how far we are from what's normal for the time of year."

While it's fun to talk about record-breaking weather, Prociv hopes to never again experience a winter like Atlanta's 2014 "snow jam." As one of the few staffers who could get to the station, she worked back-to-back 18-hour days and gave co-workers keys to her nearby apartment, dubbed "Hotel Kathryn." The station was utter chaos, with workers' pets and children milling around and the cafeteria rationing food. "It was exciting, but the level of exhaustion I felt by the end of the week was crushing," she said. "And I wasn't even caught in traffic for 24 hours, like some people."

But ask her about storm chasing and she smiles. "I miss it," Prociv said. "I experience a 'minor depression' when tornado season rolls around and I'm not chasing a storm." Not to be out of the hunt for long, she plans on taking vacation time to go storm chasing this spring.

Alumni Events Calendar

MARCH 22-26, 2015

American Chemical Society Spring National Meeting and Expo: Chemistry of Natural Resources
Denver, Colorado
acs.org

APRIL 19-21, 2015

71st Annual Northeast Fish and Wildlife Conference
Newport, Rhode Island
neafwa.org

APRIL 21-25, 2015

Association of American Geographers Annual Meeting
Chicago, Illinois
aag.org

MAY 15-17, 2015

Virginia Tech Commencement Ceremonies:
Friday, May 15 – University Commencement
Friday, May 15 – Graduate School Commencement
Sunday, May 17 – National Capital Region Commencement
vt.edu/commencement

JUNE 10-12, 2015

Forest Products Society 69th International Convention
Atlanta, Georgia
forestprod.org/ic

AUGUST 16-20, 2015

American Fisheries Society 145th Annual Meeting
Portland, Oregon
2015.fisheries.com

Alumni news online

We love hearing about the great things going on with our alumni. To share all of the news, we have expanded our online postings. Scan the QR code below or visit cnre.vt.edu/tags/alumni.html.

Recent posts

Craig Bonds ('00 M.S.)
Mike Chaveas ('98 B.S.)
Vic Ford ('82 Ph.D.)
Steve Moyer ('84 M.S.)
In memoriam:
Linda Dawn Joyner ('76 B.S., '81 M.S.)
Greg Killinger ('94 M.S.)



IN MEMORIAM: James Edward (Jim) Mooney II



Photo courtesy of Timber Harvesting magazine

Alumnus **James E. (Jim) Mooney II**, 55, founder, past president, and executive director of the Virginia Loggers Association, died Oct. 27 at his home in Lake Monticello, Virginia. He was a passionate logging industry activist, a former logger, and a community volunteer.

Many remember him as the "Mooney's Corner" columnist for Timber Harvesting magazine from 2001 to 2008. He loved to evoke subscriber feedback, handling both praise and criticism with the grace of a Virginia gentleman.

Described by Timber Harvesting Executive Editor David "DK" Knight as a giver, Mooney was a lifetime member of

the local volunteer fire and rescue squad, became an EMT, organized a swift water rescue team, and always traveled with first-aid equipment.

A native of Charlottesville, Mooney earned a degree in forestry from Virginia Tech in 1982. The next year he co-founded Piedmont Thinning and Harvesting Inc., operating the company for several decades. Mooney was active in the Virginia Forestry Association, serving on the logger committee and recruiting other logging contractors to the organization. He was instrumental in getting the forestry association to form a logging council, the genesis of the Virginia Loggers Association (VLA), of which he became the first president. Mooney later served as VLA's first executive director, receiving only partial compensation during the early years. He remained at the VLA helm until his death.

In 1994, Mooney was among the group that hammered out the framework of a new national group, the American Loggers Council. He helped write bylaws, sat on its first board of directors, and served as the council's fifth president. He was also one of three loggers who

represented the national logging community on the Sustainable Forestry Initiative Logger's Forum. At the time of his death, he was serving as chairman of the council's communications committee and on its membership committee.

To help ensure the continuance of the industry he loved so much, Mooney took steps to establish a scholarship at his alma mater. To donate to the Jim Mooney Memorial Scholarship Fund in the College of Natural Resources and Environment, contact Emily Hutchins at ehutch@vt.edu or 540-231-8859.

Read DK Knight's touching tribute to his friend and colleague at www.timberharvesting.com/remembers-james-edward-jim-mooney-ii.

Roberts moves on

After more than a decade in the college's Department of Fish and Wildlife Conservation, **Jamie Roberts** ('03 M.S. and '12 Ph.D. fisheries and wildlife science) has moved on to a position as assistant professor of fisheries at Georgia Southern University.

"Jamie's contributions over the past 10 years have been invaluable," said Restoration Biologist Jess Jones. "From teaching to research to his work with our graduate and undergraduate students, he has pushed forward the college's mission." He also engaged in frequent outreach, especially with children from schools and 4-H.

"Overall, Jamie is perhaps the most capable, well-rounded scholar I've advised in my 26 years here," said Professor Paul Angermeier, Roberts' advisor.

Over the course of his extensive study of Roanoke logperch, Roberts significantly expanded the science of

the species, detailing life history, population structure, and basic biological information. He is now considered the world's foremost expert on the endangered fish.

"His research results inform management efforts by the Virginia Department of Game and Inland Fisheries and the U.S. Fish and Wildlife Service to conserve imperiled species," said Professor Eric Hallerman, Roberts' co-advisor.

Roberts' education efforts were equally impactful. He taught both undergraduate- and graduate-level courses while helping graduate students give shape to their ideas and get their research off the ground. "By the end of his time here, he was teaching his mentors," added Hallerman. "That is the mark of an exceptional mentee."

"Jamie's presence in the college will be missed," emphasized Jones. "We hope Virginia Tech has been a great launching point for the exciting career ahead of him."



Research field experience takes students to new heights



A new course offered by the geography department took six students to the Cascade Mountains of Washington state last summer and is slated for more trips to rugged mountain locations in the future. Spearheaded by Associate Professor Lynn Resler and Senior Instructor Dave Carroll, the course engages students in an intensive study of the landscape and weather of mountain environments. "The course offers an incredible experience," said Resler. "It strengthens students' knowledge of physical geography, outdoor ethics, and wilderness skills."

"It was awesome witnessing processes I had learned about in my meteorology classes," remarked meteorology major Sean Ridge. "Seeing it in real life was the most engaging demonstration possible."

Prior to their trip, the students attended a spring semester course designed to familiarize them with the North Cascades environment and train them for the physical components of the trip, such as cold-weather backpacking, basic rope work, and climbing skills. "In addition to the geography-related curriculum, students learn a tremendous amount about personal limits, self-reliance, and outdoor leadership," explained Carroll. "They trained for the trip for months in advance in order to be physically fit and hone their outdoor skills."

The team partnered with the American Alpine Institute to conduct alpine environment studies and train in safe alpine wilderness travel. "We learned so much more than the anatomy of a glacier and how to save your rope team from tumbling into a crevasse," said Bonnie Long, who earned her bachelor's in geography in May 2014 but returned for the summer excursion.

"Learning basic mountaineering skills and transforming from classmates to people you'd trust to pull you out of a 100-foot crevasse made the course more fulfilling than I expected," Ridge added.

The students learned how complex mountain topography influences the dynamics of physical systems as well as the forces and events that formed the Cascade Mountains. "Each student chose a specific topic to make observations about," explained Long. "We measured various environmental factors along the way. I had a temperature probe clipped to my backpack, and we used other meteorological measuring devices to track wind speed, pressure, and altitude."

The students used both traditional and modern navigation tools to traverse the backcountry, employing maps and compasses as well as handheld GPS devices. They



Emergency rescue techniques were included as part of the group's training in alpine travel. Here, the team tests the strength of a snow anchor that held the weight of the entire group.

also utilized high-definition, helmet-mounted video cameras to record location, elevation, air pressure, and temperature in addition to the breathtaking mountain views.

"It was like we had stepped into a completely different world," recalled Long. "At one point I actually crawled up to the edge of a crevasse on my stomach and hung over the edge for a better look. I couldn't even see the bottom!"

The Cascades adventure culminated in an expedition up the 10,781-foot Mount Baker, the second-most glaciated volcano and thermally active crater in the Cascades range.

"You have to really want to summit," said Ridge. "We actually turned around once due to weather, but then tried again an hour later after part of our group decided they still wanted to try."

The Cascades trip will certainly not be the last of the geography department's alpine excursions. "The structure for the mountain environment field course continues to evolve, and the plan is to follow up the Cascades course with a trip to the Andes of South America, where students will study and experience the alpine environment at elevations of 20,000 feet or more," said Carroll.

"The Andes is a region that will be heavily impacted by climate change," explained Ridge. "The towns there are highly dependent upon glacial meltwater, and with the glaciers retreating rapidly, their water source is in danger. Witnessing this issue firsthand would help humanize the impacts of climate change."

"This trip was definitely worth it," Long concluded. "Field courses allow you to fully submerge yourself into the material, no distractions, and it's fun!"



Students Sidney Burleson (left) and Bonnie Long (center), and Nate Furman of the American Alpine Institute negotiate a crevasse on the Coleman Glacier.

The group takes a rest after a lecture on safe alpine travel, alpine tree limits, and the glacial history of the Coleman Glacier. Left to right, bottom row: Matt Smith, Sean Knight, Sidney Burleson, and Associate Professor Lynn Resler. Top row: Bonnie Long, Cody Bracket, and Grace Grunstra.



Above: The first team ascends a steep part of route toward the summit of Mount Baker. Teams traveled in groups of four to five led by an American Alpine Institute guide.

2015 Drillfield Series

Join us in Blacksburg for a series of weekend programs designed for Virginia Tech alumni, family, and friends.

Specially reduced lodging is available in The Inn at Virginia Tech.

Learn more at www.alumni.vt.edu.

Food For Thought
February 20-21, 2015

What Fuels Our Planet?
March 20-21, 2015

The Rich Heritage of Southwest Virginia
June 5-6, 2015

Alumni and Legacy Weekend
July 10-11, 2015

College of Natural Resources
and Environment
Virginia Tech
Cheatam Hall, Rm 324 (MC 0324)
310 West Campus Drive
Blacksburg, Virginia 24061

NON-PROFIT ORG
U.S. POSTAGE PAID
LYNCHBURG, VA
PERMIT # 714