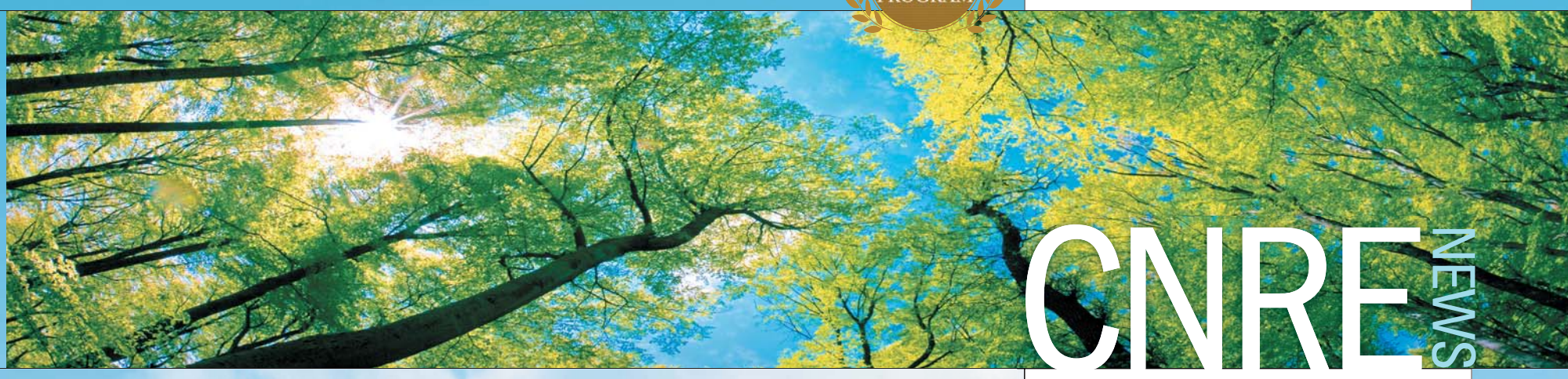
SUMMER 2017
COLLEGE OF NATURAL RESOURCES AND ENVIRONMENT

No.1 RANKED PROGRAM

VirginiaTech



CNRE NEWS

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ADVANCING THE SCIENCE OF SUSTAINABILITY

ISLANDS IN THE SKY

Ancient red spruce forests are prime habitat for rare flying squirrels

When the last ice age ended 12,000 years ago, the boreal forests that had extended into the Southeastern U.S. followed the cooler climate north into Canada or migrated to higher elevations. Today, vestiges of natural communities of a time long past, such as the stately red spruce and the tiny northern flying squirrel, cling to high peaks in the southern and central Appalachians.

This radio-collared female Carolina northern flying squirrel was captured in a stand on Whitetop Mountain in Southwest Virginia. Photo by Corrine Diggins

Early in the 20th century, logging and fires drastically reduced what little spruce remained, shifting the forest to a northern hardwood community. Some red spruce stands endure, however, in protected or particularly rugged areas. The rare Virginia subspecies and the endangered Carolina subspecies of the northern flying squirrel still occur in these isolated spruce patches, their only habitat south of the Adirondack Mountains.

The two flying squirrel subspecies eat truffles — the fruiting bodies of fungi that occur in symbiosis with the roots of spruce. The fungi help the spruce take up nutrients; the trees provide carbohydrates to the fungi. The fungi depend on the squirrels to disperse spores, signaling when they are ripe with peculiar odors that attract the squirrels. It is only in the last decade that the squirrels' dependence on spruce forests and associated fungi has been fully documented.

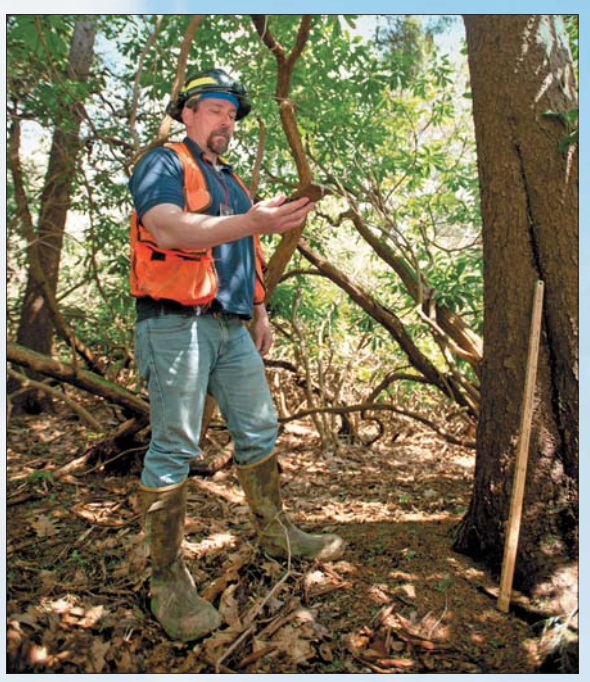
Mark Ford, who has been studying squirrels for 20 years, calls the spruce-squirrel habitats "islands in the sky." Now the leader of the U.S. Geological Survey's Virginia Cooperative Fish and Wildlife Research Unit at Virginia Tech, Ford's work with agency and university partners contributed to the removal of the Virginia subspecies from the endangered species list in 2013. Corrine Diggins, a former Virginia Tech fish and wildlife conservation doctoral student and now post-doctoral research associate, continues to monitor the Virginia squirrel's status, and she and Ford started similar research with the Carolina squirrel in 2012.

Surveying squirrels is hardly a walk in the woods. It is a trek, mostly off trail, hauling cumbersome equipment. "You go out during the day, when the squirrels are snug in their dens," Diggins said. "You carry a gigantic ladder because the artificial nest boxes to survey the squirrels are 15 to 20 feet off the ground. You find a nest box, then very quietly, lean the ladder against the tree and sneak up."

The surveyor plugs the box's exit hole and taps it to see if it is occupied. If so, a net is placed over the hole and the box is shaken until the squirrel shoots out. The researchers weigh, measure, tag, and radio-collar the squirrel, then return it to the nest box and plug the hole until the animal calms down. "You don't want a nocturnal animal taking off into the forest during the day just to get eaten," Diggins explained.

Corrine Diggins (on ladder) checks a nest box on Roan Mountain in North Carolina. Photo by Sue Cameron, U.S. Fish and Wildlife Service

Finding squirrels in nest boxes is hit or miss, so data collection requires repeated trips. After locating a squirrel's den, the researchers return at night. "We set up simultaneous listening stations to estimate their foraging locations based on where the radio directions converge," she said. "Some of the forests are so dense that we would never be able to follow them by foot."

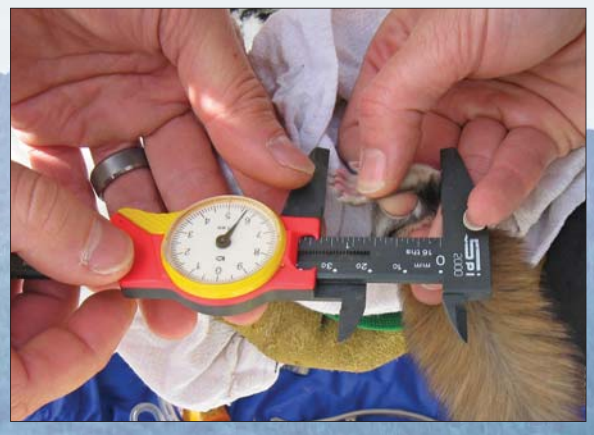


Mark Ford takes a canopy cover reading in a red spruce forest. Photo by Shelby Lum

Ford's work with flying squirrels began when he was a wildlife biologist for the Westvaco Corporation (now WestRock) in the 1990s. He found what he thought was a common southern flying squirrel in a nest box but soon realized it was a then-endangered Virginia northern flying squirrel. "It was a great day until I had to tell my boss that I had found an endangered species on company land," he recalled. "Fortunately, the company realized that the discovery allowed us to show what careful forest stewardship can do for wildlife."

Upon joining Virginia Tech in 2010, Ford began building on earlier work, analyzing two decades of capture data and habitat information. The results were two models that predicted where the Virginia subspecies occurred in the Allegheny Mountains in West Virginia and how different sites were spatially related. "The work led to additional surveys of likely habitat, revealing the presence of the squirrels across a million-acre landscape," he said. In addition, he helped devise approaches to improve the quality of red spruce habitat using active forest management, such as selectively thinning competing hardwoods to release red spruce.

(Continued on page 3)



The northern flying squirrel has a distinctively large hind foot. Photo provided by the North Carolina Wildlife Resources Commission

FROM THE DEAN'S PERSPECTIVE

In July we welcomed Tom Crawford as chair of the Department of Geography (see p. 3). Tom comes to us from St. Louis University, where he held the Banpu Chair of Sustainability. His research interests, which combine human geography and geospatial science in the study of land-use changes, make him an especially good fit, and his extensive leadership in program development come at an important time as we continue to seek growth in enrollment and standing of our already well-regarded programs. Most importantly, Tom gets the essence of academic leadership, and I look forward to working with him to continue to advance the department and the college.

For the third consecutive year, the college was ranked No. 1 by USA Today College Edition among more than 50 natural resource and conservation programs in the U.S. Our forestry program was ranked No. 1 by the same study. The college's packaging systems and design degree in the Department of Sustainable Biomaterials has been one of the fastest-growing new majors on campus and was recently ranked seventh out of the top 20 packaging programs in the country by Value Colleges. Graduates find many good-paying opportunities in the global packaging sector, the third largest on the planet. The packaging sector uses a lot of wood and wood fiber, so this program synergizes with the comprehensive profile of our portfolio. Our faculty, staff, and students are truly outstanding, and these rankings are because of their commitment.

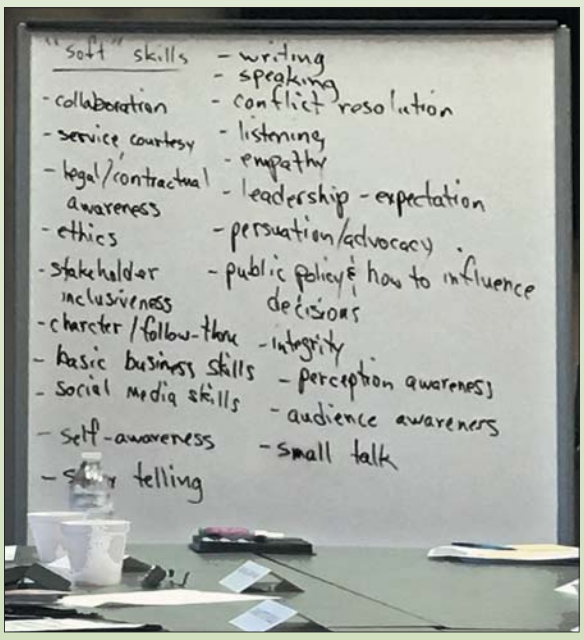
We enter the fall semester with about 900 undergraduates enrolled in the college and welcomed more than 200 entering freshman and transfer students this summer. Enrollment is more uniformly distributed across our four departments than ever before. Orientation is a bright spot during the summer months, and we are as excited as our students about their arrival at Virginia Tech and the college. We plan to crest 1,000 undergraduate students by spring 2018 on our way to our college goal of 1,250, in step with Virginia Tech's enrollment growth goals.

We have added additional advisors to our college Advising Center to better support our growing enrollment and to serve our students and faculty. All freshmen, sophomores, and transfer students are advised in the Advising Center. An advisor will be assigned to each academic department, forming a synergistic partnership between the Advising Center, the department faculty, and our students. College growth, both in student enrollment as well as faculty and staff, will require scaling our entire enterprise to ensure that we maintain the collegial, supportive, and welcoming atmosphere that is our hallmark.

As you read and think about how the college is growing, please know that we are very much tuned into the environment in which we work and how we serve our students and each other. Strategic growth is a key component of the college's future in the complex world of higher education. We are keen on maintaining and expanding our natural resources and environment programs in the growing mix of programs and initiatives at Virginia Tech. We are keeping our roots but adding new branches and flowers!

The 2017 Virginia Forestry Summit, held in Roanoke in May, offered an ideal venue for networking with partners from across the state. (Left to right) Joby Timm, supervisor of the George Washington and Jefferson National Forest; Stephanie Grubb, forester with International Paper's Franklin Mill; Bettina Ring, Virginia State Forester and college alumna; and Dean Paul Winistorfer presented at a session titled What's New with Virginia Stakeholders? A number of college faculty gave presentations and participated in summit activities. Photo courtesy of Virginia Forestry Association

I was on a panel discussion last fall and asked other panel members "What can we do at the university to better prepare students for careers in the public and private sector?" The responses were exactly as I anticipated: "Your students need better communication skills and better speaking and writing skills." Our Forest Resources and Environmental Conservation Advisory Board broached this topic at its spring meeting. Many members told me it was the most engaging and valuable board meeting ever! The members spent considerable time on this topic, and I snapped a photo of the white board for the record.



At the spring Forest Resources and Environmental Conservation Advisory Board meeting, members developed a list of terms that capture a wide range of skills and competencies desirable in graduates entering their professional careers.

Under the heading "soft skills," the board developed a list of terms that capture a wide range of skills and competencies. Every book I read, whether on leadership, strategy, or emotional intelligence, includes many of these topics — the same discussed by the board for successful employees, successful leadership, and successful organizations. These are important life skills, and we incorporate many throughout our courses and curricula. However, I believe we need a renewed strategy and effort to address the perception and reality of our students' writing and speaking skills, and other competencies mentioned by the board. What if our students were not only recognized nationally for their subject matter competency but also as exceptional communicators — writing and speaking as seasoned professionals? What will we do in the college to address this in a meaningful way? Stay tuned to the conversation; I welcome your input.

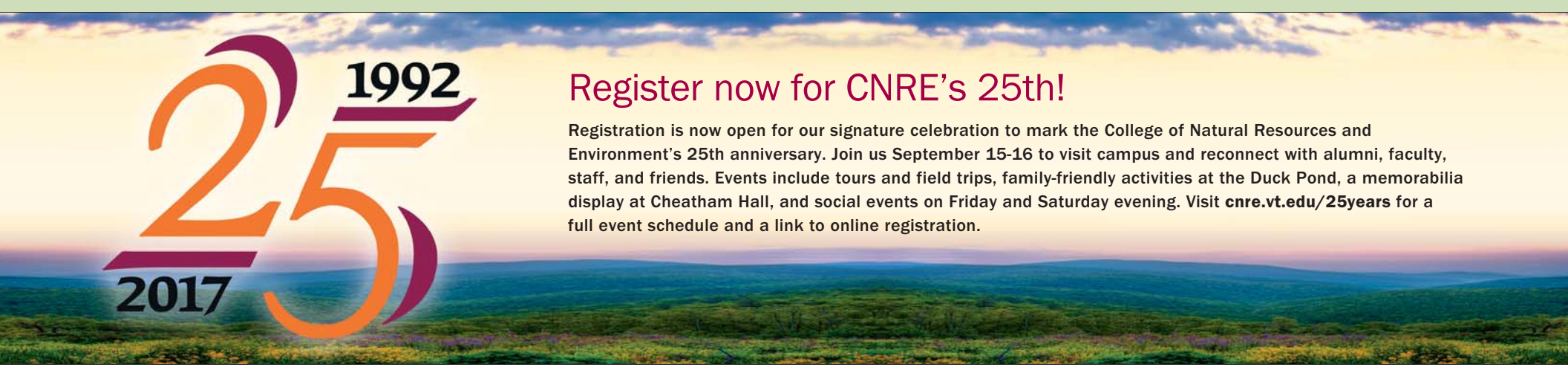
Creating space for meaningful and inclusive conversation seems a lost art in today's busy world but is something we all need to work on. To this end, the college will hold several networking events over the coming year — getting out of Blacksburg to engage with you. We have many emerging opportunities in front of us, and how we position programs, develop courses, and hire faculty and staff must be accompanied by meaningful and inclusive conversation. That is my goal for the coming year — to engage in conversation within the college and with our stakeholders and alumni about our continually evolving future. I hope you will join me.

I hope to see you at the college's 25th anniversary celebration September 15-16. Don't miss this very special celebration of our heritage, our accomplishments, and our relationships. We are proud caretakers of this wonderful institution — the College of Natural Resources and Environment at Virginia Tech. Our work and value to society is more important than ever before.

Thank you for your continued interest and support.

Warm regards from our faculty, staff, and students,

Paul M. Winistorfer
Dean
pstorfer@vt.edu



Register now for CNRE's 25th!

Registration is now open for our signature celebration to mark the College of Natural Resources and Environment's 25th anniversary. Join us September 15-16 to visit campus and reconnect with alumni, faculty, staff, and friends. Events include tours and field trips, family-friendly activities at the Duck Pond, a memorabilia display at Cheatham Hall, and social events on Friday and Saturday evening. Visit **cnre.vt.edu/25years** for a full event schedule and a link to online registration.

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U.S. Fish and Wildlife Service partners with college to target students for future conservation careers

The need to prepare today's students to take on new challenges in conservation was the driver behind a memorandum of understanding (MOU) signed between the U.S. Fish and Wildlife Service and the college in June. Both organizations recognize that providing students with an understanding of conservation principles, coordinating educational opportunities, and facilitating hands-on experiences will not only benefit the environment, but also enhance student career development.

"The MOU will assist us in recruiting a student body representative of the American population and allow us to assist the Fish and Wildlife Service in developing a diverse workforce capable of addressing the conservation challenges of the 21st century," said Dean Paul Winistorfer. The two groups will collaborate on special projects; provide students with career advice and conservation-related work experience; and locate, develop, and engage with university groups and conservation organizations, including those that reach minority groups.

"This MOU is a tremendous step forward in our efforts to reach out and build relationships with the conservation biologists of the future," said Steve Guertin, deputy director of the U.S. Fish and Wildlife Service. "Together we can work to cut across demographic divides and find and cultivate the Rachel Carsons and Aldo Leopolds of tomorrow, opening them up to the possibilities that exist at the Fish and Wildlife Service."

Relationship building with individual students is a key component of the MOU to inform them of the volunteer, internship, and work opportunities at the service and the help these avenues may provide for future employment. The MOU is also part of a broader effort at the service to engage with diverse audiences to ensure the future relevance of its mission in this changing landscape, as well as an extension of the commitment Virginia Tech has to contribute to fish and wildlife conservation at all levels through integrated programs in research, teaching, and engagement.

Steve Guertin (seated left), deputy director of the U.S. Fish and Wildlife Service, and Dean Paul Winistorfer (seated right) recently signed a memorandum of understanding that will offer students hands-on experiences and enhance career development. Standing (left to right) are Jerome Ford, the service's assistant director of migratory birds; Charisa Morris, the service's chief of staff and a college alumna; and Joel Snodgrass, head of the college's Department of Fish and Wildlife Conservation.

Crawford named chair of the Department of Geography

Tom Crawford, formerly the Banpu Endowed Chair of Sustainability at Saint Louis University, was welcomed as chair of the Department of Geography in July. Crawford follows Professor Bill Carstensen, who served as department chair until 2016, and associate professors Korine Kolivras and Lynn Resler, who jointly chaired the department's executive leadership committee during the transition.

Crawford earned his bachelor's in mathematical economics but says he was inspired to study geography by a post-graduation cross-country bicycle trip. "During that trip, I was exposed to so many different environments and groups of people, and I realized that studying geography could go beyond maps and would allow me to better understand how people interact with their environment," he recalled. He went on to earn his master's and doctorate in geography from the University of North Carolina, Chapel Hill.

Crawford has served as a faculty member at Gettysburg College and East Carolina University. His recent position at Saint Louis University allowed him to engage in sustainability-related teaching and establish a master's of science degree in geographic information systems.

He is looking forward to continuing his research in sustainability and human-environment interactions at Virginia Tech. "My research interests center around the geospatial analysis of human-environment interactions and sustainability issues, including coastal development, land-use changes, natural hazards, and public health," he noted.

Crawford said his new role as department chair should prove to be both exciting and challenging. "In addition to the university's great qualities, I am at a career stage where taking on an administrative leadership role will give me new opportunities to exercise existing skills and develop new ones." He hopes to help the department reach goals already in place by providing leadership and coordination, as well as develop new goals to attract the best faculty and students.

CNRE Career Fair

Recruit future employees from the No. 1 ranked natural resources school in the USA! Attend the CNRE Career Fair on Oct. 4 from 10 a.m. to 4 p.m. Email **cnrecareerfair@vt.edu** or call 540-231-5482 for more information or to reserve a space.

Rare flying squirrels *(Continued from front cover)*

In North Carolina, the Southern Appalachian Spruce Restoration Initiative — a partnership between The Nature Conservancy, the U.S. Forest Service, the North Carolina Wildlife Resources Commission, and other parties — has begun the task of helping to restore 150,000 acres of red spruce forest. "Unlike the Virginia subspecies, which occurs over a relatively large, connected landscape, the Carolina northern flying squirrel remains critically endangered, being scattered among the high mountain ranges miles apart and surrounded by a sea of inhospitable hardwoods," Ford said.

The Virginia and Carolina subspecies of northern flying squirrel eat truffles, the fruiting bodies of fungi that live on the roots of the red spruce. The fungi depend on the squirrels to disperse spores. ***Photo by Corrine Diggins***

Ford's experience with the Virginia subspecies drew the interest of Christine Kelly, lead for the Carolina northern flying squirrel project with the North Carolina Wildlife Resources Commission. "We had low captures and recaptures in North Carolina, and we needed insight on analyzing the data," she said. Ford and Kelly began to collaborate to create a predictive habitat model.

Advances in GIS technology allowed the team to look at the Carolina subspecies relative to terrain shape as well as elevation and forest community. "We discovered that the best places for the squirrels are sheltered ravines on north-facing aspects," Ford said. "These spots have high moisture and deep organic soil layers where red spruce and their symbiotic fungi grow best." The research team created a predictive model for the area that helps managers assess the landscape and prioritize areas for spruce restoration.

Acoustic surveys offer another method for surveying squirrels. Michelle Gilley, an assistant professor at Mars Hill University working with Ford and Kelly, discovered that flying squirrels vocalize above the level of human hearing, meaning they could be "heard" by commercially available bat acoustic detectors.

"Nest boxes haven't allowed for density estimates because capture rates are low and the process is time-consuming," Diggins explained. "Acoustics allows us to differentiate between rare northern and common southern flying squirrels without having them in hand, as their vocalizations differ in duration and modulation." But the research is still preliminary. "We are exploring how useful the method will be. Bioacoustics works with bats because navigation requires them to constantly vocalize, but squirrels are usually quiet. We have to iron out the nuances."

Why save a tiny flying rodent and its evergreen home? "Red spruce and northern flying squirrels cannot move further up the mountains to escape climate change," Ford said. "So we monitor the subspecies to see where both passive and active forest management can work to perpetuate this community while we develop strategies to cope with changing conditions. It tells us about the health of the forest and the whole Appalachian ecosystem. It only takes one visit to a red spruce forest to know these are special places worthy of managing for future generations."

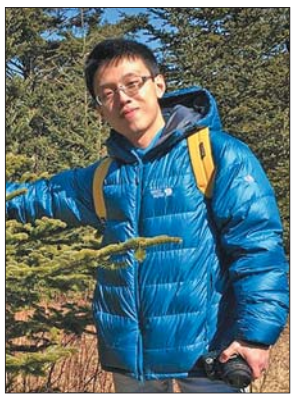
Red spruce seedlings fill a treefall gap on Unaka Mountain, Mitchell County, North Carolina. ***Photo by Christine Kelly***

Virginia Tech hosts Southern Silvicultural Research Conference

The Department of Forest Resources and Environmental Conservation hosted the 19th Biennial Southern Silvicultural Research Conference in March, bringing together 180 scientists and professionals. The three-day conference, which is a joint effort between participating universities and the U.S. Forest Service, included concurrent panel sessions, an adjudicated student presentation session, and field tours. Professors John Seiler and Michael Aust served as co-chairs of the local arrangements committee, organizing housing, food, and other details for conference attendees.

Two Virginia Tech students accepted awards for presentations in the Student Oral and Poster Presenter Contests, in which students are judged on their research methods and presentation skills.

Edward Russell, a doctoral student in tree physiology and ecological climatology, received an award for his presentation on the interaction between intensive management practices and water limitation



Doctoral students Edward Russell (left) and Sheng-I Yang each received presentation awards.

expected in the near future in established Virginia pine plantations. "One of the best things about this particular conference is the opportunity to see what a variety of researchers and practitioners are currently investigating. It's an opportunity to survey a broad swath of the intellectual forestry world and gain insight from both production and ecological perspectives," he said.

Sheng-I Yang, who is dual-enrolled as a doctoral student in forest biometrics and a master's student in statistics, said that this opportunity marked his first professional conference presentation. He accepted an award for his presentation on using statistical analysis to determine the maximum population sizes of loblolly pine crops. "It was my first time doing this and I got to meet so many people from different universities and exchange ideas. I really appreciated the question-and-answer sessions at the end of each talk," he recalled.

According to Seiler, Virginia Tech students do well historically in the conference's contest, having taken almost 30 percent of the awards to date. "It's a very friendly conference for students giving their first talk," he said. "It's a testament to the strength of our program."

PINEMAP project earns partnership award

Five years ago, a vast team of researchers from 11 southeastern land-grant universities and a host of research cooperatives banded together to conduct an unprecedented study on southern pine forests funded by a U.S. Department of Agriculture grant. This initiative, the Pine Integrated Network: Education, Mitigation, and Adaptation Project (PINEMAP), was recently recognized with the USDA National Institute of Food and Agriculture's Partnership Award.

Virginia Tech's team included over a dozen graduate students, post-doctoral associates, and staff members in addition to the following faculty members: **Harold Burkhart**, **Thomas Fox**, **Jason Holliday**, **John Seiler**, **Brian Strahm**, **R. Quinn Thomas**, **Valerie Thomas**, and **Randolph Wynne**.

According to Fox, who served as the lead principal investigator on Virginia Tech's portion of the project, PINEMAP had three main goals: research, outreach, and education. The project's selection for the award is recognition of the successful integration of those missions. Efforts will continue well beyond the end of the current grant.

"We need to continue working to understand the pine forest ecosystem in the Southeast, which is a major economic driver in the region and provides tremendous environmental services that benefit society," said Fox, who also served in other PINEMAP leadership roles. "We also need to continue our education and outreach efforts so that we can put the knowledge we gain to work improving people's lives and the environment."

PINEMAP research was conducted at several locations. At a site in Appomattox County, Virginia, plastic troughs reduced rainwater reaching the soil by 33 percent, allowing scientists to simulate how a future climate with less rainfall would affect loblolly pine.

Awards and Honors

The college honored some of its most accomplished students, prominent alumni, respected faculty, and cherished friends at this year's Annual Awards Recognition Celebration. View the complete list of 2016-17 awards and recipients at cnre.vt.edu/events/awards-recognition-celebration/2017-awards-recognition-celebration-program.pdf. Among the many honors presented are those highlighted here.

Outstanding recent alumnus

Photo by Uninvented Colors Photography

Alexander L. Miller ('06 B.S. fisheries science, '06 B.S. environmental policy and planning, '09 M.S. agricultural and applied economics) received this year's **Outstanding Recent Alumni Award** in recognition of his early career accomplishments.

Miller had been interested in marine resources from an early age and was involved with the Virginia Junior Academy of Science. Since graduating from Virginia Tech, he has worked in the fields of marine economics, global seafood markets, and fisheries management. He is currently vice president of business development at Trace Register LLC in Seattle, which he describes as being a different world than academia or government.

"My understanding of the economic and business side of the seafood industry started at Virginia Tech," Miller shared. "As an undergraduate fisheries science major, I worked with the Smithsonian Institution in the Canadian Maritime Provinces and observed the impact the collapsed cod fishery had on the region." He finds that the knowledge he gained through these experiences is still useful day to day.

Miller has had many chances to "invent the future," including working with his colleagues and Whole Foods Market to develop a first-of-its-kind tuna sourcing policy that allows the food retailer to trace, monitor, and more efficiently manage the canned tuna it sells. "I enjoy working with companies and global seafood supply chains to create an even better world and future," he said.

Outstanding graduates

Graduating senior: Ally Moser
Hometown: Ashburn, Virginia
Major: Wildlife conservation
Main accomplishment: Becoming involved with The Wildlife Society early in my undergraduate career framed many of my opportunities and interests. The student chapter was a great space to meet other students, to be mentored by faculty and professionals, and to gain experience in peer leadership. My involvement also allowed me to travel to many professional conferences where I learned more about my career goals and research interests. I recommend that every incoming student join a professional society.

Master's Student: Kayla Davis
Hometown: Ellerbe, North Carolina
Major: Wildlife conservation
Research focus: My master's thesis focused on parent-offspring interactions of the federally endangered roseate tern and young tern survival at Cape Cod National Seashore in Massachusetts. My research allowed me to work directly with land managers who will use my thesis results to make research-guided conservation decisions. I am continuing this type of conservation-minded research as a doctoral student at Oregon State University studying the marbled murrelet, a small seabird that nests in old-growth forests.

Graduate student: Anne Hilborn
Hometown: Seattle, Washington
Major: Wildlife conservation
Research focus: I am investigating some of the ways large carnivores affect the foraging behavior of smaller ones. Using 35 years of data on hunting behavior, I look at how cheetahs in Tanzania respond to threats from lions and spotted hyenas, and how they modify their behavior to minimize risks from larger predators. My research will increase our knowledge of how behavioral flexibility allows multiple carnivore species to coexist and how the way large carnivores impact the behavior of smaller ones goes on to affect prey populations.

STUDENT NOTES

Livingston designs a better future

Gucci Livingston with his son, Jaiden

Packaging systems and design major **Lamont "Gucci" Livingston of Newport News, Virginia**, received the Division of Student Affairs Aspire! Award, which recognizes a student who is preparing for a life of courageous leadership. Not only is Livingston preparing for such a life, he is living it.

Livingston began his studies as an engineering student on scholarship in 2012. However, he soon faced unexpected challenges — including his girlfriend's pregnancy — that prevented him from maintaining his scholarship, and he had to leave Virginia Tech.

He spent a year and a half working, single parenting, and house hopping, yet he was determined to continue his education. He returned to Blacksburg in fall 2015 to resume his studies, bringing with him his son, Jaiden, who was his inspiration while readjusting to academic life.

Upon returning, he started looking at new majors within his interests. He found packaging systems and design and instantly fell in love, thrilled that the work he would be doing is still hands-on creation. He also felt welcomed, especially by Professor Robert Bush, who was the first faculty member to allow Livingston to bring Jaiden to class.

Livingston spent his first two semesters back working and studying hard, all while living on a friend's couch with his son. He brought Jaiden to every class, group project, and organizational meeting.

Bush said that he finds Livingston to be thoughtful and talented, and believes he is a good example to other students of the diversity of peers' college and life experiences. "I get the impression that he has talent and capabilities that we have not yet seen bloom," Bush said.

In spring 2016, Livingston earned his way to the dean's list and got a room in an apartment for Jaiden and himself. That fall he was granted childcare. He has raised his cumulative GPA to a 2.65 since returning to Tech. "I second-guessed myself every day, but my son's face was all I could see when I wanted to give up," said Livingston who is on target to graduate next May. "Knowing that it could be done gave me the fight to finish."

Students speak to Ut Prosim Society

Tyneshia Griffin (left) and **Lindsay Wentzel** were among the Virginia Tech students selected to speak at this year's Ut Prosim Society Celebration. Griffin, a geography major from Prince George, Virginia, shared about her experience in the college's Sustainability Institute. Wentzel, a fish and wildlife conservation double major from Yorktown, Virginia, spoke about her undergraduate research project on black bears as well as her time studying red wolves and elephants with the Smithsonian Conservation Biology Institute. She was the only student presenter at the celebration's HokieTalks event.

The Ut Prosim Society recognizes donors who are leaders within the community of philanthropy that sustains Virginia Tech and who have made lifetime contributions of $100,000 or more.

Fitzpatrick studies endangered plant species for Fralin Fellowship

Wildlife conservation major **Jessica Fitzpatrick of Chesapeake, Virginia**, spent part of her junior year studying the federally endangered plant species Michaux's sumac under a Fralin Undergraduate Research Fellowship, which provides recipients $1,000 to conduct research with a faculty mentor.

Under the guidance of Verl Emrick, a research scientist with the college's Conservation Management Institute, Fitzpatrick collected data on the population density of Michaux's sumac, which reproduces primarily through vegetative or asexual reproduction, as well as the nutrient status of the soil where the shrub grows.

The research team Fitzpatrick worked with found that the plant favors soils with a neutral pH and that both the soil temperature and the size of the plant's rhizome (an underground stem) influence the success of propagation in the greenhouse. The team used its findings to propagate approximately 100 small plants from existing plants. Fitzpatrick hopes to continue her research in order to support the recovery and potential delisting of Michaux's sumac.

Although she never imagined she would be working with endangered species, Fitzpatrick seems to have found a new calling. "This rewarding work has inspired me to search for more research involving endangered species, and I aspire to have a career in that field after graduation," she noted. Fitzpatrick presented her findings at a showcase in Fralin Hall in the spring.

Mixing some "green" with game day orange and maroon

The Game Day Green Team comes together at each home football game to encourage tailgating recycling. *Photo courtesy of Caroline Firer*

While interning for the Office of Sustainability, **Bridget Acland of Millwood, Virginia**, conceived an idea to institute a recycling program for home football games. With the help of fellow interns, the program was developed and implemented at the start of the 2015 football season.

Before home football games, about 30 volunteers visit tailgates around campus, handing out blue recycling bags and talking with tailgaters about what to recycle and what to throw away. The program has since been taken over by another student, but Acland, a sustainable biomaterials major, still finds time to volunteer.

Acland really began to see the effects of the program after the first year. One time she approached a large tailgate group but found they had brought their own blue recycling bags and converted to all compostable or reusable items. "That felt like a big victory," she said. "It means that the behavior change is not just a one-time event; it is something that is sticking with Hokie fans and that people are thinking about outside of just game days."

STAFF MEMBER SPOTLIGHT

'Mission RareQuest' earns film festival award

When **Priya Jaishanker**, an audiovisual media specialist with the Department of Forest Resources and Environmental Conservation, submitted her video, "Mission RareQuest," to the 2017 RVA (Richmond) Environmental Film Festival, she had no idea it would be chosen for one of two runner-up awards.

She created the video, funded by the Virginia Native Plant Society, in collaboration with the Virginia Master Naturalist program to highlight the RareQuest project, in which over 80 citizen scientist volunteers worked to identify and collect data on rare bird, butterfly, and plant species.

Jaishanker followed Program Director Michelle Prysby and a RareQuest team in Shenandoah National Park as they searched for Rand's goldenrod, a flowering native plant species in the same family as the sunflower. "The team of women I filmed with had a real passion for the environment," she recalled. "It was a great experience."

"The Virginia Master Naturalists provide a real service," continued Jaishanker, who hopes the video can be used as a recruitment tool for the program. "All the data and photos they collect go to the Virginia Natural Heritage Program so they can use it to help conserve some of these rare species when they're found."

Jaishanker was pleasantly surprised that her video was chosen as a runner-up in the film festival. "This is the first time I've won an award where there's a screening. I'm beyond thrilled," she said.

Associate Professor John Munsell, Jaishanker's supervisor, said, "The award speaks to the quality of her work and its benefit to our department, college, and programs. It also demonstrates how our focus resonates with artists like Priya who are passionate about the environment and keen on bringing their skillset to the overall effort."

Watch Jaishanker's video at **virginiamasternaturalist.org/rarequest**.

Priya Jaishanker's film "Mission RareQuest" was named a runner-up at the 2017 RVA Environmental Film Festival.

Schwarz named director of Seafood AREC

Michael Schwarz, an adjunct faculty member in the Department of Fish and Wildlife Conservation and an aquaculture specialist for Virginia Cooperative Extension, has been named director of the Virginia Seafood Agricultural Research and Extension Center (AREC) in Hampton. Schwarz, a leader in aquaculture production, has worked around the globe to share his knowledge with nations and industries looking to increase sustainable food production.

In his new role, Schwarz will oversee the center's ongoing core research and Extension programming in areas such as seafood safety, quality control, engineering, business and marketing, and education and outreach for industry and consumers. A recent addition to this programming is the incorporation of a new conservation aquaculture program designed to help both conservation and restoration efforts.

New position unites social science with bird conservation

Ashley Gramza has joined Virginia Tech to serve as the national bird conservation social science coordinator. In this new position, based in the Department of Fish and Wildlife Conservation, she will also co-chair the Human Dimensions Subcommittee of the North American Bird Conservation Initiative, a forum of government agencies, private organizations, and bird initiatives dedicated to promoting and advancing bird conservation.

The objective of this high-profile position is to build social science (also referred to as human dimensions) capacity within the bird conservation community through research, partnerships, and outreach. Gramza is well suited for the role, having worked on topics ranging from wildlife habitat conservation on private lands in Iowa to understanding the motivations for negative human-wildlife interactions at National Park Service sites. She holds a bachelor's in wildlife ecology and a master's in human dimensions of natural resources, and is completing her doctorate in wildlife biology.

Gramza will work closely with Ashley Dayer, assistant professor of human dimensions in the department. Their first project will examine why landowners choose to enroll in the USDA Conservation Reserve Program, a voluntary initiative that pays landowners to remove environmentally sensitive land from agricultural production to improve environmental health.

Murphys recognized for conservation efforts

Professor **Brian Murphy** and his wife, Martha, are this year's recipients of the A. Willis Robertson Citizen Conservation Award. The Virginia Chapter of the Wildlife Society presents the award to nonprofessionals who have exercised outstanding conservation practices on their own land or who have contributed to conservation efforts in Virginia.

Over the past 15 years, the Murphys have worked to convert their 67-acre farm in Craig County into a conservation area for native species. They have done so in many ways, including fencing livestock out of streams, reducing the size of the herd, installing food-producing shrubs, converting all of their pastures to native plants, and raising bees to produce honey.

The Murphys frequently open their farm to students and community groups for tours and learning opportunities, and work to educate their community on the importance of habitat and wildlife conservation. They hope their neighbors and community members will be inspired to begin their own conservation efforts.

They have seen great improvements to their farm in light of the changes. "As soon as you put the habitat out there, the animals show up," Brian Murphy said. "We've seen an enormous increase in diversity of both plants and animals. I even see species that we didn't plant beginning to come back because they can grow here again."

Castello awarded Pew marine conservation fellowship

Assistant Professor **Leandro Castello** has been awarded a marine conservation fellowship by The Pew Charitable Trusts. He will use the fellowship, which supports research to improve ocean conservation and management, to determine the best way to generate catch-rate data for tropical fish.

Roughly one-third of the global fish yield comes from the tropics; however, lack of data on species abundance makes managing tropical fisheries difficult. Castello plans to engage with local fishers in his home country of Brazil and use their expertise to develop a handbook of practical guidelines that will help them gather their own catch-rate data and apply it in fisheries management.

Castello will begin by interviewing fishers about past fishing events and comparing their responses with government data to determine the reliability of their memories. "Fishers are a principal element of a fishery, just like the fish they harvest. Without their buy-in, our management recommendations are unlikely to succeed," he explained.

Edgar and Dong receive American Chemical Society awards

Professor **Kevin Edgar** received the Anselme Payen Award from the American Chemical Society's Cellulose and Renewable Materials Division in April. The award honors outstanding professional contributions to the science and technology of cellulose and other polysaccharides. Edgar, who has worked in the field of cellulose research for almost 35 years, is researching new ways to use cellulose and other natural polysaccharides in drug formulation and delivery.

One of Edgar's students, **Yifan Dong**, received the division's Graduate Student Award, a prestigious international honor given to only one student worldwide each year. Dong, a doctoral candidate in polymer chemistry, is now with Dow Chemical Company in Freeport, Texas, after graduating in May. "Yifan is highly deserving of this award," Edgar said. "She's incredibly diligent and creative, and she's clearly a leader in the lab. Good things happen because of people like her."

Dong is the fourth student from Edgar's research group to receive this award since 2011. "Having four students win this award is awesome. It speaks to how lucky I've been with the students who chose to join my group," Edgar said. "Getting to work with young people and then seeing them out in the world doing well is pretty wonderful."

Kevin Edgar

Yifan Dong

De Soto named 'Favorite Faculty'

Angie De Soto was nominated as a "Favorite Faculty" in a Housing and Residence Life program for on-campus students to honor faculty members for their hard work, contributions to academia, and dedication to student learning and success.

De Soto is director of the college's Sustainability Institute, a two-week "boot camp" style training program offered to students from all majors that teaches them how to problem solve using a "sustainability lens" through case studies, skills-based training, workshops, and meeting with industry professionals.

The student who nominated De Soto said, "Angie made me see how everyone has something at stake when they make decisions and take actions. . . . It was great to see a young female leader not letting the world limit her imagination. . . . She inspires me to live unapologetically!"

ALUMNI CORNER

ALUMNI PROFILE

A Farrell family affair

Rob Farrell ('88 B.S. forestry, '03 M.S. forestry) began college with one thing on his mind: trees. "I'm really just a tree guy. All I've ever wanted to do is work with trees. I never really thought about going anywhere except Virginia Tech or majoring in anything besides forestry," he said.

Little did Rob know, his time in the college would also impact his life in more a personal way. He met his wife, **Jill** ('89 B.S. human services), who began her undergraduate career as a wildlife science major, at a Forestry Club meeting.

"The first time I saw Rob, I was going to cut firewood early in the morning with the Forestry Club," Jill recalled. "As I walked in, Rob walked out, looking very scruffy and carrying a hatchet. A few weeks later, we sat beside each other at a Forestry Club outing to Pizza Hut and talked about how we both loved to snow ski. I mentioned to my roommate that I liked him, and she encouraged me to sit next to him at a club meeting. We've been together ever since."

Rob has held several forestry-related positions after earning his bachelor's, including working as an arborist in Fairfax, Virginia, and conducting urban forestry work with the college. During graduate school, he was a local forester with the Virginia Department of Forestry, where he worked for 12 years before stepping into his current role as Deputy State Forester. "Every job I've ever had has been because of the experience I had at Virginia Tech," he said. "I've gotten referrals and references from professors and classmates."

Now, the couple's two children will continue the family's Virginia Tech legacy. **Jack**, a sophomore majoring in water policy, resources, and management, chose Virginia Tech because of a deep love and appreciation for the outdoors. "I love that the college provides the ability to create the path that you see most fit for yourself," he said. "I have the opportunity to study almost anything related to fresh water. When you think about the people, places, and things that could not function without water, you realize how many possibilities there are."

Will, an incoming freshman, is undecided about a major, but knows that environmental conservation and time spent outdoors are priorities. "I'm most looking forward to meeting new people who share my interests and experiencing new things. My parents were in the Forestry Club, and that was a really big part of their college experience. I plan on joining skiing and mountain biking clubs, because those are my favorite things to do."

For their part, Rob and Jill are excited to have an excuse to visit Blacksburg regularly. "Cheatham Hall always felt like home to us, so we're glad to have the boys there," Rob said.

Jill added, "We have shared a love of the natural world with our boys and we are excited to have them pursue their passions in CNRE. Natural resource experts will be needed to develop solutions, and the college is diversifying to prepare students to meet society's needs with natural-resource-based solutions from a wide range of perspectives."

Domenech appointed Assistant Secretary of the Interior

Doug Domenech ('78 B.S. forestry and wildlife), who has held several positions in the Department of the Interior, was nominated by President Trump in June as the department's Assistant Secretary responsible for the Office of Insular Affairs. The office coordinates federal policy for the U.S. territories of American Samoa, Guam, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands. It is also responsible for administering and overseeing U.S. federal assistance to the freely associated state of the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau.

"It is a great honor to be nominated for this important position, which helps bridge the distance between Washington, D.C., and our insular areas," Domenech said. "People living on these often-remote islands face unique challenges relating to economic development, national security, and environmental issues, and it's important that our neighbors and fellow Americans feel confident in the U.S. government to help address these challenges."

Domenech currently serves as Senior Advisor to Interior Secretary Ryan Zinke and as the Secretary's appointee to the Advisory Council of the Conservation Trust of Puerto Rico. He previously served as the Secretary of Natural Resources for the Commonwealth of Virginia, overseeing six state environmental, recreation, and historic resource agencies. During the George W. Bush Administration, Domenech served the Interior Department as White House Liaison and as Deputy Chief of Staff, as well as Acting Deputy Assistant Secretary for Insular Affairs.

IN MEMORIAM: Belinda Stone Carroll ('85)

Belinda Stone Carroll of Blacksburg passed away on March 21, 2017, at the age of 55 after a three-year battle with ovarian cancer. Carroll earned her bachelor's in forestry with a minor in horticulture in 1985 and went on to earn a master's in agricultural and extension education in 1996. She held several positions in Virginia Tech's College of Agriculture and Life Sciences, including teaching more than 3,000 students in the Department of Entomology and as educational technology manager for Agriculture, Human, and Natural Resources Information Technology, which serves the college, Virginia Cooperative Extension, and the Virginia Agricultural Experiment Station.

Belinda is survived by her husband, Dave, a meteorology instructor in the college's Department of Geography, and their son, Ben.

Bumann's art selected to represent American Heritage Prize

A bronze sculpture of a bull bison by **George Bumann** ('02 M.S. wildlife science) served as the physical manifestation of the first Ken Burns American Heritage Prize given by the American Prairie Reserve. Renowned author and historian David McCullough, recipient of the Presidential Medal of Freedom and a two-time Pulitzer Prize and National Book Award winner, received this inaugural honor.

Castings of George Bumann's bison sculpture were presented to historian David McCullough and filmmaker Ken Burns.

Bumann has worked as a professional sculptor since earning his degree, working out of his studio in Gardiner, Montana, at the northern entrance of Yellowstone National Park. In addition to creating stunning wildlife artwork, Bumann teaches art and natural history programs and guides outdoor education programs in and around Yellowstone. His works are on display across the U.S. and Europe, including permanent collections at the National Museum of Wildlife Art in Wyoming and the C.M. Russell Museum in Montana.

Bumann and his young son, George, traveled to New York City for the awards event at the American Museum of Natural History in May. Both McCullough, the award recipient, and Burns, the prize's namesake, received a casting of Bumann's exquisite sculpture.

Alumni news online

We love hearing about the great things going on with our alumni, but we don't have enough space in the newsmagazine to print them all. Catch up with former classmates and fellow Hokies online; scan the QR code or visit **cnre.vt.edu/tags/alumni.html**.

Recent posts
Courtney Couch Johnson ('92 B.S.)
Peter D'Anieri ('88 M.S.)
Franklin Myers ('81 B.S.)
Beth Reed ('82 M.S.)
David G. Shore ('78 M.S.)
E. Glen Worrell ('92 B.S., '96 M.S.)

In memoriam:
Robert "Bob" Abraham ('53 B.S.)
Susan M. Gibson ('97 B.S.)
Thomas "Tom" Harshbarger ('64 B.S., '69 M.S.)
Michael X. Kolpak ('77 B.S., '81 M.S.)

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New Zealand makes an ideal venue for studying sustainability

CNRE NEWS

Over winter break, 26 students and two faculty members traveled to New Zealand for a three-week study abroad course called Sustaining the Natural Environment and Human Societies in New Zealand. The Department of Geography course focuses on cultural perspectives related to the three pillars of sustainability: environment, social equity, and economics.

"This type of experience allows students to gain knowledge and perspectives about society and the environment that can't be attained in a classroom," explained Assistant Professor Luke Juran. "Studying abroad gets students out of their comfort zone, facilitates personal growth, and forges memories and friendships that can last a lifetime."

Beginning their journey in Christchurch to survey earthquake damage, the group visited several towns, wildlife reserves, national forests, and coastal areas on the South Island. Throughout the trip, students explored topics such as ecology, geology, glaciology, and New Zealand's efforts to promote renewable energy. They saw the firsthand effects of climate change during a visit to see glaciers and explored the effects of tourism on the environment. "I want to study wildlife around the globe, so this trip was the first step in seeing a different culture directly," said Miranda Anderson, a junior wildlife conservation major.

The group visited several farms to hear from guest lecturers and observe how farmers are promoting sustainability in sheep and dairy farming. "I wasn't expecting that because that's not what I think about when I think about sustainability," said Katie Herring, a senior majoring in biology and English. "I think about recycling or conserving trees, but at these farms we learned about how New Zealand is using the dairy and meat industry as a way of being sustainable."

They also hiked and kayaked in several national parks, including Mount Cook National Park, which boasts the highest mountain in New Zealand, and swam with the diminutive Hector's dolphins in Akaroa Harbour.

"The students were highly motivated and dedicated to the sustainability theme," noted Professor Jim Campbell. "On one of the last days, they took it upon themselves to discuss how they plan to live out the ideas of sustainability they had studied during the trip. They are genuinely dedicated to this type of thinking."

Twenty-six students and two faculty members traveled to New Zealand over winter break for a three-week study abroad course focusing on sustainability.

In keeping with the theme of sustainability, students also engaged in a service project at Lord's Bush Scenic Reserve, where they assisted the New Zealand Department of Conservation in planting 320 endemic trees. The students were provided with the GPS coordinates for the reserve so they can use Google Earth to watch the trees grow over time. "Being able to volunteer in a country almost 8,000 miles away and help people there was really great," said Herring. "It really gives you a sense of community across the entire globe."

Juran added, "New Zealand's natural environments are unique, and the approaches of its citizens towards preserving them offer valuable lessons for our own lives. Earth and its natural environments are resilient but vulnerable. We observed how humans assert a dominant role in ecological health, which in turn has feedbacks that can either facilitate or degrade the lives of humans."

The students observed land management firsthand at Hinewai Reserve, a protected area on the northern coastline of South Island.

The students visited Routeburn Flats along Routeburn Track, a popular trail through the Southern Alps. The steep valley walls were created by rapid glacier erosion over the centuries.

The Routeburn Track is home to an unusually humid landscape rich with trees and related vegetation that thrive in New Zealand's Southern Alps.

The students learned about sustainable sheep rearing at Fork Farm. Co-owner Phil Hunt discussed his approach to sheep farming and his strategies for managing his land to maintain its productivity and protect the local environment.

All photos contributed by Jim Campbell and Luke Juran

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