Fall 2015

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**Forest Resources
& Environmental
Conservation**

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Munsell Awarded $1.4 Million for Agroforestry Projects

Dr. John Munsell

John Munsell has been awarded a total of $1.4 million to expand uses of agroforestry to enhance farm and forest production while achieving strategic conservation goals.

Many practices fall under the broad category of agroforestry, which is the integration of trees into agricultural systems. Trees in agroforestry systems can be managed for timber, livestock fodder, fruits, nuts, florals, and more, offering landowners opportunities to produce marketable forest products in addition to agricultural products. Incorporating more trees into the landscape also plays an important role in improving soil health and water quality.

Thomas Leads $2.6 Million, Five-Year Project

Quinn Thomas is launching a new project to enable scientists to look many decades ahead and predict the effectiveness of land management practices in agriculture and forestry to mitigate climate change.

The project is focused on predicting how forest and agriculture management can be used to meet demands for food and fiber while having positive benefits on climate. The project is being led by Thomas and is funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture.

Dr. Quinn Thomas

From the Department Head

It is difficult to believe, but I have been a faculty member in the department we now know as FREC for over 27 years. Honestly, when I arrived here I anticipated staying at Virginia Tech for two or three years before I moved on to another institution closer to "home." However, I realized quickly that this is a special place, with a faculty, staff, and administration committed to growth—growth of the size and scope of the program, certainly, but also growth in quality of the program and in recognition of our leadership role in matters of forestry and the environment. I soon was drawn into the culture myself, and have appreciated the opportunity to work in that atmosphere for almost three decades. As a program, we enjoy a passionate and productive faculty, unmatched extension faculty/associates, an outstanding staff support team, engaged students, and active and dedicated stakeholders. I continue to be humbled and excited to be a part of this program, and I am now honored to be able to represent FREC as Department Head.

Dr. Jay Sullivan
Professor and Head
Forest Resources and
Environmental
Conservation

Looking forward, my vision for our program is to continue to develop that culture of growth, seeking to grow our enrollment, to grow in our commitment to achieving diversity in our student and faculty ranks, and to grow in our global reputation as the thought leaders in the science and practice of our field. We already are recognized as an outstanding program for our teaching, research and outreach efforts, and yet there is no reason to rest where we are now, even given the accolades we're already receiving. We can handle, and in fact need growth of our enrollment, both for the sake of garnering resources which are likely to be tied increasingly to student metrics, and if we are going to satisfy those who will be looking to us to provide the forest, environmental, and water resource professionals of the future. I also believe that increasing our commitment to diversity is not only the right thing to do, but also that there is likely to come a time when we will not have much of a clientele (students) at all if we aren't relevant to a diverse clientele. Finally, I think we still have room to increase our impact in the education, scientific, and policy arenas, as well as in practice and outreach to the Commonwealth—that is, to be the go-to place for those looking for answers to pressing and complex forest and environmental questions at the local, regional, national, and global levels. Of course lasting, significant gains aren't made overnight, but we have many of the building blocks already in place, and I am excited about the opportunity to work with all of you toward making this vision a reality

Sue Snow Retires

After being a guiding presence in the department for over three decades, **Sue Snow,** assistant to the department head and graduate student coordinator, retired effective July 1. Friends and colleagues gathered for a send-off reception in May, with many attendees recalling her warmth, kindness, and helpfulness. Sue will be greatly missed and we wish her the very best in her retirement.

Welcome New Faculty/Staff

Holly Chittum joined the Department of Forest Resources and Environmental Conservation in November 2016 as an Extension Project Associate working with John Munsell. Her research interests include non-timber medicinal forest products cultivation, management, and supply chains. Chittum comes from medicinal forest plant education and herbal products industry consulting to support projects directed toward increasing NTFP production and trade opportunities for Appalachian landowners. She earned her M.S. in Therapeutic Herbal Studies at Maryland University of Integrative Heath.

Nate Jones joined the Department of Forest Resources and Environmental Conservation in August of 2015 as a Postdoctoral Associate working with Daniel McLaughlin. His research focuses on examining wetland ecohydrology and the effects of hydrologic connectivity on downstream water quality. Jones received a B.S. in Biological Engineering from the University of Arkansas in 2010 and a Ph.D. in Biological Systems Engineering here at Virginia Tech in August of 2015. When not knee-deep in a wetland or data processing, you can usually find him enjoying the outdoors with his wife!

Michelle Prysby returned to the Department of Forest Resources and Environmental Conservation in September 2014 and is now serving as the Program Director for the Virginia Master Naturalist program in the program's Charlottesville office. Her academic interests include citizen science, volunteer management, public engagement, and natural resource education. Prysby earned her B.S. In Biological Sciences from North Carolina State University and her M.S. In Ecology from the University of Minnesota, where she studied monarch butterflies and citizen science.

Bingxue Wang (2014 Ph.D. Forestry) joined the Department of Forest Resources and Environmental Conservation as a Postdoctoral Associate. She is working on understanding the light use efficiency of loblolly pine. In particular she is trying to understand why loblolly pine in Brazil grows so much faster and holds so many more needles than it does in the United States. She will be investigating the same clones of loblolly pine grown in the United States and Brazil and will determine if their light use efficiency, particularly in the lower crowns, is the same.

Forest Ecology and Silvics Class Visit Recreation Trails

To improve their oral communication skills, students in **Carolyn Copenheaver's** Forest Ecology and Silvics class visited recreation trails in southwestern Virginia and gave presentations in class about the forest characteristics and ecology of these sites. Shown in the photograph are **Morgan Bissell,** a senior in Environmental Resource Management, and **Hannah Nyquist**, a senior in Natural Resources Conservation, who spoke to the class about the endemic species found at The Nature Conservancy's Bottom Creek Gorge Preserve.

Forest Modeling Research Cooperative 2015 Annual Meeting

The 37th Annual Meeting of the Forest Modeling Research Cooperative (FMRC), hosted by American Forest Management and Hancock Forest Management, was held in the Charlotte, N.C. area December 2-3. A one-day field trip took about 30 participants to see operational activities in loblolly pine plantations at different stages of stand development. Stops on the field tour included very young plantations established with intensive site preparation and improved genetics, mid-rotation stands where alternative thinning regimes are under consideration, and older stands that will be clearcut and merchandized for sawtimber are approaching rotation-age.

During the indoor session on the second day, Virginia Tech personnel **Harold Burkhart** and **Ralph Amateis** summarized collaborative efforts with other scientists and institutions in North and South America and progress on growth and yield model and decision support software development and testing. Virginia Tech graduate student **Micky Allen** presented research results from his Ph.D. dissertation work that focused on modeling growth at different levels of stand density in loblolly pine plantations. The mission of the FMRC is to develop tree growth and stand development models that advance the science of forest modeling and provide land managers with decision support capabilities needed to practice economically viable and environmentally sustainable forest management.

Virginia Master Naturalist Program wins 2015 Award

The Virginia Master Naturalist program won the 2015 award for "Outstanding Educational Materials" from the Alliance of Natural Resource Outreach and Service Programs (ANROSP). ANROSP is a national alliance of Master Naturalist-type programs with member programs from more than two dozen states. The award is specifically for our new curriculum materials for the "Urban and Developed Systems Ecology and Management" section of the VMN basic training curriculum. These materials include videos, Powerpoint presentations and scripts, lesson plans for hands-on activities, assessment questions, and evaluation resources. Development of these materials was funded by an Urban and Community Forestry grant from the Virginia Department of Forestry.

ANROSP 2015 award winners from naturalist programs in North Carolina, Virginia, Utah, and California. Photo by Alycia Crall.

Beegle Puts Textbook Lessons into Practice on Her Family Farm

Earlier in 2015, the Beegle farm received a grant through the U.S. Department of Agriculture's National Resources Conservation Service Environmental Quality Incentives Program (EQUIP). The funds support practices that address natural resource concerns and improve soil, water, plant, animal, air, and related resources on agricultural land. "I learned about the grant because I was a student," **Dana Beegle** said. "Now that we have received funding, I am putting the theories from my textbooks to work in a very real way." On the Beegle farm, the three-year funding cycle supports the construction of a riparian buffer and development of silvopasture, as well as other sustainability efforts.

Dana Beegle, a mother of five whose children range from 5 to 14 years old, runs a busy home, volunteers in her community, and with her husband, Jon, owns and operates three businesses in Floyd County, Virginia.

In spring 2014, Beegle was awarded the George E. and Hester B. Aker Graduate Fellowship, enabling her to pursue her studies full-time. "I think that has helped me to stay on top of my studies and still manage my other responsibilities," she said. "But my husband and my children have made sacrifices so that I can follow this dream. This is definitely a family affair." A portion of the Aker Fellowship supports a research study Beegle started in January 2014. Her project explores the use of agroforestry practices in the mid-Atlantic and the role of permaculture — a concept that encourages cooperating with nature rather than working against it — in agroforestry design.

"I am interviewing farmers who implement some form of agroforestry on their properties," Beegle said. "I expect to learn more about the type of folks interested in and using agroforestry, how they are learning and sharing this information, and if and how they are combining agroforestry with other sustainable agriculture practices."

Meeting on Forest Measurements and Modeling Hosted at Virginia Tech

Participants in the field excursion to the Reynolds Homestead toured research studies aimed at improved management of pines and of hardwood species. (Photo credits: Arne Pommerening)

On October 11-14, 48 scientists from five countries (USA, Canada, Sweden, Malaysia, and Turkey) convened on the Virginia Tech campus for two days of technical sessions, followed by a field excursion to the Reynolds Homestead Forest Resources Research Center in the Piedmont region of Virginia. Presentations focused on modeling forest trees and stands, forest inventory, statistical estimation techniques, and assessment of biomass and carbon at varying scales (trees, to stands, to landscapes and regions). The field excursion that followed included research studies aimed at pine and hardwood management, as well as forest operations, stream crossings, and protection of water quality.

Virginia Tech graduates made numerous contributions to the conference. Several alumni gave presentations and/or served as moderators. **Mike Strub** (B.S., M.S., Ph.D. Virginia Tech) was a conference co-organizer. **Quang V. Cao** (M.S., Ph.D. Virginia Tech), Professor of Forest Biometrics at Louisiana State University, was the recipient of the 2015 Southern Mensurationists Scientific Achievement Award.

The conference was cosponsored by the Southern Mensurationists, a regional group in the US that is dedicated to promoting quantitative applications in forestry, and Division 4 of the International Union of Forest Research Organizations (IUFRO). **Harold Burkhart** served as overall conference organizer; other Virginia Tech faculty involved with organizing and implementing the technical sessions were **Phil Radtke** and **Ralph Amateis**. **Kyle Peer** arranged the field tour at the Reynolds Homestead; **Tom Fox** led the field presentations on pine silviculture; and **Mike Aust** described work on road construction, stream crossings, and implementation of Best Management Practices aimed at protecting water quality during forestry operations.

Land-Atmosphere Research Station Helps Virginia Tech Expand Capacity to Study Forests

Thomas O'Halloran is a research faculty member who brings access to the land-atmosphere research station he founded at Sweet Briar College. O'Halloran originally designed the site to quantify the role of forests in regulating climate, particularly trees' production of aerosols, which contribute to haze and interact with clouds. "This new collaboration with **Quinn Thomas** and Virginia Tech has significantly increased the scope and impact of the processes we can study at the site," O'Halloran said.

Thomas and O'Halloran are interested in similar questions and instrumentation but have different backgrounds, Thomas in ecosystem science and O'Halloran in meteorology, which they combine to study land-atmosphere interactions.

Munsell Awarded $1.4 Million for Agroforestry Projects (continued from front page)

"The objective is to increase tree-based nutrient offset opportunities on farmland in Virginia's region of the Chesapeake Bay watershed and beyond," Munsell said.

"The overarching aim of the work is to expand the cultivation and conservation of nontimber forest products and to prepare forest farmers to supply verified and organic forest-grown raw materials to nutraceutical and herbal product industries," Munsell explained.

Partners in this effort include the USDA Forest Service, U.S. Geological Survey, Penn State, North Carolina State University, Maryland University of Integrative Health, Virginia Tech's Visual Computing Lab and Center for Geospatial Information Technology, Appalachian Sustainable Development, United Plant Savers, Rural Action, Blue Ridge Woodland Growers, USDA National Agroforestry Center, North Carolina Herbarium, Pennsylvania Bureau of Forestry, and Southern Regional Extension Network.

Thomas Leads $2.6 Million, Five-Year Project (continued from front page)

Research partners include geophysical and biological scientists from multiple institutions.

"Presently, society needs climate predictions from climate models at the 10- to 50-year time scale," Thomas said. "It is on this time horizon that we hypothesize biological services associated with land management, such as carbon storage, may have an important influence on prediction. This project focuses on testing this hypothesis by improving the representation of biological processes and land management in earth system models."

The project will use field data to better understand key ecological processes and integrate these findings into a state-of-the-art earth system model that contributes to the goals of the Intergovernmental Panel on Climate Change. The model runs on one of the nation's most powerful supercomputers, located at the National Center for Atmospheric Research-Wyoming Supercomputing Center in Cheyenne, Wyoming.

Additional project partners are Christine Goodale and Jed Sparks, professors in the Ecology and Evolutionary Biology Department at Cornell University; Jeffrey Dukes, professor of Forestry, Natural Resources, and Biological Sciences at Purdue University; Stuart Grandy and Serita Frey, professors in the Natural Resources and the Environment Department at the University of New Hampshire; and Professor **Thomas Fox**, University Distinguished Professor **Harold Burkhart**, and forestry doctoral student **Benjamin Ahlswede** of FREC.

The project, titled "Decadal prediction of sustainable agricultural and forest management — Earth system prediction differs from climate prediction," also will expand the education and research opportunities of students in natural resources and ecological fields by enabling them to work directly with the nation's leading climate scientists.

Researchers to Use Grant to Examine Linkages Between Humans and Freshwater Quality

Understanding human interactions with the natural environment can enhance the protection of surface water quality in lakes and streams.

A multidisciplinary team of researchers will examine the linkages between humans and freshwater quality using a $1.8 million grant from the National Science Foundation's Dynamics of Coupled Natural and Human Systems Program.

Kelly Cobourn, assistant professor of natural resource economics in FREC, is the principal investigator on the project.

The goal of the research project is to investigate human-natural feedbacks in freshwater systems by examining the linkages between land-use decision-making, water quality, and collective action taken by the public to protect water quality.

The research team will study the effects that human activities in freshwater systems have on the degradation of lake water quality and how those land-use decisions by humans affect nutrient fluxes through lake ecosystems. Project researchers will also study how changes in lake water quality in turn affect human behavior. Degradation of lake water quality affects humans by threatening the amenities that they value, such as drinking water, recreation, and fisheries.

Project researchers will also study how changes in lake water quality in turn affect human behavior. Degradation of lake water quality affects humans by threatening the amenities that they value, such as drinking water, recreation, and fisheries. Research results will ultimately lead to a coupled modeling framework that captures how land-use decision-making interacts with the crucial services freshwater provides. That framework will act as a guide for citizen-driven lake associations to advocate for laws and regulations that will allow for the environment surrounding lakes to be protected and ultimately the benefits gained by humans to be preserved.

Land-atmosphere Research Station   (continued from page 6)

The research station features a 120-foot tower with an array of instruments to measure forest-atmosphere interactions across a 67-acre pine plantation. Measurements include the movement of carbon, water, and energy between the forest and the air above, which affect climate. Work at the site continues as a collaboration between the two schools.

Instrumentation on the tower measures the properties of forests similar to ways they can be seen from space, so ground-based measurements can be linked to satellite measurements. In addition to gathering data, the atmosphere research station continues to be a resource for graduate student projects and undergraduate classes from several disciplines, such as forest resources, environmental informatics, and meteorology.

Geospatial Experts Author E-book

To broaden access to a comprehensive education in geographical information systems (GIS), three geospatial experts have authored an e-book called "Remote Sensing Analysis in an ArcMap Environment."

The authors, Tammy Parece, a doctoral candidate in geospatial and environmental analysis; James Campbell, a professor in the Department of Geography; and **John McGee,** a professor within FREC and a geospatial specialist for Virginia Cooperative Extension, designed the e-book specifically to help make the tremendous volume of remotely sensed images more accessible to people who are learning, teaching, and working in geospatial sciences.

GIS is powerful technology that lets users display, map, associate, and explore many different kinds of information and spatial data, offering a valuable tool to industry and governments to help manage resources. GIS data also serves as the foundation for many geographically based smartphone apps.

"Unfortunately, most conventional remote sensing software used for instruction is prohibitively expensive, taking remote sensing instruction out of reach for community colleges and high schools," Campbell said.

The e-book fills that gap. Written for students and professionals who have access to the new software through their employers or educational institutions, the new e-book teaches them how to use it. Presented as a set of tutorials, screen-capture videos walk readers through each step of the process and provide links that expand the training to supplemental information and support online.

Virginia Master Naturalist Program Welcomes New Sponsoring Agency

The Virginia Master Naturalist program, a statewide volunteer training and service program providing education, outreach, and service to better manage natural resources and natural areas in Virginia, welcomes the Virginia Institute of Marine Science's Center for Coastal Resources Management as its newest sponsoring agency.

The Center for Coastal Resources Management develops and supports integrated and adaptive management of coastal zone resources. To fulfill this mission, the center undertakes research, provides advisory service, and conducts outreach education, including Master Naturalist training courses for coastal and estuarine ecology and management in collaboration with other Virginia Institute of Marine Science departments.

Karen Duhring, the center's outreach and training coordinator, will represent the agency on the Virginia Master Naturalist program's steering and executive committees.

Spotlight: Faculty - Staff - Students

Urban Forestry Professor and Students Participate in Saluting Branches

In September, professor **Eric Wiseman** and a group of urban forestry students participated in Saluting Branches, a national day of arborist service at veteranS cemeteries across the country. Students **Lucy Cohn-Still**, **Bobby Nance**, **Rodney Walters**, and **Michael Webb** traveled with Wiseman to Salisbury National Cemetery in North Carolina to work alongside over 40 arborists pruning trees on the cemetery grounds. The aim of this day of service was to honor the sacrifices of deceased veterans by caring for the trees around their permanent resting places and create a safe, beautiful environment for those who come there to pay their respects. Nationwide, 1,000 arborists volunteered their time and skills at 27 veterans cemeteries on the day of service.

Mike Webb, Eric Wiseman, Lucy Cohn-Still, Rodney Walters, and Bobby Nance take a break for a group photo during Saluting Branches national day of arborist service.

McElligott Awarded Soil Science Society of America Luxmoore Graduate Student Award

Kristin McElligott, a Ph.D. student co-chaired by **John Seiler** and **Brian Strahm,** was awarded with the Soil Science Society of America's Luxmoore Graduate Student Award. This was the first year that the award was available and the competition was quite stiff, but McElligott walked away with one of three $500 prizes recognizing her accomplishments and the importance of her research to the Forest, Range, and Wildland Soils division of the society.

The best presentation awards are not grad student awards - they compete for these coveted honors alongside scientists from across the globe and in different stages of their career.

Barrett Receives Young Forester Leadership Award

Scott Barrett received the Society of American Foresters' 2015 Young Forester Leadership Award. The award was established in 1984 and recognizes a young forestry professional's outstanding leadership supporting forestry and the Society of American Foresters, the world's largest professional society for foresters.

Barrett has coordinated the SHARP (Sustainable Harvesting and Resource Professional) logger education program since 2002 within the department.

McGee Receives National Award for Expanding Geospatial Education

John McGee received the 2015 Distinguished Geospatial Education Partner Award from the National Geospatial Technology Center of Excellence. He was recognized for his work with the Expanding Geospatial Technician Education Through Virginia's Community Colleges (GeoTEd) project, a Virginia-focused effort designed to build academic pathways to employment for geospatial technicians through Virginia's community colleges.

According to the Department of Labor, the tremendous growth potential of geospatial technology is limited only by the educational system's ability to provide future workers.

The award recognizes the GeoTEd project, for which McGee is a co-investigator, for work "that has made significant contributions in support of geospatial education at two-year colleges." McGee shared the award with his co-investigators: Chris Carter (principal investigator), Virginia Space Grant Consortium; David Webb, GeoTEd consultant; Chérie Aukland, Thomas Nelson Community College; and Sandy Stephenson, Southwest Virginia Community College.

GeoTEd works with partnering community colleges to lead students to careers in geospatial technology by increasing the number of courses the schools offer in geospatial topics. Importantly, GeoTEd "trains the trainers" by educating faculty, staff, and administration. Partnering community colleges then serve as models for other colleges to further disseminate geospatial education throughout the state.

One-week intensive residential workshops for community college and high school educators are just one of the programs offered. Participants receive hands-on training in using geospatial technology, as well as classroom-ready materials and geospatial data for Virginia and their local areas. GeoTEd partners provide two years of mentoring to participants as they implement courses at their home institutions.

FREC Fall 2015 Graduates!

- Eric Carbaugh-M.S.
- Gavin Corral-Ph.D.
- Kimberly Cowgill-Ph.D.
- Cory Furrow-M.S.
- Beth Stein-Ph.D.

Welcome New Graduate Students!

- Deborah Nemens
- Jake Diamond
- Jason Steele
- Brittany Hoffman
- Morgan Schulte
- Ethan Barker

Alumni Corner

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Kuykendall Awarded 2015 Forest Stewardship Award

Jim Kuykendall, 1986 B.S. Forestry (Industrial Forestry Operations), was awarded the 2015 Forest Stewardship Award at the annual Conservation Awards dinner in Culpeper on November 5.

Kuykendall was the Woods Manager/Co-owner, Snowball Logging Co., Inc. near Asheville, N.C. from 1984-85 and the Administrative Assistant/ Residue Procurement with Stone Container from 1986-1995. In 1996, he became the Sustainable Forestry Initiative Coordinator with VFA, where he developed and delivered Virginia's SHARP Logger program. Since 2001, Kuykendall has been in his current position with Glatfelter and is currently the Southern Maryland/Virginia District Manager.

Kuykendall gives the highest level of dedication to the field and forestry profession and to private landowners. Glatfelter has not only been a positive contributor to the forestry community, but under Kuykendall's leadership, the company has been a stabilizing force in the regional forest industry. His leadership and business connections provide many value-added benefits in the area in buying wood, employment, and contributing to local natural resource educational and capacity-increasing efforts.

The Department of Forest Resources and Environmental Conservation is on social networks! Facebook (https://www.facebook.com/vtfrec) and Twitter (https://twitter.com/VTFREC). If you are a part of these social networks, look us up!

Gifts from our clients and friends have a direct impact on the quality of learning, discovery, and engagement programs that the Department of Forest Resources and Environmental Conservation offers. We invite you to become part of our team! To make a tax-deductible contribution, send your check, payable to the Virginia Tech Foundation, Inc., to: Department of Forest Resources and Environmental Conservation, 313 Cheatham Hall (0324), Virginia Tech, Blacksburg, VA 24061. For further information on memorial giving, endowed professorships, gifts of securities, planned or deferred giving opportunities or other contributions, please contact **Emily Hutchins**, Development Officer, at 540-231-8859 or send an e-mail to ehutch@vt.edu.