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School of Forestry & Wildlife Sciences

2017 Fall Seminar Series

Date	Speaker	Organization	Topic
Aug. 30	Sanjiv Kumar	Auburn University School of Forestry and Wildlife Sciences	Land-atmosphere coupling and soil moisture memory contribute to long-term agricultural drought
Sept. 6	Robert Moon	Forest Products Laboratory, USDA Forest Service	Cellulose Nanomaterials: An Enabling Technology for a Sustainable Future
Sept. 13	James Martin	University of Georgia Warnell School of Forestry and Natural Resources	Transitioning from Vital Rates to Decisions: A Case Study with Northern Bobwhites
*Sept. 20	John Kush	Auburn University School of Forestry and Wildlife Sciences	Prescribed Fire – Burning Questions (What? When? How? Insanity!)
Sept. 27	Matt Waters	Auburn University College of Agriculture, Department of Crop, Soil and Environmental Sciences	Linking Landscapes and Aquatic Environments through Time: Applying paleolimnology to the lakes of the SE USA
*Oct. 4	Deborah McCullough	Michigan State University College of Agriculture & Natural Resources, Departments of Entomology & Forestry	Emerald Ash Borer – Kicking Ashes Across the Country
Oct. 11	Jon Cale	University of Alberta - Edmonton Department of Renewable Resources	Over a century of impact: Beech bark disease in eastern hardwood forests
Oct. 18	Gang Dong	Shanxi University	The Changing Climates and Vegetation and the Ecosystem services of Loess Plateau in China
Oct. 25	Bob Smith	Virginia Tech, College of Natural Resources and Environment, Department of Sustainable Biomaterials	Assessing the Impacts of a Changing Natural Resource Program
Nov. 1	Stephen H. Schoenholtz	Virginia Tech College of Natural Resources and Environment, Department of Forest Resources and Environmental Conservation	A Rising Tide: Water Challenges in the Mid-Atlantic Propel Scholarship, Research, and Engagement
Nov. 8	Adam Maggard	Auburn University, School of Forestry and Wildlife Sciences and Alabama Cooperative Extension System	Costs and Trends of Southern Forestry Practices
Nov. 15	Elizabeth VanWormer	University of Nebraska, School of Veterinary Medicine and Biomedical Sciences & School of Natural Resources	Health at the human-animal-environment interface: Tracing pathogens from land to sea

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602 Duncan Drive, Auburn, AL.

Wednesdays, 11 a.m.- 12 p.m., Room 1101 or 1224*

Complimentary coffee and cookies served.

CFEs available upon request.



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Land-atmosphere coupling and soil moisture memory contribute to long-term agricultural drought

August 30, 2017

Conference Room 1101

**Dr. Sanjiv Kumar, Assistant Professor of Hydroclimatology
Auburn University School of Forestry and Wildlife Sciences**

Abstract: We assessed the contribution of land-atmosphere coupling and soil moisture memory on long-term agricultural droughts in the US. We performed an ensemble of climate model simulations to study soil moisture dynamics under two atmospheric forcing scenarios: active and muted land-atmosphere coupling. Land-atmosphere coupling contributes to a 12% increase and 36% decrease in the decorrelation time scale of soil moisture anomalies in the US Great Plains and the Southwest, respectively. These differences in soil moisture memory affect the length and severity of modeled drought. Consequently, long-term droughts are 10% longer and 3% more severe in the Great Plains, and 15% shorter and 21% less severe in the Southwest. An analysis of Coupled Model Intercomparison Project phase 5 data shows four fold uncertainty in soil moisture memory across models that strongly affects simulated long-term droughts and is potentially attributable to the differences in soil water storage capacity across models.



Biography: Sanjiv Kumar is an Assistant Professor at the School of Forestry and Wildlife Sciences, Auburn University. Kumar holds an undergraduate degree in Civil Engineering from the Indian Institute of Technology and a Master's and Ph.D. in Civil Engineering from Purdue University. Kumar researches in the area of land use change and climate interactions and feedback. The overarching goal of his research is to improve predictability of natural resources, e.g. water, and forest and agricultural productivity at sub-seasonal to decadal time scales.

Cellulose Nanomaterials: An Enabling technology for a Sustainable Future

September 6, 2017
Conference Room 1101

Dr. Robert J Moon, Materials Research Engineer, USDA Forest Service - Forest Products Laboratory

Abstract: Cellulose based materials (wood, cotton, etc.) have been used by our society as engineering materials for thousands of years and their use continues today as verified by the enormity of the world wide industries in forest products, paper, textiles, packaging, etc. A new family of cellulose based particles, cellulose nanomaterials (CNMs), are nanosized fibril-like particles (3-50 nm wide, 50-2000+ nm long) that have properties and functionalities distinct from molecular cellulose and wood pulp, and are being developed for applications that were once thought impossible for cellulosic materials. CNMs exhibit unique characteristics due to their size, morphology and large surface area, and are inspiring advances in cellulose science, technology and product development in an ever growing application space, including but not limited to: polymer reinforcement, nanocomposites, rheology modifiers, cosmetics, cements, fibers/textiles, transparent-flexible electronics, biomedical implants, tissue engineering scaffolds, drug delivery, barrier/separation membranes, batteries, supercapacitors, catalytic supports, food coating, etc.

The first half of this seminar will provide a general introduction to CNMs, a review of CNMs research areas, an overview of CNM applications and products, and then the second half will focus on recent work at GaTech investigating how to incorporating CNMs into glass-fiber epoxy composites to produce lighter weight components for automotive applications.



Biography: Dr. Robert J. Moon is a Materials Research Engineer at the USDA Forest Service - Forest Products Laboratory, and is an Adjunct Professor in both the School of Materials Engineering (at Purdue University), and in the School of Materials Science and Engineering (at Georgia Institute of Technology). Dr. Moon received a B.S. in Metallurgy from the University of Wisconsin (1994), a M.S. (1996) and PhD (2000) in Materials Engineering from Purdue University. He is currently stationed at the Renewable Bioproducts Institute at Georgia Institute of Technology. Dr. Moon is an expert in processing-structure-property relationships as they apply in various aspects of cellulose nanomaterial research, such as, nanocomposites, hybrid

composites, recyclable solar cells, multi-scale modeling, characterization, etc. He is an internationally recognized researcher in cellulose nanomaterials having 37 peer reviewed journal publications, 1 critical review (1700+ citations in Google scholar), 2 patents, an editor of 1 book, 3 keynote/plenary talks, and 50+ invited talks all on cellulose nanomaterials. View full publication record at [Google Citations](#), [ResearchGate](#). Dr Moon is also active in the broader international research efforts of CNs, where he is the chairman of the Technical Association for Pulp and Paper Industry (TAPPI) Nanotechnology Division, a member of ISO standards development for cellulose nanomaterials, active many other workshops and roadmap development in the area of renewable materials.

Transitioning from Vital Rates to Decisions: A Case Study with Northern Bobwhites

September 13, 2017
Conference Room 1101

Dr. James Martin, Assistant Professor of Wildlife
University of Georgia Warnell School of Forestry and Natural Resources

Abstract: The relationship between wildlife science and management has always been present as demonstrated by scientific management listed as the 7th Sister of the North American Wildlife Conservation Model. However, the explicit linkage between empirical information and meeting stakeholder objectives has been weak at best. The framework for cementing this linkage has been established for decades and has been implemented successfully in waterfowl management but not well for other species. In Northern Bobwhite ecology and management, we as “quail scientists” have historically focused on vital rates and sometimes the relationship between vital rates and management actions. However, relating this back to stakeholder objectives has been tenuous. I will present on work that is in progress that relates vital rates, population dynamics, and theory to objectives such that optimal decisions can be made. Lastly, the remaining uncertainty can be reduced through monitoring and experimentation.



Biography: James A. Martin is an Assistant Professor in the University of Georgia Warnell School of Forestry and Natural Resources. He directs the Gamebird and Managed Ecosystem LAB which includes 13 graduate students studying animal ecology and how animals interact with climate, predators, humans, and land use change. Specifically his work focuses on Northern Bobwhite ecology and management throughout the species range. At the recent National Quail Symposium his lab published 4 proceedings papers and presented 15 technical presentations. Much of his work is in collaboration with Tall Timbers and numerous state agencies. Most importantly, he and his wife Nevena raise three young children—Scarlett, Ada, and Gus. Together they also maintain a kennel of dogs (some of them useful) and dabble in beekeeping.

Prescribed Fire – Burning Questions (What? When? How? Insanity!)

September 20, 2017
Classroom 1224

Dr. John Kush, Research Fellow & Instructor
Auburn University School of Forestry and Wildlife Sciences

Abstract: Prescribed fire is one of the most powerful and inexpensive tools we have in natural resource management. The School of Forestry and Wildlife Sciences is uniquely positioned to provide students with educational opportunities to learn about fire ecology and fire management. It has a diverse land base where prescribed fires could be conducted every month of the year (given favorable weather conditions). Auburn may be the only University in the US capable of providing such an opportunity for its students. This presentation will focus on some of the burning questions we have covered in the forest fire management class: You want me to burn my hardwood stand? You want me to burn how often? You want me to burn during what time of the year? You want me to look at the effects of the fire when? Why do you want me to know what is on the ground or in the forest understory? Is it INSANITY? These questions and more will be addressed in the presentation.



Biography: Dr. John S. Kush is a Research Fellow here in the School of Forestry and Wildlife Sciences. His Bachelor of Science degree in Forest Science from the University of Illinois, Urbana-Champaign. He received his Master's and PhD, both in Forest Ecology from Auburn. He has been conducting research for over 33 years with a focus on stand dynamics, fire effects, and restoration. He has taught classes in forest ecology; forest measurements; longleaf pine management; restoration ecology; forest stand dynamics; fire ecology and fire management; and natural resource sampling. He's helping to lead an effort to establish an on-line graduate certificate program in restoration ecology at Auburn. He is a certified senior ecologist and was inducted into the Alabama Foresters Hall of Fame earlier this year. He is an affiliate faculty with the Office of University Writing.

Linking Landscapes and Aquatic Environments through Time: Applying paleolimnology to the lakes of the SE USA

September 27, 2017
Conference Room 1101

Dr. Matt Waters, Assistant Professor of Environmental Science
Auburn University College of Agriculture, Department of Crop, Soil and Environmental Sciences

Abstract: Alterations to terrestrial landscapes impact materials entering aquatic ecosystems which can trigger ecological changes. While current best-management practices are being applied and established, much less is known of how ecosystems have changed prior to monitoring efforts and concern over land-water connectivity. One way to reconstruct terrestrial and aquatic ecosystem change is by applying paleolimnological tools to sediment cores collected from lake environments. Here, I will present historical changes to terrestrial and aquatic environments from three locations in the SE USA: Lake Mattamuskeet, NC, Open Pond, FL located in the Osceola National Forest, and Lake Seminole, GA. The land-use and management practices of canal construction, water-level changes, prescribed burning, agricultural productivity, and dam release will be investigated by applying the sediment analyses of organic matter, nutrients, stable isotopes, charcoal and photosynthetic pigments. Results demonstrate the need to better understand the role of legacy nutrients, hydrological modifications, and biological interactions on the management of materials entering aquatic environments. The sediment record also shows the extraordinary extent of modern change to SE landscapes when compared to historic environmental states.



Biography: Matt Waters is an assistant professor of environmental science and aquatic resources at Auburn University. Dr. Waters and his students collect sediment cores from lake environments and reconstruct environmental change through time. The majority of his research has occurred in the southeastern USA comparing environmental conditions throughout the Holocene with ecological conditions from modern, human-disturbed periods.

Emerald Ash Borer – Kicking Ashes Across the Country

October 4, 2017

Classroom 1224

**Dr. Deborah G. McCullough, Professor of Entomology and Forestry
Michigan State University Departments of Entomology and Forestry**

Abstract: Emerald ash borer (EAB), a notorious invasive pest first identified in North America in 2002, continues to spread, affecting ash in forests, riparian zones, along with residential and urban areas. The seminar will include an overview of EAB biology, the array of impacts associated with this pest, and management options. Effects of EAB in forests reflects, in part, intraspecific variation in host preference and/or ash resistance. Control and management tactics can be integrated to slow EAB population growth and the rate of ash mortality at local and perhaps landscape scales.



Biography: Deborah G. McCullough holds graduate degrees in Forestry (M.S., Northern Arizona University) and Entomology (Ph.D., University of Minnesota). She is a Professor with a joint appointment in the Dept. of Entomology and Dept. of Forestry at Michigan State University, with research, extension and teaching responsibilities. Dr. McCullough's research focuses on the ecology, impacts and management of forest insects, including invasive pests such as emerald ash borer, beech bark disease, and most recently, hemlock woolly adelgid. She works with forest managers, regulatory officials, arborists and private landowners to develop sustainable management strategies to protect forests from damaging populations of forest insects. McCullough has published more

than 100 papers about forest insect ecology and management in scientific journals, along with more than 200 extension bulletins and articles. She is a member of the national Forest Research Advisory Committee to USDA, the Science Advisory Board for American Forests, state committees related to invasive pests and forest health, and frequently provides advice on forest insect management to state, tribal, municipal and private landowners.

Over a century of impact: Beech bark disease in eastern hardwood forests

October 11, 2017
Conference Room 1101

Dr. Jonathan A Cale, Post-doctoral Fellow
University of Alberta - Edmonton, Department of Renewable Resources

Abstract: The invasive beech scale (*Cryptococcus fagisuga*) arrived in North America in 1890 and soon after partnered with fungal pathogens to cause one of the most temporally and spatially extensive biotic forest disturbances in the world: beech bark disease (BBD). Presently, the disease affects American beech (*Fagus grandifolia*) forests from Nova Scotia south to North Carolina and west to Wisconsin, causing heavy mortality near its expanding edge and moderate mortality in long-impacted forests. Beech succumb to BBD after overlapping periods of infestation by scale insects (beech scale and *Xylococcus betulae*) and infection by causal fungi (*Neonectria ditissima* and *N. faginata*) that can be associated with phytochemical and nutritional factors. However, interactions among these biotic and abiotic factors likely vary over time. In portions of the impacted range, a positive feedback occurs where the number of BBD-susceptible stems in a forest increases due to the proliferation of clonal root sprouts following aboveground mortality. Thus, while BBD is entrenched in eastern forests, extirpation of beech from these areas is unlikely. However the disease has resulted in substantial ecological impacts and nonmarket value losses, including altered forest composition, structure, successional trajectory, soil nutrient dynamics, mast for wildlife, and biodiversity. This seminar will discuss key aspects of BBD development, damage, and ecological impact in newly- and chronically-affected forests as well as important considerations and directions for future research.



Biography: Jonathan Cale is a forest pathologist currently working as a post-doctoral fellow in the Department of Renewable Resources at the University of Alberta. His research investigates how soil fungi in disturbed forests affect pine defense chemistry, and how chemicals from host trees and competing fungi affect the success of bark beetle-vectored fungi. Prior to joining the U of A, he received his PhD from the State University of New York College of Environmental Science and Forestry in 2014 and a BS in Biology from Paul Smith's College in 2008. As a graduate student, Jonathan's research primarily focused on understanding the roles of interacting entomological, phytochemical, and nutritional factors in the development of beech bark disease in long-affected forests of New York State. He is broadly interested in fungal chemical ecology and understanding the phytochemical basis of tree resistance to insects and pathogenic fungi in order to promote forest resistance to outbreaks and disease.

The Changing Climates and Vegetation and the Ecosystem services of Loess Plateau in China

October 18, 2017
Conference Room 1101

Dr. Gang Dong, Associate Professor of Ecology
Shanxi University

Biography: Dr. Gang Dong is an associate professor of Ecology at Shanxi University. He graduated and received his PhD from Northeast Normal University in 2011. He is active member of U.S.-China Carbon Consortium. Dr. Dong has been actively working on carbon sequestration, evapotranspiration, and water use efficiency, and ecosystem services in northern China and Mongolian Plateau. He is also interested in interdisciplinary study including the coupled natural and human system, socio-economic sustainability and regional development.



Assessing the Impacts of a Changing Natural Resource Program

October 25, 2017
Conference Room 1101

**Dr. Bob Smith, Professor and Head of the Department of Sustainable Biomaterials
Virginia Tech College of Natural Resources and Environment**

Abstract: In 2011 the College of Natural Resources and Environment at Virginia Tech conducted a major study of its stakeholders to measure its perception among various clientele: CNRE students, students not enrolled in the college, campus partners, and external stakeholders. The study was to determine how the college was viewed by these constituents and identify areas for improvement. From that study, a number of major new initiatives have been implemented to improve its value to students and other constituents. The rebranding of the college, changes in department names, additions to degree programs and an increase emphasis on student services all have led to an enrollment growth of over 70% in the past 5 years. This presentation will highlight the efforts of the college from the beginning of the study conducted in 2012 to its current state.



Biography: Bob is a professor in forest products marketing and head of the Department of Sustainable Biomaterials at Virginia Tech. In his current role he directs 15 faculty in one of the leading departments in sustainable biomaterial science in North America. He is also the Director of the Center for Forest Products Business (a collaborative effort among the forest products industry, state and federal agencies, and the university). Bob holds a Ph.D. from Virginia Tech in Forest Products Marketing, a MBA from the University of Wisconsin at Oshkosh, and a B.S. in Wood and Fiber Utilization from Michigan Tech. Bob taught undergraduate and graduate courses in the areas of wood science, business management, and forest products marketing. As an extension specialist for 14 years his work focused on assisting companies with business and marketing issues to help increase their competitiveness. His research efforts focus upon industrial marketing and new opportunities for wood in international markets. Prior to completing his Ph.D., he worked for a major U.S. manufacturer of wood products for 14 years as quality control director, production manager, and sales representative in the Midwest. Bob currently serves by appointment of the US Secretary of Agriculture on the Forest Research Advisory Council (FRAC) of the USDA. This council recommends the forestry research agenda for the USDA. He has authored/coauthored 2 books, over 100 scientific publications in this field, and has participated in over \$4 million dollars in research funding.

A Rising Tide: Water Challenges in the Mid-Atlantic Propel Scholarship, Research and Engagement

November 1, 2017
Conference Room 1101

Dr. Stephen Schoenholtz, Professor of Forest Hydrology and Soils
Virginia Tech College of Natural Resources and Environment



Biography: Stephen H. Schoenholtz joined the College of Natural Resources and Environment at Virginia Tech in 2006 upon his appointment as director of the Virginia Water Resources Research Center and professor of forest hydrology and soils. Schoenholtz previously served on the faculties in the College of Forestry at Oregon State University (2001-06) and in the College of Forest Resources at Mississippi State University (1990-2001).

In his capacity as director of the [Virginia Water Resources Research Center](#), Schoenholtz oversees a federally and state-funded research center employing seven faculty and staff. The Water Center, established within the Office of the Vice President for Research at Virginia Tech in 1965, became an affiliate of the College of Natural Resources and Environment in 2005. The mission of the Water Center is to provide research and educational opportunities for undergraduate and graduate students interested in water resources, to promote interdisciplinary research on practical solutions to water-resources challenges, and to facilitate timely transfer of water-science information to citizens, government leaders, and water specialists. Schoenholtz currently serves on the board of directors for the National Institutes for Water Resources.

Schoenholtz has an active research program focusing on interactions between land management and water and soil resources, in which he has supervised 37 graduate students, garnered more than \$5.6 million in research funding, and published approximately 90 papers and book chapters to date. He has also taught 14 different [undergraduate and graduate courses](#), ranging from wetland ecology and management to silviculture. Currently, he is a member of two interdisciplinary graduate education programs at Virginia Tech, [Water for Health](#) and [Interfaces of Global Change](#).

Schoenholtz holds B.S. degrees in forest science and biology from The Pennsylvania State University, and an M.S. and Ph.D. in forest soil science from Virginia Tech. He was raised in the anthracite coalfield region of northeastern Pennsylvania, where he first fostered his lifelong interest in studying the restoration of disturbed ecosystems.

Costs and Trends of Southern Forestry Practices

November 8, 2017
Conference Room 1101

Dr. Adam Maggard, Assistant Professor and Extension Specialist of Forest Systems Management

Auburn University School of Forestry and Wildlife Sciences and the
Alabama Cooperative Extension System

Abstract: Estimates of the costs of forestry practices in the South have been reported since 1952 from surveys distributed to forest landowners across the southeastern, United States. Since 1982, the survey has been reported every two years. As a continuation of the survey, 650 questionnaires were mailed or emailed to private firms, public agencies, and individuals from 14 states across the South during the winter of 2016. The objectives of the survey are to better understand the costs of various forestry practices today and to provide long-term trends of changing costs and types of forestry practices across the region for forest landowners. Representing the twenty-fourth version of this report, results of the 2016 survey are presented and compared to costs reported by prior surveys. For the 2016 survey, respondents were asked to provide a detailed breakdown of their cost for mechanical site preparation, planting, prescribed burning, chemical application, fertilization, fire protection, timber cruising, timber marking, precommercial thinning, and custodial management. From 2014 to 2016, the majority of practice costs increased with the exception of timber marking, machine planting, and fertilization, which all decreased in cost.



Biography: Adam Maggard joined the faculty as Extension Specialist and assistant professor of forest systems in January. A Florida native, Maggard earned his undergraduate forestry resources and conversation degree and graduate business degree from the University of Florida and later, his Master's and doctorate and in Natural Resource Ecology and Management (Forest Resources) from Oklahoma State University in 2011 and 2016. Maggard's teaching focus will be on the education and promotion of the benefits associated with multi-use management and sustainable forestry practices. He will also lead Extension programs that will focus on the financial and economic aspects of forest management and planning, and optimizing the use of forest resources that will aid in improving the economic well-being of Alabamians.

Health at the human-animal-environment interface: Tracing pathogens from land to sea

November 15, 2017
Conference Room 1101

Dr. Liz Van Wormer, Assistant Professor of Practice
University of Nebraska-Lincoln
School of Veterinary Medicine and Biomedical Sciences, School of Natural Resources

Abstract: As human activities rapidly reshape landscapes, climate, and species interactions, understanding the ecology and epidemiology of zoonotic diseases is critical for protecting human and animal health. Originally described in terrestrial environments, *Toxoplasma gondii*, a globally distributed zoonotic parasite, is emerging as an important pathogen in aquatic systems. *Toxoplasma gondii* has been linked to widespread marine mammal infection and severe water-borne disease outbreaks in humans in temperate and tropical ecosystems. The impact of *T. gondii* has been particularly significant in threatened California sea otters, which serve as sentinels for disease threats to people and animals sharing coastal environments. As wild and domestic felids are the only known hosts capable of shedding extremely hardy *T. gondii* oocysts into the environment, infection of marine mammals suggests land-to-sea pathogen transmission. High-risk marine sites for *T. gondii* infection in sea otters have been identified, but parasite burden in the terrestrial environment is not well characterized. Liz will share research on contributions of wild and domestic felids to terrestrial parasite loading and human influences on movement of *T. gondii* from land to sea in the coastal California landscape. The research team used a One Health approach, which emphasizes the importance of diverse disciplinary tools and perspectives to understand health challenges impacting people, animals, and ecosystems.



Biography: As an epidemiologist, Liz Van Wormer focuses on diverse health issues at the interface of humans, animals (both domestic and wild), and the environment in the US and abroad. After earning her undergraduate and veterinary degrees from Michigan State University and PhD from UC Davis, Van Wormer lived and worked on One Health projects in Tanzania. She's currently an assistant professor of practice in the School of Veterinary Medicine and Biomedical Sciences and the School of Natural Resources at University of Nebraska-Lincoln.