AUBURN UNIVERSITY

School of Forestry & Wildlife Sciences

FEATURE STORY

Building Momentum: Cross-laminated timber markets continue to grow across the U.S.

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Advisory Council Meeting Dinner

Forest, Environment and Wildlife Leadership (FEWL) Academy Visits Alabama Capitol

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Cross-Laminated Timber (CLT) Event

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SCHOOL OF FORESTRY AND WILDLIFE SCIENCES
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A Message from the Dean

Dear alumni and friends:

Greetings from the School of Forestry and Wildlife Sciences. In this issue, we are excited to share the impactful work of our faculty, staff and students; as well as our alumni who continue to flourish as leaders within the forestry, wildlife and natural resources industries in Alabama and beyond.

With the addition of new undergraduate programs such as the wildlife enterprise management and sustainable biomaterials and packaging degrees and the professional online graduate certificate programs, you will note from the annual report that since 2015 we have increased undergraduate and graduate student enrollment by 47 percent.

As you'll read, among other research, our faculty are transforming society's approach to climate science with breakthroughs that will predict and mitigate effects of long-term drought and accurately assess greenhouse gas emissions to inform global policy. We are also studying wildlife habitat, reproduction and genetics to better understand how ecological changes and conservation methods will impact species survival.

The school's outreach activities such as the recent "Cross-Laminated Timber Markets: A Panel Discussion" are bringing administrators and stakeholders together to explore the use of cross-laminated timber for residential and commercial construction, with the hope that Auburn University will one day be home to a series of CLT constructions, thereby inspiring its use across the state.

Finally, in support of our academic and research missions, the school has launched a search for four tenure-track faculty positions in the areas of geospatial analytics of forests/natural resources, sustainable biomaterials and packaging systems, population and conservation genetics and conservation social sciences. Hiring committees began reviewing applications Feb. 1 and we anticipate new faculty will begin fall semester 2019.

War Eagle!
Best regards,

Dean Janaki R.R. Alavalapati

Administration

Three faculty and two longtime staff retire

Faculty members Brenda Allen, Arthur Chappelka and Larry Teeter and longtime research and teaching staff members John Kush and Efrem Robbins have retired from the School of Forestry and Wildlife Sciences as of Dec. 31, 2018.

Brenda Allen joined the faculty in 1997, with a split appointment between teaching and the Alabama Cooperative Extension System. She taught urban forestry and environmental ethics and served as extension specialist in urban forestry.

Allen served on numerous discipline-related boards and advisory groups at the state, regional and national levels and most recently served as faculty advisor for the Auburn student organization, Minorities in Agriculture, Natural Resources and Related Sciences.

Arthur Chappelka joined the faculty in 1987. His major research emphasis included understanding the effects of environmental stresses on the growth and productivity of native and urban-forested ecosystems.

Chappelka served as the school's interim associate dean of research, chair of the Auburn University Faculty Research Committee and most recently as chair of the Auburn University Tree Preservation Committee.

Larry Teeter joined the faculty in 1985, teaching forest management, policy, economics and geographic information systems, or GIS. His research focused on economic impact assessments, timber inventory/supply analysis, private landowner decision making and the use of GIS in resource management.

Brenda Allen, Arthur Chappelka and Larry Teeter (pictured) retired as of Dec. 31, 2018. Longtime research and teaching staff members John Kush and Efrem Robbins also retired.

Teeter served on numerous university and senate committees. Most recently, he was chair-elect, chair and immediate past chair of the University Faculty and Senate.

John Kush taught numerous courses in the school, including forest ecology and restoration ecology, directed 18 forestry senior capstone projects and was named teacher of the year four times.

In collaboration with Chappelka, Efrem Robbins managed the school's atmospheric deposition research site, maintained and operated analytical instruments and research equipment, monitored experiments and advised and directed the collection of data.

Meeting Showcases Innovative Student, Faculty Research

The 2019 Advisory Council meeting and dinner was held on Feb. 27 and 28. During the meeting, members had the opportunity to interface with student members of the new Forests, Environment and Wildlife Leadership Academy, or FEWL. They also toured the forest products development center where faculty and graduate students shared their research to develop new commercial products from wood residues and other biomaterials. Extension faculty and personnel also shared the latest wildlife management strategies deployed to reduce wild pig populations and damage.

Lights, Camera, Action!

SFWS hosted a public screening of Alabama Public Television's documentary on "Forestry," the first of a trilogy to showcase SFWS' research and the importance of Alabama's natural resources. "Forestry" premiered in February, "Wildlife" premiered this May, and the "Environment and Society" episode is expected to air in the fall 2019. Shown are left to right, Mike Ousley, producer; Roy Clem, APT executive director; Dean Janaki Alavalapati; Mike McKenzie, APT program director; and Phil Hutcheson, APT chief legal counsel and financial officer.

School of Forestry & Wildlife Sciences

SFWS NEWS • Spring 2019

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The SFWS newsletter is distributed to alumni and friends of the school. Inquiries and suggestions concerning the newsletter should be directed to the school's Office of Communications and Marketing at the address below.

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Giving

Questions concerning the school's development program, including annual and corporate giving, planned gifts, and estate planning, should be directed to Heather Crozier, School of Forestry and Wildlife Sciences Building, 602 Duncan Drive, Auburn, AL 36849. Inquiries may also be made by email to vannhea@auburn.edu or by phone at 334-844-2791.

AUBURN UNIVERSITY
SCHOOL OF FORESTRY AND WILDLIFE SCIENCES

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Academics & Learning

Study links undergraduate research experiences, pursuit of STEM doctorates

College students who participate in hands-on, faculty-mentored research for a bachelor's degree cite multiple personal and professional benefits from the experience — from strengthening their time-management, critical-thinking and communication skills to developing one-on-one connections with distinguished faculty.

But a new analysis by scientists from Auburn and four collaborating institutions suggests the value of structured research programs for undergraduates extends to society as a whole by encouraging participants to seek advanced degrees in scientific and technological fields — often referred to as STEM for science, technology, engineering and math.

In an article published June 13 in the journal BioScience, the researchers reported that undergraduates who take part in summer research training programs — specifically, the National Science Foundation's Research Experiences for Undergraduates, or REU, initiative — are 48 percent more likely to pursue STEM-related doctoral degrees than demographically matched students who apply but are not selected.

"We often assume that involving undergraduates in research improves their training as scientists but had little evidence to back up that assumption," said Todd Steury, a School of Forestry and Wildlife Sciences associate professor who contributed to the study. "This study demonstrates that undergraduate research really does improve their education, in at least as far as their desire to pursue advanced degrees and their ability to generate scientific output."

Steury said the desire to seek doctoral degrees is not the only benefit of undergraduate research. "Students who had undergraduate research experiences had more publications, gave more presentations and won more awards than the students who applied to doctoral programs but had no research experience."

He also said the results of the study might encourage faculty members to consider additional undergraduate research assistants.

Tucker Batley, a sophomore majoring in forestry, said his undergraduate research experience studying the impacts wild pigs have on water quality has lasting benefits. "Working in the research lab has given me hands-on experience in the field, and I believe it will boost my resume in the future."

Ariella Fay, an undergraduate research fellow working with Mosley Professor and Extension Specialist Mark Smith, checks a game camera to examine the impact of wild pigs on acorn availability for game species

Students explore the role of forests in human health and livelihood in South Africa and Madagascar

Students learn about the corporate investment of forestry companies to provide mobile health clinics that offer free medicine, daycare, and electronic interactive classrooms or communities living around the commercial forestry plantations.

School of Forestry and Wildlife Sciences students traveled to South Africa and Madagascar to study the role of trees and forests in human health and livelihood.

During the trip in August, the group met with world experts, research stations and grassroots organizations to learn about the management of forestland. The trip provided a rare opportunity to see two very different countries. SFWS Assistant Professor Ryan Nadel, a native of South Africa, and Assistant Professor Sarah Zohdy, who has worked in Madagascar for more than 13 years, developed and led the study abroad experience.

The use of trees is critical for health, nutrition, infrastructure and development in Africa. Students met with leaders of commercial forestry companies and learned about the role they play in the development to explore health, education and conservation initiatives to which they contribute.

Study abroad students at the community reforestation nursery at Association Mitsinjo, Madagascar.

The trip allowed students to visit many different sites and land types where trees are grown to see how humans use forest products. Sites visited included Afromontane forests, high altitude grasslands, wetland ecosystems, swamp forests, lowland montane rainforests, montane highland rainforests and sandstone formations with ancient oases and canyons.

New FEWL Academy to foster leadership in natural resources

The School of Forestry and Wildlife Sciences has established a new program called the Forest, Environment and Wildlife Leadership, or FEWL, Academy to create future leaders for the natural resources fields and the society.

Dean Janaki Alavalapati co-instructs the students with Adam Maggard, assistant professor and extension specialist.

"To aid in their experiential learning during the two-semester course, students will interface with a range of leadership and private industry executives, as well as policy makers in Montgomery and Washington, D.C.," said Alavalapati.

Accompanied by their instructors, the first cohort of students recently visited Montgomery to meet with Alabama Gov. Kay Ivey and other representatives of the Alabama Forestry Association and the Alabama Department of Conservation and Natural Resources.

"We have been reading and discussing a book on leadership that outlines traits of successful leaders, as well as offering tips and insight for us to use in our professional lives after entering the workforce," said Will Dunnam, a forestry student.

"To see how the same skills we have discussed in class are used on Capitol Hill was a great learning opportunity for all of us."

Later this year, they will travel to D.C. organizations and offices to learn and witness the development of natural resource policy issues.

The academy is comprised of students from each of the school's academic programs.

Qualified students in good academic standing with an interest in developing leadership skills are invited to apply. Each year, 12 to 15 outstanding applicants will be selected to participate in the Leadership Academy.

The 2019 program is sponsored by a private donation from Ed Sweeten '79. "I am motivated to support programs such as the FEWL Academy that will directly benefit the marketplace," said Sweeten. "As these young professionals advance in their careers, natural resource-related industries will gain from their leadership."

The school's long-term goal is to create an endowment to support the program.

Alabama Gov. Kay Ivey meets with Auburn University's Forest, Environment and Wildlife Leadership Academy on April 1 in her Capitol office. (Photo courtesy of Sydney A. Foster of the governor's office)

BUILDING MOMENTUM

Cross-laminated timber markets continue to grow across the U.S.

by Teri Greene

Cross-laminated timber, or CLT, is an engineered wood product that has quickly become a popular, economical and dependable building material for mid- and high-rise construction in the United States.

This precision-engineered wood provides improved strength and durability when compared to concrete and steel. It reduces the carbon footprint for buildings and can save valuable construction time with its custom design and production that creates precisely prefabricated panels that can pop up and bond together like huge, sturdy "LEGO® bricks" on a construction site.

Cover and interior photos
John W. Olver Design Building at UMass Amherst
Architect: Leers Weinzapfel Associates
Photographer: Albert Vecerka / Esto

Image sourced and used with permission by the Oregon Forest Resources Institute

"...It's like putting up a LEGO® set... That's the idea. There's very little waste, very little cutting - if there is any cutting at all."

This burgeoning technology now has a home in Alabama. International Beams developed its first commercial CLT manufacturing plant in Dothan, Alabama, last year, and the state's vast supply of southern yellow pine is the source of material for the wood product. This is a first for the industry east of the Mississippi.

The launch of the new plant, which will serve the rapidly expanding market for CLT, could have a significant economic impact for Alabama's forestry industry. And students pursuing the new sustainable biomaterials and packaging degree, taught collaboratively by the Auburn University School of Forestry and Wildlife Sciences and the Colleges of Business, Agriculture, Engineering and Architecture, Design and Construction, will be ready to step right into dozens of new careers in the fast-growing industry.

"In the undergraduate curriculum, one of the primary concerns is preparing students to put their studies to work for International Beams," said Regions Bank Professor and Director of Forest Products Brian Via. Students in the cross-disciplinary program are trained in working with renewable materials like CLT through a combination of classes in engineering, design, business and traditional products and processing, providing them with a unique skill set the CLT industry demands.

SFWS Dean Janaki Alavalapati said the school is actively engaged with a range of stakeholders and administrators to promote research and outreach activities related to CLT.

Recently, the growing interest for CLT construction has prompted Auburn Provost Bill Hardgrave to visit the University of Arkansas to tour their CLT structures. Leaders from the Colleges of Agriculture and Architecture, Design and Construction, SFWS, Facilities Management and University Housing and Residence Life accompanied him.

During the visit, the group toured the Mullins Library high-density storage facility and the 5-story 708-student residence hall. Their conversations with University of Arkansas leadership were insightful and generated enthusiasm for the potential of CLT construction on Auburn's campus.

"We hope that the growing momentum will soon translate into a series of CLT constructions at Auburn University and across the state," Alavalapati said.

At a SFWS-hosted panel discussion, three CLT experts talked to stakeholders about the technology's potential as well as its inevitable challenges.

Steve Lieberman, senior product engineer for IB X-LAM, the division that manufactures CLT for International Beams, outlined CLT's streamlined process, from design and planning to engineering and construction. It begins with a team of architects, design staff and engineers who create a 3D model for the project using specialized software.

"If you keep a very simple building that's very modular and rectangular, it can all be done in one shop and installed very quickly...Those projects are coming in at-cost or slightly even cheaper than traditional steel or concrete construction."

That model is so precise that when CLT production begins, panels of wood that have been assembled and glued layer by layer in a computer numerical control machine, or CNC — are cut within a sixteenth of an inch.

"When the mechanical, electrical and plumbing components are correctly coordinated with the design staff, "It's like putting up a LEGO® set," Lieberman said. "That's the idea. There's very little waste, very little cutting – if there is any cutting at all."

Lieberman's division works closely with the Austrian company KLH, a CLT innovator in Europe, where CLT has been widely used for more than 20 years as the basis for projects ranging from a "plyscraper" in London to earthquake-proof buildings in Italy.

The phenomenon has spread worldwide. In Tokyo, a 1,148-foot-tall wooden tower is scheduled to be completed in 2041. In Canada, Brock Commons, a 164-foot residence hall at the University of British Columbia, holds the world's record for tallest wooden building.

In the U.S., where previously the only CLT manufacturers and suppliers were huddled in the Pacific Northwest, there is a lot of catching up to do. Peters said current building codes allow CLT buildings to range from nine to 18 stories.

With rapid growth comes sudden change, and those who enter the industry can count on never being bored. They'll be diving headlong into a rapidly changing, challenging career that demands quick choices and nimble adjustments to new regulations, production processes and other changes that cannot yet be imagined.

Though a specific code, PRG 320, lists official quality assurance requirements for CLT in the U.S., strict guidelines are hard to apply to an industry that is growing at a rampant pace.

"It's kind of like the wild west out there right now," Lieberman said. "Nearly every manufacturer creates different variations of the product, with different capacities." Ideally, he said, individual designers could pair up with specific manufacturers to prevent multiple iterations. However, that's not always possible when competitive bidding for projects is involved.

Marketing challenges also abound in the industry, said Jeff Peters, Southeast regional director of the Wood Products Council, or Woodworks. He educates professionals in commercial design, engineering and construction about CLT. In addition to CLT's logistical improvements, some potential clients are just beginning to grasp CLT's impact on carbon footprint.

Peters presents them with a tangible example: The carbon footprint benefit of the new buildings on which WoodWorks consulted on in 2018 alone, he said, is the equivalent of taking almost 700 passenger cars off the road for a year.

The issue of comparative cost of CLT to more traditional models often arises, too.

Tom S. Chung, a principal and design leader at the Boston-based Leers Weinzapfel Associates, said CLT manufacturing costs can fluctuate on projects that vary widely. He admits that as a new industry, it will be difficult for CLT to compete with the steel and concrete industries that have dominated the market from the beginning.

But the bottom line may be CLT's greatest selling point, said Chung, who has led CLT projects at the University of Massachusetts, Amherst, Boston's Wentworth Institute of Technology and a student residence building at the University of Arkansas, which is currently the largest CLT timber project in the U.S.

"We hope that the growing momentum will soon translate into a series of CLT constructions at Auburn University and across the state."

The industry's booming growth and its undeniable cost efficiency may help it become competitive sooner than expected. And as demand for CLT grows, more and more suppliers will enter the market, lowering prices.

Chung noted the progress he saw in the three years between the completion of two of his projects. In that short period, premiums came down as the number of CLT suppliers doubled in the U.S. and Canada.

The model's efficiency, simplicity of design and ease of construction also slashes expenses and the time it takes to complete a building that is ready to use.

"If you keep a very simple building that's very modular and rectangular, it can all be done in the shop and installed very quickly," he said. "Those projects are coming in at-cost or slightly even cheaper than traditional steel or concrete construction."

Expert panelists included from left to right, Tom S. Chung, AIA LEED AP BD+C, principal of the architectural firm Leers Weinzapfel Associations; Steve Lieberman PE, International Beams; and Jeff Peters PE, Southeast regional director, Woodworks - Wood Products Council. Also shown to the far right is panel discussion moderator, Auburn Regions Professor of Forest Products Brian Via.

School of Forestry & Wildlife Sciences

2018 Annual Report

Academics & Research

76 undergraduate degrees were conferred in 2018

18 graduate degrees were conferred in 2018

Undergraduate Degrees

- Forestry
  Forest Engineering Option
- Geospatial and Environmental Informatics
- Natural Resources Management
- Sustainable Biomaterials and Packaging
- Wildlife Ecology and Management
- Wildlife Enterprise Management
- Wildlife Sciences – Pre-vet Concentration

Undergraduate Minors

- Natural Resource Ecology
- Nature-based Recreation
- Urban Environmental Sciences
- Watershed Sciences

Online Graduate Certificates

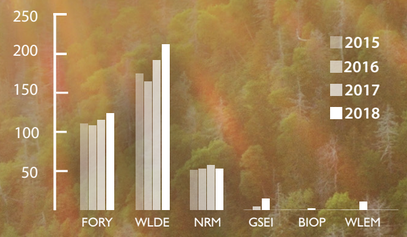
- Forest Finance and Investment
- One Health
- Restoration Ecology

Graduate Degrees

- Forestry – MNR, MS, PhD
- Natural Resources – MNR, MS
- Wildlife Sciences – MS, PhD

20% INCREASE in undergraduate enrollment

Undergraduate Enrollment by Degree 2015–18



27% INCREASE in graduate enrollment

Graduate Enrollment 2015–18

Extension & Outreach

$270,000 AWARDED ANNUALLY for merit & financial aid scholarships & fellowships

11.4% of SFWS students on the **DEANS LIST** with 36 of 353 earning a 3.75+ GPA

37 RESEARCH FACULTY

9 Affiliated RESEARCH CENTERS and Cooperatives

7.3 REFERRED ARTICLES average per faculty member

The economic impact of extension programs was nearly **16.5 MILLION**

MORE THAN 30,000 people visit Kreher Preserve & Nature Center annually

NEARLY 7,500 children served by Kreher Preserve & Nature Center environmental education programs

MORE THAN 13,500 people served by extension forestry, wildlife and natural resources programs

9,430 user days were recorded by the Dixon Center last year

OVER 1,600 acres of prescribed fire completed at the Dixon Center

Development

$906,630 RAISED IN 2018, REPRESENTING

78% CASH GIFTS

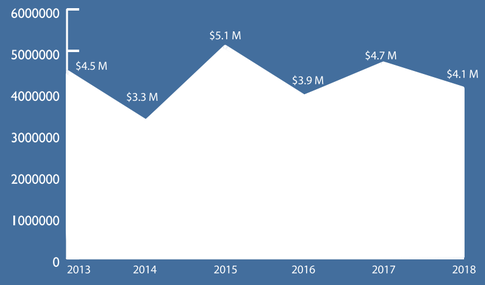
22% LEGACY GIFTS

Woodlands & Wildlife Society membership increased to **over 200 MEMBERS**

Investment Priorities

- Boone and Crockett Club Professorship
- Named Deanship
- Forests, Environment and Wildlife Leadership (FEWL) Academy
- Increase planned gifts
- Annual and endowed scholarships for new majors
- Name remaining Auburn Oak
- Name SFWS building

2013 - 2018 Extramural Funding



Learn more about SFWS program outcomes online at sfws.auburn.edu/fact-sheets

Tian to serve as a member of the International Global Carbon Project steering committee and co-lead the 2019 greenhouse gas report to the UN's Intergovernmental Panel on Climate Change

Professor Hanqin Tian was recently chosen as one of 12 scientists selected to serve as members of the scientific steering committee of the Global Carbon Project, an international project affiliated with the World Climate Research Programme and Future Earth.

Tian serves as an Alumni Professor and the Solon Dixon Professor in Auburn's SFWS and is director of the school's International Center for Climate and Global Change Research.

His primary research interest is in the understanding and quantification of coupled biogeochemical cycles in the Earth's ecosystems, human impacts on climate systems and dynamics of coupled natural and human systems.

Tian's research has covered a range of topics, including studies of carbon, nitrogen and water cycles in a variety of ecosystems across the globe, including boreal and temperate forests in North America and East Asia, tropical forests in the Amazon Basin and Southeast Asia, savannas in Africa, grasslands in the United States and Mongolia and croplands in China and the United States. His research has resulted in over 250 peer-reviewed journal articles including six papers published in Nature and Science, two of the most prestigious scientific journals in the world. His list of national and international awards is extensive, including Auburn's Creative Research and Scholarship Award and SEC Faculty Achievement Award.

On behalf of the international scientific committee, Tian has given several keynote speeches on greenhouse gas emission and climate change at international conferences held in Paris; Stockholm; Beijing; Kobe, Japan; Edinburgh, Scotland; and Washington, D.C.

The Global Carbon Project, or GCP, acts as a clearinghouse for scientific knowledge of greenhouse gases as related to human activities and the "Earth" system as a combination of its interacting subsystems including the hydrosphere, geosphere, atmosphere and biosphere.

The GCP develops global budgets for three dominant greenhouse gases—carbon dioxide, methane and nitrous oxide, having just released its annual report of the Global Carbon Budget: 2018, of which Tian is one of 76 co-authors from multiple countries.

Tian was also elected to be fellow of the American Association for the Advancement of Science, or AAAS, and co-chair of the Global Nitrous Oxide Budget, or Global N2O Budget, synthesis.

"Nitrous oxide is the third most important long-lived greenhouse gas and is also an important stratospheric ozone depleting substance. The global warming potential of nitrous oxide is about 300 times of carbon dioxide," said Tian.

"Food production and nitrogen fertilizer use have greatly enhanced emissions of N2O to the atmosphere. Effective nutrient and manure management strategies will improve nitrogen use efficiency which offers significant co-benefits to improve water and air quality as well as helping the climate."

The GCP created the Global N20 Budget to establish and improve the global nitrous oxide budget, trends and variability for 2019, as a companion to the carbon and methane budgets.

"International collaboration is essential for solutions to global environmental change and sustainable development goals," said Tian. "Strengthening partnerships for international research and education is of critical importance to Auburn University's global profile and ranking."

Tian's research group conducts cutting-edge research in global environmental change and sustainability and trains and prepares young scientists facing future challenges. In the past decade, more than 10 PhD graduate students and research associates working in Tian's lab have become faculty members in different universities in the United States.

The GCP working group contributes to the Intergovernmental Panel on Climate Change, or IPCC, a United Nations body created to assess the science related to climate change.

According to the IPCC, its purpose is to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forth adaptation and mitigation options.

The IPCC will then assimilate the budgets within its climate assessments and provide the information to policymakers to support international negotiations to address climate change.

Steury receives $1.1 million grant to study bear cub survival in Alabama

A new Auburn University research project funded by the Alabama Department of Conservation and Natural Resources will study American black bear denning, reproduction and cub survival, dispersal and recruitment (population growth rate by birth or immigration) in Alabama to determine how such demographics impact bear populations in the state.

A project that examines the denning behavior of Alabama's black bear population and its impact on reproduction and cub survival has received a $1.1 million grant from the Alabama Department of Conservation and Natural Resources.

The grant provides new funding for a five-year study on bears in Alabama directed by Todd Steury, associate professor of wildlife ecology in the School of Forestry and Wildlife Sciences at Auburn University.

Steury said the new grant will aid his research in three critical ways.

"We want to understand, first, what proportion of cubs make it to adulthood, and what the cause of death is for the ones that don't. Secondly, we want to find out where the females den for giving birth and the quality of those dens. Finally, we want to see where the cubs that make it to adulthood disperse to and whether they are able to become part of the breeding population," Steury said.

"These questions are a priority because anecdotal evidence from our own field research suggests that many of the cubs that are born are not surviving to adulthood. Thus, we need to determine if that's actually true and if so, why."

Chuck Sykes, director of the Wildlife and Freshwater Fisheries Division at the Alabama Department of Conservation and Natural Resources, said the state is home to one of the smallest and most fragmented black bear populations in North America.

"Given the relatively small size of the population and its isolation from other bear populations, what happens to young bears when they disperse from the mother is of particular concern," Sykes said.

"Anecdotal observation suggests that black bears in south Alabama may be lacking in appropriate denning habitat, and many young appear to be lost before they recruit into the population, which may be the cause of the stagnant growth of the population. Thus, effective management and conservation requires more information on its reproductive ecology and ultimate viability."

Steury said examining the dwellings of bears concentrated in Washington County, just north of Mobile, Alabama, is key.

"Bears usually den in caves, under rock outcroppings and in hollowed-out trees. The Mobile area doesn't really have caves or rock outcroppings, and the old, hollow cypress trees have long since been chopped down," Steury said. "Consequently, most of our Mobile bears seem to just build nests on the ground—hollowed out depressions, lined with vegetation. We're concerned that these nests don't offer good protection from predators and the elements for cubs, and hence may result in poor cub survival."

School of Forestry and Wildlife Sciences Dean Janaki Alavalapati said this continued research is vital.

"Dr. Steury's research on the declining population of black bears in Alabama will yield information that is critical to preserving the species in the state," said Alavalapati. "This study will lead to efforts to protect the bears and ensure that they thrive."

In the current phase of the project, Steury and his research team are visiting Alabama bear dens, taking measurements of den characteristics and fitting cubs with expandable radio-telemetry collars. They will monitor the cubs for nine months, until the young bears are self-sufficient and have made it past the initial stage of mortality.

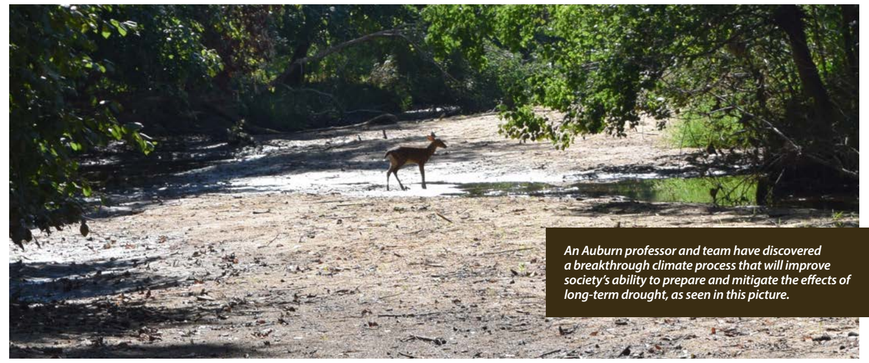
When the cubs are 2 years old—the age in which they typically disperse from their mothers—they will be caught again and equipped with GPS-enabled radio-telemetry collars to track their dispersal patterns and determine whether they move into the general population.

Steury said the renewed funding makes this critical portion of the bear study possible.

"Our previous grant only allowed us to study adult bears—where they are, how many there are, their movements and habitat use and their genetic makeup. The previous grant also funded a public survey of how people feel about bears in Alabama," he said. "However, the previous grant didn't include funding for a detailed examination of bear reproduction."

The research on bear denning, reproduction and cub survival, dispersal and recruitment (population growth rate by birth or immigration) will continue through 2023.

Kumar and team discover breakthrough climate process that will improve society's ability to prepare and mitigate effects of long-term drought



An Auburn professor and team have discovered a breakthrough climate process that will improve society's ability to prepare and mitigate the effects of long-term drought, as seen in this picture.

Sanjiv Kumar, assistant professor in the School of Forestry and Wildlife Sciences at Auburn University, led a team of researchers who recently discovered soil moisture re-emergence, a phenomenon that experts say will have a profound impact on climate predictability science, particularly in the long-term forecasting of drought.

Re-emergence is the idea that the memory of the land is not just at the surface, but beneath the surface as well and can serve as a predictor of future water availability.

The team's findings were recently published in the Journal of Climate.

"The soil moisture re-emergence process discovered in this study provides a foundational basis for developing an early warning system for drought, which is a multibillion-dollar event," Kumar said, citing the 2012 drought that spread devastation along a broad section of the U.S. and resulted in an economic loss of $30 billion, largely from the agricultural sector.

The collaborative effort includes Kumar's work at Auburn along with Matt Newman of the Boulder, Colorado-based NOAA Earth System Research Laboratory, or ESRL, and his colleagues Yu Wang and Ben Livneh at the University of Colorado Boulder.

Kumar, who joined the Auburn faculty in March 2017, began working on the project in 2016, when he was a National Research Council associate at NOAA ESRL in Boulder.

He and his co-researchers plan to continue their studies on this phenomenon.

Newman, a senior research scientist in the physical sciences division of ESRL, said his prior research has primarily focused on climate forecast models based on temperature patterns in the Pacific Ocean. This study's model took similar factors and applied them to activity in soil.

"The argument tended to be that things were much more ocean-driven," Newman said, adding that scientists often concentrate on a few months' predictability, rather than a full year.

Puneet Srivastava, director of the Auburn University Water Resources Center and an expert in water resources and climate variability problems, said the new research will have a great impact in the field.

"Through their novel research, Dr. Kumar and his co-authors are challenging the conventional thinking that root zone soil moisture anomalies persist only for a few months," said Srivastava, who was not involved in the soil water re-emergence study.

"They are demonstrating that greater memory, in the order of several months to over a year, in soil moisture anomalies exist in the layer immediately below the root zone, which has potential to enhance interannual-to-decadal variability in droughts."

SFWS Dean Janaki Alavalapati said this discovery will affect climate science in the years to come.

"The findings that Dr. Kumar and his team have made in this research are compelling and could result in substantially improved predictability of drought, leading to preventative measures and more effective warning systems that could save billions of dollars and positively impact the lives of people affected by drought each year," Alavalapati said.

Kumar said this discovery provides potential answers to societally relevant climate science questions including the prediction of drought, its severity and intensity, and the role soil moisture processes and their interaction with the atmosphere play in long-term drought.

"This study can help farmers, natural resource managers and policy makers by letting them better prepare and mitigate effects of long-term drought," Kumar said. "This is a major breakthrough in terms of how we see land in climate predictability science."

SESAF Award for Excellence

Faculty member Lori Eckhardt, a full professor in integrated forest pathology and entomology, has received the Award for Excellence in Research and Development from the Southeastern Society of American Foresters, or SESAF. The award is given to individuals who have conducted outstanding research and/or developed activities that have made significant contributions to forestry within the area served by the SESAF. Shown is Eckhardt receiving her award from SESAF President Patrick Minogue at the SESAF annual meeting and awards banquet held this January in Mobile, Alabama.

Extension & Outreach

W. Kelly Mosley Environmental Award recognizes five for their outstanding stewardship of Alabama's natural resources

Five individuals received the W. Kelly Mosley Environmental Award for Achievement in Forestry, Wildlife and Related Resources in recognition of their outstanding voluntary efforts toward the wise stewardship of Alabama's natural resources.

Local Chefs David Bancroft and Rob McDaniel contributed to the Alabama Oyster Social, a fundraiser for the state's oyster farmers.

Felicia and Lamar Dewberry work to educate and encourage countless numbers of women to take an active role in forest management on their own property.

Jerry Lacey spent decades with the Limited Resource Landowner Education Assistance Network, or LRLEAN, an association of African American landowners in the Black Belt region of Alabama, promoting sustainable forestry management.

To learn more about the W. Kelly Mosley Environmental Awards Program or to submit a nomination, please visit sfws.auburn.edu/wk-mosley-environmental-award/.

Mosley Environmental Professor and Extension Specialist Mark Smith presented Felicia and Lamar Dewberry with the W. Kelly Mosley Environmental Award.

SPOTLIGHT on alumni

CHRIS DERRICK '01

Chris Derrick, a 2001 forestry graduate, is the product line manager of the Whitetail Deer Division of Sitka Gear, a sporting goods and apparel company based in Bozeman, Montana. In 2003, Derrick follow up his undergraduate degree with a Master of Business Administration degree from Auburn's Raymond J. Harbert College of Business. He lives in Bozeman, Montana with his wife, Joey, and children Cole, 11, and Leah, 9.

What motivated you to pursue your career field?

Working with things that I'm personally passionate about is really what drove me to where I am. When I left Auburn after grad school, I wanted to head out west, so I wound up in Denver working for the western apparel company CINCH due to my background in rodeo. I was coached by Greg Williams, who started Auburn's rodeo team and who is now head coach of the national championship Auburn Equestrian team.

"I was fortunate enough to have great mentors at Auburn and early in my career who helped guide me, and I valued their opinions."

Even though I started in forestry, that's how I got my start in apparel. Once my wife and I had kids, we came back to the Southeast to be closer to family and I took a job working for Pure Fishing in Columbia, South Carolina. During those years I led marketing for the rod and reel brands, Abu Garcia and PENN. And then Pure Fishing acquired the Hodgman brand, which developed the first pair of waders in 1838. I was then asked to re-energize the Hodgman product line, which led me back into technical apparel development for outdoor enthusiasts.

I've just continually tried to work in fields that I consider to be consumer passion brands. I have no interest in working on products that don't help people pursue their hobbies. Several years ago, Sitka was looking for someone who understood technical apparel gear product development and had experience in whitetail deer hunting. Luckily, God had the stars aligned, and I wound up developing performance gear for a really amazing company.

What prepared you for your career?

I was fortunate enough to have great mentors at Auburn and early in my career who helped guide me, and I valued their opinions. Also, I pursued a degree in forestry because I loved being outdoors. That's what drove me into the field. It's weird how sometimes things just work out. I'm not in the forestry field now, but I'm absolutely tied to wildlife and land management.

My family has property in Sylacauga, Alabama, and I still hunt there today. Aligning the skills I learned while at Auburn with my passion for working outdoors set the foundation for my career. My time spent out in the woods understanding what challenges, problems and discomfort whitetail hunters face has helped me to conceptualize products that make the overall hunting experience better.

What advice would you give to a student pursuing this career?

I think if they're wanting to get into specifically the outdoor industry, be willing to take the steps to get a foot in the door. Be willing to take a few risks. Commit early in your career because it gets harder to make a move later on. It doesn't have to be hunting—it could be any field in forestry or another career. Find something you're passionate about and look for ways to showcase how well you can do that job. If I hadn't taken that unpaid internship at an advertising agency to build my skill set, then I wouldn't have been in the right place to get the job with CINCH, which ultimately opened the doors 15 years later at Sitka Gear.

Find out what you're interested in. You're going to be working from eight to 10 hours in the field every day of your life. Be sure you enjoy what you do. Hopefully, you'll find something you love.

Read more about Chris online.

Tiger Giving Day projects benefit wildlife locally and abroad

Nearly 4,000 donors supported Auburn University's fourth Tiger Giving Day, with the number of donors, gifts and funded projects breaking previous Tiger Giving Day records.

The 24-hour, university-wide funding effort, held on Feb. 21, featured 37 projects from research studies to student-led initiatives. Of the projects featured, 31 were fully funded, with the remaining projects receiving more than 50 percent of their needed funds.

SFWS hosted two projects for this year's Tiger Giving Day.

The Tiger University Consortium champions the cause of wild tiger preservation. Clemson University, Louisiana State University and the University of Missouri—all land-grant universities with expertise in conservation—are collaborating with Auburn to save wild tigers.

To support this initiative, the school's "Save the Wild Tigers" project raised $10,840 from 146 donors, surpassing the original goal by 144 percent within 24 hours. These funds will support two government natural resource agency professionals from India who will perform graduate research at Auburn to benefit wild tigers around the world.

The students will focus on conservation analysis and planning human-tiger ecosystems. They will examine ways to reduce conflict between humans and tigers in high priority areas and close gaps in conservation funding.

"A century ago, there were more than 150,000 wild tigers roaming the planet. Now, only 3,800 tigers are left in the wild," said Janaki Alavalapati, dean of SFWS.

"Through Tiger Giving Day, the Auburn Family has pooled its resources to help assure that this majestic symbol of our strength and unity, which inspires so many of our cherished traditions, will continue to live on in the wild."

The other successful Tiger Giving Day project hosted by the school, "Birding Takes Flight at the Kreher Preserve," will benefit the Kreher Preserve and Nature Center's birding program.

The nature center has recently become a designated site along the Alabama Birding Trail, and is now attracting many birders to monitor a variety of bird species. To diversify habitat and provide educational resources for visitors, funds were needed to purchase nesting boxes, cameras, binoculars and signage for the center's birding trail.

The project surpassed its original goal by 202 percent within 24 hours and raised $6,150 from 72 donors.

"Additional funds will be used to purchase interpretive signage, high-quality bird houses, nesting platforms for birds of prey and other resources that will enhance birding opportunities," said Michael Buckman, manager of the Kreher Preserve.

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Woodlands & Wildlife Society Members
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Alabama Department of Conservation and Natural Resources
Alabama Fire Council
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Learn more about the Woodlands and Wildlife Society online at sfws.auburn.edu/woodlands-and-wildlife-society.

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Learn more about Compass Circle online at sfws.auburn.edu/compass-circle.

A Lasting Legacy Initiative

What legacy will you leave? Since the conclusion of the Because This is Auburn Campaign, a Campaign for Auburn University, the School of Forestry and Wildlife Sciences has launched A Lasting Legacy initiative. Our goal is to increase the amount of planned gifts designated to the School of Forestry and Wildlife Sciences over the next two years.

Planned giving, along with annual and major giving, helps sustain and support philanthropic investments, better allowing our school to weather fluctuations in charitable giving.

One such bequest by the estate of the late Harry Murphy, co-founder of Resource Management Services, established the Harry Murphy Dean's Enhancement Fund for Excellence. This endowment supports faculty, students and staff with costs related to teaching, research and outreach in the school, while also giving the dean flexibility to help reach his vision.

Some planned gifts provide life-long income to a donor. Other legacy plans use estate and tax planning to provide for charity and heirs in ways that maximize the gift and/or minimize its impact on the donor's estate.

One of the easiest ways to leave A Lasting Legacy at Auburn University is through an estate gift. There are a variety of ways to make a deferred charitable gift, and we invite you to join other loyal members of the Auburn Family who have established a planned gift. Your support will help us preserve the Auburn experience for generations to come.

If you already have or are interested in supporting SFWS through your estate plans, please contact Heather Crozier at vannhea@auburn.edu or 844.2791. Legacy investments of $25,000 or more receive recognition in the Woodlands and Wildlife Society, as well as the George Petrie Society.

Former Auburn postdoctoral fellow accepts top wildlife position for Virgin Islands government

Nicole Angeli shown releasing green sea turtles in St. Croix.

Nicole Angeli, a former School of Forestry and Wildlife Sciences postdoctoral fellow, is the new chief of wildlife at the Department of Planning and Natural Resources for the government of the Virgin Islands.

Angeli will take on the role of endangered species coordinator of the Virgin Islands, where she will be responsible for securing state wildlife grants and funding for the management of all terrestrial species within the territory and granting permits to agencies to conduct wildlife management work. She will also supervise biologists in the civil service and communicate with the people of St. Thomas, St. John, Water Island and St. Croix.

Angeli's fellowship was with the Alabama Cooperative Fish and Wildlife Research Unit under SFWS Associate Research Professor and Acting Unit Leader Conor McGowan. Her responsibility was to use biological, stakeholder and monitoring information to create population models that inform management and support policy for endangered and threatened species. Additionally, she published an extensive amount of research during her time at Auburn.

"I've been given an extraordinary opportunity to develop professionally, facilitate and execute exciting research projects and apply for funding opportunities," she said. "I added taxonomic, geographic and methodological diversity in my own work repertoire and to that of the School of Forestry and Wildlife Sciences."

SFWS Dean Janaki Alavalapati commended Angeli's work for broadening the study of endangered and threatened species on a national level. "Her outstanding contributions and dedication make her a superb choice to take on this important and influential role in the government of the Virgin Islands."

Angeli said it is an honor to provide vision and leadership for the wildlife management of a U.S. Caribbean territory.

"I will bring the lessons that I learned at Auburn with me. I'd love to continue collaborating or hosting my friends and colleagues if they happen to come to the Virgin Islands," she said.

Best of the Best

Professor Yaoqi Zhang was selected as one of five new Alumni Professors for 2019. Up to 25, five-year, non-renewable alumni professorships are sponsored by the Auburn Alumni Association, with funds endowed from annual giving. The awards are presented on the basis of research, publishing and teaching.

Student Awards

SFWS honored exemplary students during its annual Student Awards Celebration held on April 10. A number of SFWS faculty and staff were also recognized for their exemplary service in teaching, outreach and research. During the event, L. Frank Walburn '79, was honored as the recipient of the Outstanding Alumni Award for his lifetime contributions to his industry and community.