Imaging technology measures health of individual plants to entire ecosystems

Over the years Professor Phil Townsend, along with his students and post-docs, have been developing methods to use reflectance spectroscopy to measure a range of traits related to the biochemistry and physiology of ecosystems. Perhaps you are wondering: What is reflectance spectroscopy? It is the study of how light interacts with materials; basically, where physics, chemistry, and biology come together. “We use spectrometers— instruments that are sensitive to light across wavelengths 350 to 2500 nanometers—to measure the intensity of light reflected by plants,” explains Townsend. “The variation in that reflectance is due to differences in the structure, metabolism and chemical makeup of those plants.” These measurements can be made at leaf level, just above the canopy, or from remote sensing platforms, such as unmanned aerial vehicles (UAVs), aircraft, or spaceborne satellites. This “imaging spectroscopy” allows spatial mapping of traits ranging from individual tree crowns or agricultural plots to entire landscapes. “We use this technology to map the chemistry, structure, function, and health of ecosystems—their heartbeat and lung capacity, if you like—over large areas,” says Townsend. What’s truly novel is that they have developed methods to estimate and map vegetation traits important to the functioning of ecosystems that previously were incredibly time consuming and limited in spatial scope. Now within minutes they can make measurements from live vegetation that previously required hours of measurements or...
Alumni Update

2010s
Camille Warbington (MS 2013 Wildlife Ecology) received a PhD assistantship at the University of Alberta. Her dissertation involves extensive fieldwork in Uganda on the population dynamics and demographics of the sitatunga (Tragelaphus spekii), a medium-sized antelope prized for the males’ spiral horns. Her research will help establish population parameters that can be used to manage the sitatunga population. Email: camille.warbington@gmail.com

Cody Strong (BS 2011 Wildlife Ecology) is a research assistant in the Cooperative Fish and Wildlife Research Unit at New Mexico State University working on his MS degree. His research centers on the breeding biology, habitat selection, and survival of Lesser Prairie-chickens in New Mexico. Cody is also a 2nd Lieutenant and Medical Operations Officer in the National Guard. Email: codyrstrong@gmail.com

Travis Bartnick (MS 2010 Wildlife Ecology) earned the honor of publishing the most read paper in the Canadian Journal of Zoology for 2013. The article, “Variation in cougar predation habits during wolf recovery in the southern Greater Yellowstone Ecosystem,” is based on his Master’s thesis and is co-authored with Tim Van Deelen, H.B. Quigley and D. Craighead. Email: travisbartnick@yahoo.com

2000s
Corey Raimond (BS 2007 Wildlife Ecology) is Blue Mounds Area Project (BMAP) Ecologist. He helps private landowners improve and create native habitat on their properties. BMAP is a community-based organization that works with private landowners in southwestern Wisconsin to help them enjoy, protect and restore native biodiversity and ecosystem health. Email: corey.raimond@gmail.com

EnSpec, continued from page 1

collection of foliage for chemical analysis back at the lab. This allows them to address questions they did not have the ability to look at previously, such as: How do genetic differences within populations of trees or other plants affect traits related to nutrient use and productivity. The potential applications in forestry, agriculture, and ecology are extensive. For example, Townsend has worked with Professor Eric Kruger to use these new approaches to estimate photosynthetic capacity of vegetation in replacement of cumbersome gas-exchange methods. This allows them to more rapidly and more extensively estimate forest growth rates and to rapidly assess how vegetation productivity responds to environmental changes, such as drought. Townsend and his research team have also worked with UW entomologist Professor Rick Lindroth and others to use imaging spectroscopy to map genetic variation in aspen trees. Aspen is highly susceptible to stresses, such as insect defoliation and disease. Imaging spectroscopy enables them to better understand the distribution of different genotypes of aspen and potentially identify more resistant or productive stands. Likewise, the Townsend group works with a range of researchers in agricultural crops to detect disease and other critical traits before plants become symptomatic.

Townsend’s research team is in the process of constructing a new research facility at UW-Madison devoted to developing and testing ways to apply reflectance spectroscopy to a range of basic and applied research questions. Their goal is to partner with researchers in diverse fields at UW-Madison and elsewhere, as well as with agencies, landowners, and industry, to put into practice some of these new approaches for rapidly assessing ecosystem condition. The new lab, the Environmental Spectroscopy Lab, or UW EnSpec, will have a wide range of instrumentation and provide training and best practices support to make these new measurements in support of research at the leaf, canopy, field/stand, and landscape scale. “Ultimately, we hope to link to the next generation of satellite sensors in development by NASA and other agencies so we can detect these ranges of traits globally from satellite platforms,” says Townsend.

Student Sean DuBois (left) and research technicians Ryan Geygan (kneeling) and Ben Spaier (right) make canopy level spectral measurements in a pepper field. The UW’s new EnSpec Lab will be capable of taking measurements at the leaf, canopy, field, and landscape levels. Photo: Shawn Serbin
The Wildlife Society presents awards to Norton, Garwood

Ph.D. candidate Andrew Norton has reason to feel good about attending this year’s Wisconsin Chapter of The Wildlife Society Meeting March 11-13, 2014, in Rothschild, WI. He received an award for the best graduate student paper presentation and also was named recipient of the Aldo Leopold Memorial Graduate Student Scholarship. Norton’s award winning paper is titled “A Bayesian approach to estimating white-tailed deer abundance using an integrated age-at-harvest model.” Co-authors on the paper are D.M. Heisey, M.A. Watt, R.D. Walrath, D.J. Storm, and T.R. Van Deelen. The $1,000 scholarship is presented to a student dedicated to a wildlife career who has shown exceptional commitment to developing themselves professionally.

The Wildlife Society awarded Tyler Garwood the $1,000 Undergraduate Aldo Leopold Memorial Scholarship. He was selected from a statewide pool of applicants and was chosen based on his commitment to the wildlife profession, completion of his undergraduate degree, and commitment to developing himself professionally. Tyler graduated in May and has accepted a position trapping and collaring wolves for Montana Fish, Game and Parks with plans to attend graduate school in the fall of 2015.

Student News continues on bottom of page 6

Geisler recognized for volunteer service

Congratulations to Ellen Geisler who was awarded the President’s Volunteer Service Award from Winrock International for her work in Nigeria. The award is a national honor offered in recognition of the valuable contributions of volunteers. In May 2013 Geisler, who owns a beekeeping business, taught an 8-day beekeeping training course for a group of young men in Kagarko, Nigeria. The course was part of a USAID Farmer-to-Farmer international development project through Winrock International. In nearby Awon she taught an introductory beekeeping course for men, women, and youth. Geisler says that prior to her training sessions many of the participants collected honey by destroying the wild beehives. None of the participants had heard of managing beehives for honey production. Under the guidance of Adena Rissman, Geisler completed her Masters degree in Forestry this spring. She conducted qualitative research to better understand the economic and environmental challenges facing Wisconsin’s timber industry.

Pictured below is Ellen Geisler with a group of future beekeepers in Nigeria who saw pictures of a wooden bee hive one afternoon and built their own hive the next day.

Alumni Update continued from page 2

Maggie (Grosenick) Seaberg (BS 2005 Forest Management and Recreation Resources Management) is the Timber Management Assistant for the North Zone of the Salmon Challis National Forest. She works out of North Fork, Idaho, running the timber program for the 1.7 million acre Zone. She is responsible for putting together commercial timber sales, planning and implementing hazardous fuels reduction, and forest restoration projects along with a number of other duties. Maggie notes that the Salmon Valley is a beautiful place to live and work. “It’s a wonderful thing to be able to work in a place where most people go to vacation!” Email: margareteseaberg@fs.fed.us

Lucas Joppa (BS 2004 Wildlife Ecology) was recently featured in a Microsoft Research profile piece. As a scientist in Microsoft’s Computational Ecology and Environmental Sciences Group, he develops technologies, programs and models to aide conservation efforts. To view the article and video clip visit: http://blogs.technet.com/b/inside_microsoft/archive/2013/12/16/latest-microsoft-research-luminary-lucas-joppa-conservation-scientist.aspx

After graduating from UW-Madison, Lucas served in the Peace Corps in Malawi then completed his PhD in Ecology at Duke University’s Nicholas School of the Environment. Email: lujoppa@microsoft.com

Howard Nelson (PhD 2004 Forestry and Wildlife Ecology) has taken a lecturer position at the University of Chester in the United Kingdom. Prior to that he held a position at The University of the West Indies in Trinidad. Email: howien@hotmail.com

Scott Melvin (PhD 1982 Zoology and Wildlife Ecology) was selected by the University of Maine Forestry and Wildlife Alumni Association and the University as the 2014 Distinguished...
Wildlife Alumnus. Scott grew up in Bangor and earned his BS degree in Wildlife Management at the University of Maine in 1975 followed by his MS at UW-Stevens Point and PhD at UW-Madison. He then returned to Maine where he worked at two state agencies—the Maine Department of Inland Fisheries and Wildlife and the Massachusetts Division of Fisheries and Wildlife, where he worked nearly 30 years.

1970s

Russell Kind (BS Forest Science 1976) has retired after 36 plus years of forester service with the WI DNR out of the Black River Falls office. Congratulations, Russ! Email: russell.kind@yahoo.com

Tom Larson (BS 1971 and MS 1974 Wildlife Ecology) has retired after a long career with the U.S. Fish and Wildlife For the past 38 years with the FWS he served as biologist, assistant refuge manager, assistant refuge supervisor, refuge manager and as the Midwest Region’s Chief of Conservation Planning. Tom and his wife, Patrice, will likely get to Madison every now and then since their twin daughters are enrolled at UW-Madison, one majoring in international relations and gender studies and the other in wildlife ecology. Email: bubal@aol.com

IN MEMORIAM

William Kiel, Jr. (MS 1953 Wildlife Ecology) passed away on March 21, 2014. He was 89 years old. He is survived by his wife, Jean, and four children. Mr. Kiel earned his BS at Texas A&M in 1949. After being awarded the Wisconsin Alumni Research Foundation Scholarship, Mr. Kiel moved to Madison where he received his MS and did work on his doctorate. He became a highly respected wildlife professional, holding positions with the U.S. Fish and Wildlife Service, Texas Game and Fish, King Ranch, Inc., and Texas A&M University. For full obituary visit www.memorialoakschapel.com

Forestry Club News
by Stacey Cooper

The UW-Madison Forestry Club brings together Forestry undergraduates and other environmentally-minded students and introduces them to opportunities to learn more about the forestry profession. In the 2013-14 school year, the club participated in many exciting activities. Our meetings take place on the first Thursday every month, where we discuss upcoming club opportunities and host speakers to introduce students to current issues relevant to forestry. Many of our members are also involved in the Society of American Foresters (SAF), which supports learning opportunities such as fire and chainsaw safety courses.

Spring Semester events include First Grade Forestry, an annual event in which we spend the day teaching elementary students about Forestry using fun activities. This event has been a great success. In early May, our students had the opportunity to earn chainsaw safety certification in a weekend-long workshop. In April we hosted a talk by alumnus Terry Droessler, who discussed forestry practices on an international level.

At the end of each year, we hold a BBQ picnic to honor graduating seniors. This year, we also gave a special award to Dr. Craig Lorimer, who will soon retire from the Forest and Wildlife Ecology Department after almost 40 years. He has brought the benefit of his experience into the classroom. His Silviculture and Forest Fire Behavior and Management courses have given students insight into effective forestry practices. His contributions were commemorated by the club to show our appreciation for his work.

In our recent election, we welcomed Donnie Radcliff (President), Stacey Cooper (Vice President), Trevor Iglinski (Treasurer), Meagan Backhaus (Secretary), and Andy Ciurro (Videographer) as officers for the 2014-15 academic year. In addition, we faced off against the wildlife club in our annual kickball game, and took home the prize crow! If you have any questions about the UW Forestry Club, or would like to participate in any of our events, please contact Donnie Radcliffe, the new club president, at dradcliffe@wisc.edu. More information about the club and the Forest and Wildlife Ecology department can be found at http://labs.russell.wisc.edu/forestryclub/. We encourage students from any background to join us, not just Forestry majors!
Another busy school year has come and gone at UW-Madison, and what a great year it has been for the Student Chapter of TWS! This year, the National Wildlife Society Conference was in Milwaukee and hosted by our state chapter. Aside from attending numerous plenaries, symposia, social events, and panels, our quiz bowl team also had a good showing at the annual Quiz Bowl competition. We soundly defeated Penn State in the first round but lost to Humboldt State in the second round. Although our team of Sara Matasick, Sam Emmerich, Holly Hovanec, Josh Litvinoff, and myself will be hard to beat, I have a good feeling about next year's team, which consists of Tori Fuller, Hannah Butkiewicz, Destiny Chenault, Carolin Tappe, and Jade Arneson. Next year's conference will take place in Pittsburgh, PA October 25-30th.

We offered a variety of events this spring despite the inclement weather. Highlights include the Wisconsin Frog and Toad Survey, a trip to the Aldo Leopold shack, and deer collaring. Tori Fuller also did a great job kicking up our outreach by attending numerous science nights and manning our booth at CALS Day for Kids. We just finished up the Great Wisconsin Birdathon on May 3rd, during which we saw 91 species! We ended our year with a picnic on Picnic Point and reminisced about a great semester and year.

Our meetings are held every other Monday at 5:45 pm during the academic year. We featured some high caliber speakers this semester, including Rocky Mountain Elk Foundation Chair Lee Swanson, Wildlife Services State Director Jason Suckow, and FWE’s own Andrew Norton. We also spent time tracking the famous campus foxes that Holly Hovanec has been studying as well as working on professional development with Student Services Coordinator Sara Rodock.

We have a great set of officers coming in next year: President-Tori Fuller, Vice President-Hannah Butkiewicz, Secretary-Lucas Olson, Treasurer-Danny Erickson, Outreach Coordinator-Tony Del Valle, Social Coordinator-Kyle Andreska, Marketing Coordinator-Jade Arneson, and Webmaster-Mary Schneider. We are looking for an enthusiastic person to assist Jade in her marketing duties. If you are interested, contact Tori at tfuller@wisc.edu.

Outgoing officers include Holly Hovanec, Sara Matasick, Josh Litvinoff, and myself (Tyler Garwood). It’s been a great four years. We look forward to seeing what our club will accomplish in the coming years! For more information, visit: http://labs.russell.wisc.edu/tws/.

Have a great summer!
Mladenoff featured in QUEST TV program

David Mladenoff and his team’s research are featured in the Wisconsin Public Television program QUEST. The episode is called Keeping it Cool: Otters, Cars and Old Forests, and features an in-depth look at an initiative aimed at exploring ways of building resilient forests in Wisconsin modeled after the Menominee tribe’s forest management practices. http://video.wpt.org/video/2365211962/

Forest Products Society selects Alison

The Forest Products Society awarded the L.J. Markwardt Wood Engineering Award to Adjunct Assistant Professor R. Bruce Allison and his co-authors for the technical paper, “Effect of temperature on acoustic evaluation of standing trees and logs: Part 2-field investigation.” The paper is co-authored with Shan Gao, Xiping Wang, and Lihai Wang. The award will be presented at the Society’s annual convention in Quebec.

Chemicals impact frogs’ resistance to disease

Frogs’ ability to fight disease may be linked to their exposure to pollutants, notes an article in Environmental Health News that cites the work of former graduate student Tawnya Cary, her mentor Bill Karasov and co-author Manuel Ortiz-Santaliestra. Tawnya is now a research associate in the Institute for Biology Education at the UW-Madison. The research presented in the article provides evidence that pollutants (in particular, the chemicals used in flame retardants) decrease the immune response in juvenile frogs, making them more vulnerable to disease.

MG&E honors the late Joseph Hickey

Madison Gas and Electric (MG&E) is honoring the late Joseph Hickey (1907-1993) by dedicating its 2014 falcon nesting season to him. Hickey’s research contributed to the resurgence of peregrine falcons, in particular his research on the impact of the pesticide DDT on bird populations. Hickey earned his Master’s degree at UW-Madison under the tutelage of Aldo Leopold. After Hickey earned a PhD at the University of Michigan, Leopold invited him to return to UW-Madison in 1948 to join him as the second professor in the Department of Wildlife Management. When Leopold died several months later, Hickey helped finalize Leopold’s iconic A Sand County Almanac.

Buongiorno gives keynote address in Germany

Emeritus Professor Joseph Buongiorno presented two lectures in Germany in April. The first invited lecture was at the Technical University of Munich in Freising and was presented two lectures in Germany in April. The first invited lecture was at the Technical University of Munich in Freising and was

Alexandre selected recipient of Portuguese fellowship

Congratulations to Patricia Alexandre, a forestry PhD student who was selected to receive a fellowship from the Portuguese Foundation for Science and Technology. The fellowship provides financial support as she works to complete her degree. Patricia’s research interests focus on understanding how people adapt to natural disaster, in particular wildfires as well as spatial patterns of human development in relation to wildfire, using spatial modeling techniques and satellite images. Volker Radeloff is her advisor.

Lewandowski awarded EPA STAR fellowship

PhD candidate Tera Lewandowski was awarded an EPA Science-to-Achieve Results (STAR) fellowship. The highly competitive fellowship program is designed to encourage students to obtain advanced degrees and pursue careers in environmental fields. Tera’s research focus is on the long-term effects of forest biomass harvesting on soil organic carbon pools in surface and subsurface soils in an aspen stand 20 years post-harvest. Her research will provide data for managers and other decision-makers on how to sustainably manage forests to maximize woody biomass removal, while addressing climate change and greenhouse gas emission mitigation through carbon storage in forest soils. David Mladenoff is Tera’s advisor.

Styrocycle team wins $90,000 award

Wildlife Ecology undergrad Katelyn Budke is one of a team of four UW-Madison students who won a $90,000 award to expand an innovative Styrofoam reuse and recycling program in the Madison area. The students presented their project, called Styrocycle, at the National Sustainable Design Expo in Washington, DC in April. They competed with 35 other teams for the grant to continue the program. The award enables the team to expand and prototype their program to reduce packaging material through the collection and reuse of bio-shipping containers.

The Styrocycle team won $90,000 to continue its Styrofoam reuse and recycling program. Pictured front (l to r) are FWE major Katelyn Budke, Jenna Walsh and Emily Baumann. Behind them are team advisers Frank Kooistra (left) and Andrew Markley. Not pictured is team member Jared Ottman.
Young coordinates sustainability conference

Emeritus Professor Raymond Young organized and moderated the international conference titled, “Uneven-aged management, economics, tree diversity, and the supply of carbon storage.” He also presented the keynote address at the International Conference of IUFRO unit 4.02.00 on Forest Cover Change, also in Freising. That talk was titled, “Global modeling to predict timber production and prices: GFPM with carbon offset payments.”

Follow these links for more news

MGE dedicates the 2014 falcon-nesting season to the late Joseph Hickey. www.mge.com/environment/falcons/today/hickey.htm

The research of David Mladenoff and his colleagues was featured in an episode of QUEST on WPT. http://video.wpt.org/video/2365211962/

UW-Madison’s Styrocycle team won a $90,000 award to expand its Styrofoam recycling program. http://go.wisc.edu/5d41b8

Chemical exposure weakens frogs’ immune systems. http://go.wisc.edu/lrd0rs

---

Forest and Wildlife Ecology Fund

We invite you to join us in our efforts to provide support for important department priorities. Donations to the Forest and Wildlife Ecology Fund are used to support activities such as student travel to professional meetings, help cover the costs of the summer field camp, and host special lectures.

I/we would like to donate to:  ____ General FWE Fund  ____ Graduate Student Travel Fund

I/we would like to donate:  ____ $25  ____ $50  ____ $75  ____ $100  ____ Other (please specify amount)

I/we would like to pledge $______ each year for ______ years

Please charge my gift of $________ to my (please circle):  Mastercard  Visa  American Express

Card Number:  __ __ __ __ - __ __ __ __ - __ __ __ __ - __ __ __ __  Card Expiration Date:  __ __ __ __

Cardholder’s Name (please print) ____________________________________________________________

Cardholder’s Signature __________________________________________ Date _____________________

Name(s) _____________________________________________________________

Street Address __________________________________________________________________________

City, State, Zip ________________________________________________________________

If paying by check, please make your gift payable to UW Foundation and mail to: University of Wisconsin Foundation, US Bank Lockbox, P.O. Box 78807, Milwaukee, WI 53278.

Donations may also be made online at: http://forestandwildlifeecology.wisc.edu/alumni
We enjoy hearing from you!
We’d like to hear what’s new with you, your career, family, etc. Drop us a note and include your name, degree and year, and any news you’d like to share with us. Please send your email to Mary Miron at: mjmiron@wisc.edu or drop a hard copy in the mail to the return address above.

RESEARCH CAPSULE
Autumn Sabo
Eric Kruger

Question
How do white-tailed deer affect forest herb communities?

Project
With WDNR and McIntire-Stennis formula funding, we are studying the relationship between understory plant composition and deer population density.

Preliminary Findings
Deer population density shifts the factors driving patterns in understory plant composition. For example, the importance of seed dispersal declines where deer are more abundant.