



MINNESOTA
**Forest
Scene**

Leading the way with education, research and outreach

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What has changed?

I am frequently asked by alumni, “What has changed since I was in school?” It is a large question with many answers.

Curriculum: The basic biology, chemistry, math, economics, are still there. Add to this the usual coursework in plant identification, soils, measurements, remote sensing, ecology, silviculture, harvesting, forest health, fire, recreation, hydrology,

and wildlife. But you can safely assume the content has been updated as scientific understanding and technological capability has grown! Today there is also increased emphasis placed on policy and the human dimensions of natural resources. Finally, there remain two vital field sessions now offered from the much enhanced Cloquet Forestry Center.

Faculty: A big change occurred from 1960-80. Faculty who were hired largely for instruction retired and were replaced by faculty now asked to focus on both research and education. Since the 1990s the University has increasingly emphasized quality undergraduate instruction. Our faculty have responded by winning numerous teaching awards.

Students: This is perhaps the greatest area of change. Today’s students are better educated in the basic sciences, have great tools for rapid inquiry (via the internet), but are often less experienced in actually working in and with nature. This makes the integrative nature of the curriculum, field courses and active learning approaches increasingly important.

This is just a brief overview of what has changed since you were in school. Those attending the events this September will hear more in detail – see the last page for event information. We hope you can join us!

Alan Ek, Professor & Head, Forest Resources

Great Timing: What Can We Learn From Phenology?

With spring in Minnesota comes a host of changes in the environment around us that are impossible to ignore: drab gray scenery gives way to bright greens, birds return to their summer homes, and spring warmth brings people and animals out of hiding. In other words, spring is full of activity in the field of phenology – the study of the timing of plant and animal life-cycle events.

Using phenology, Professor Rebecca Montgomery is looking for a new understanding of tree biology and the impacts climate change may have on our forests. “I’m interested in the question of how our forests and our forest species might respond to climate change,” Montgomery says. “If we have some understanding of their biology and how their biology may be affected, that will help us make decisions on how we manage our forests and parks.”

Historical Data

As a starting point, Professor Montgomery and her student workers have been delving into historical phenology records for Minnesota. These long-term records are an important

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way of better understanding what changes may already be occurring in the timing of biological life-cycle events. Professor Montgomery will be the first to analyze historical phenology data sets for Minnesota.

One of the data sets is from Dr. Alex Hodson, a professor of entomology here at the University of Minnesota, who recorded observations of a set of plant species every day on his walk to work. He kept these records for an astounding 50 years. Another data set Montgomery is analyzing was provided by John Latimer from Grand Rapids, MN. Latimer is a mail carrier who has been making phenological observations for almost 30 years and uses them for his Phenology Report on the KAXE radio station.

“We are interested in looking at these data sets as a way to see if the timings of these events are changing,” says Montgomery. “We look at whether different species show change through time and then also trying to explore why they are changing.” The records are being linked to local climate data.

“We know that spring bud burst is strongly related to temperature in a lot of species, so the expectation is that the warmer the spring the earlier the date of first leaf out,” Montgomery explains. “And we’re finding that for some species but not others.”



Cue Experiments

To better understand the different responses seen among tree species, Professor Montgomery wanted to learn more about the mechanisms behind these events. One area she has been studying is the relative importance of different cues that trigger phenological events, like budburst, in trees.

When looking specifically at what triggers trees to leaf out in spring, there are three known cues: the day length, the warm temperatures of spring, and the amount of cold plants experience during winter. “Buds need a certain amount of cold to burst at all,” explains Montgomery. “For example, if you took a maple from Minnesota and overwintered it in Florida, it would never break bud because it didn’t receive enough cold. Species differ in how much cold is required to break bud. In addition, once trees have been exposed to enough cold to be capable of breaking bud, some respond to additional cold, like that in a long winter, by speeding up bud burst once it warms up.”

To explore the role of these two temperature cues, winter chill and spring warmth, Professor Montgomery has been conducting experiments that bring branches in at different times of the winter, beginning in mid-December this year. The lab simulates the long days and warmer temperatures of springtime to see how long each species takes to break bud.

“We’re finding really big differences among species,” she says. “For example, tamarack will break bud within two weeks pretty much any time you bring it in, which suggests it doesn’t have a strong

requirement for chilling to make those buds break quickly. Red maple is the opposite. We can bring that in at the end of December, and it will take weeks and weeks. You’ll think they are never going to break bud and that the branches are dead, and then they burst bud. But if we bring them in in early April, they will break within a week and a half.”

These are just two species showing two variations in the importance of winter temperature. Some species may respond most to temperature cues, warmth or chill, while other trees may take their strongest cue from day length. There are many ways these cues could affect trees and our forests. Trees that respond primarily to spring warmth may benefit by an early spring because they are able to take advantage of a longer growing season. However, if climate change produces an unusually warm spell too early in the season, these same trees may be at risk of frost damage if cold temperatures hit again. Similar scenarios of pros and cons play out with each species that responds to a different cue. “I think about the cues for phenology as kinds of risk avoidance strategies, and some species are more risk averse than others,” says Montgomery.

Montgomery hopes to continue additional research in this area. By studying multiple tree species that occur naturally together and determining how each species uniquely

responds to cues, she hopes to paint a better picture of how these species may interact as a forest in the future.

Phenology Network

In addition to data crunching and experimental research, Professor Montgomery has been working with phenology enthusiasts, environmental learning centers, the Will Steger Foundation, and others across the state to develop a statewide observer network. The goal is to have many individuals formally monitoring the phenology of a key set of species. A website is currently in development where participants will be able to sign in, input their data, and also view the data records from other participants.

Such a network across Minnesota will continue these long-term records of phenology with an increased geographic distribution. “I can’t collect data at 100 places in the state every day,” says Montgomery. “It’s a great way to getting a lot of data by spreading out who is collecting it.”

Not only will a phenology network benefit the research, but it can also play an important role in educating and engaging the public in environmental issues. Watching and recording changes in plant and animal events can be done anywhere from your backyard, a neighborhood park, or a natural area. “It’s a very local way to make connections with the environment and be an observer,” says Montgomery. “Phenology is a really good tool for teaching about climate change and teaching about how plants and animals and what they do relates to climate.” ■

Welcome, New Faculty!

Dr. Linda Nagel

The faculty and staff of the Cloquet Forestry Center and the Department of Forest Resource are pleased to welcome Dr. Linda Nagel as Director of Operations at the Cloquet Forestry Center and Professor within the Department. Dr. Nagel's background includes a Master's in Natural Resource Sciences from Washington State University and a Ph.D. in Forestry from the University of Montana, Missoula. Her areas of expertise are in silviculture, forest vegetation dynamics, assessment of invasive plant species, and adaptive silviculture in the face of climate change. Dr. Nagel will be starting in her dual roles this August.

As Director of Operations, Dr. Nagel will be managing both the Cloquet Forestry Center (CFC) and the Hubachek Wilderness Research Center (HWRC) to develop the research, education, and outreach goals of each center. There is a long history at Cloquet with much to offer, and the Department looks forward to seeing the new opportunities and strengths Dr. Nagel will bring.

In addition, Dr. Nagel will also be a Professor within the Department to help develop research and programming in silviculture and applied forest ecology. She will play a key role in the coursework that undergraduates take during their field sessions at Cloquet.

Dr. Diana Karwan

The Department is also pleased to welcome Dr. Diana Karwan as Assistant Professor in forest hydrology and watershed management. Dr. Karwan has a Masters of Environmental Science, and a Ph.D. in Forestry and Environmental Studies from Yale University. Her research focuses on watershed hydrology and critical zone processes, seeking to understand how variations in climate and land use drive physical, chemical, and ecological transport processes in watersheds.

This fall Dr. Karwan will be teaching FR 3114/5114: Hydrology and Watershed Management. This is the key hydrological course for many undergraduates studying forestry, urban forestry, parks, recreation, environmental sciences, and fisheries. During the course, Dr. Karwan plans multiple field trips for hands-on experience exploring the hydrology of the region.

The Department looks forward to welcoming both Dr. Nagel and Dr. Karwan to our team! We look forward to all that you will bring to our efforts in education, research, and outreach!

Professor Bauer: A New Fellowship

This coming year, the Department will be able to offer a new fellowship to graduate students in remote sensing of natural resources thanks to Professor Marv Bauer. Professor Bauer, who joined the Department in 1983, specializes in using various digital remote sensing technologies to inventory, monitor, and analyze our land, vegetation, and water resources.

The Marvin E. Bauer Remote Sensing and Geospatial Analysis Fellowship will be awarded to a graduate student starting next year. This fellowship will assist full-time graduate students in their studies and research on remote sensing for analysis and monitoring of natural resources and the environment.

Marv and his wife, Jean, both enjoyed careers at the University and wanted to give something back to the University and its students. "Hopefully it's beneficial to students over the years and helps them realize their educational and career goals," says Bauer.

Even before his fellowship contribution, Professor Bauer has been creating a legacy through his work. Currently, he is working with the Metropolitan Council to generate a new and more accurate land-cover and land-use map for the seven-county metro area. Proposals are in the works to also update the statewide land-cover maps. "We've done that once before, but now the results are quite old and need to be updated," he says.

The new land-cover and land-use maps will use improved imagery and new image analysis methods to increase classification and mapping accuracy. For the metro areas and selected cities across the state, the resolution of the new maps will be one-meter compared to thirty-meters used elsewhere. This high level of detail can help areas seeing significant growth in planning and decision making.

Professor Bauer is also continuing his work on monitoring water resources and water quality in the state. Bauer and his colleagues are working on the eighth statewide assessment which has included more than 10,000 lakes each time and enables analysis of geographic patterns and temporal trends. This project will benefit from improved satellite data. "That will enable us to do more," says Professor Bauer. "Right now we can estimate water clarity. It's an important indicator of water quality, but it's not the same. It would be better to also monitor individual components of chlorophyll and sediment. We think we can do that with some of the newer satellite data that will be soon available."

Thanks to Professor Bauer for his contributions both professionally and financially. The new fellowship and gifts of this kind help support our students as well as the mission of the Department. ■

Student Spotlight: Dustin Ellis

Like many of our nontraditional students, senior Dustin Ellis came to us with a unique background and a focused goal. Now a student in the Urban and Community Forestry track, Dustin previously worked as a chef for 15 years before deciding to switch careers.

"I wanted to do something where I could make change," says Dustin. "I have children, so I wanted to be able to show them that you can work toward something and produce change."

After deciding to switch careers, Dustin started at Rochester Community and Technical College in an environmental studies program. During his first year he began volunteering for various urban forestry projects, including the University of Minnesota's Tree Care Advisors program. With these experiences, Dustin became interested in urban forestry.

He continued to pursue that interest interning for the City of Rochester and with further volunteer work with the University programs. Then in the spring of 2011, Dustin made the transfer to the Twin Cities campus. "With the environmental studies program, I had no idea what field I really wanted to go into. It's very wide ranging in focus," says Dustin. "I really nailed it down with urban forestry, and this is a really good urban forestry school. It just fit."

While it has been challenging, Dustin has enjoyed the program and the education he is gaining here. "I've had to stretch a lot more than I thought I could, so that's been very good," he says. He also commented on the field of urban forestry being more in-depth and interesting than he had anticipated, "It's a science program, and there is a lot more to it than I thought coming in. It's hard work, but it's really rewarding."



From the beginning, Dustin's goal has been to work in municipal forestry. In addition to interning for the City of Rochester, he has also interned with the City of St. Paul. He wants to bring the latest methods and knowledge with him from the undergraduate

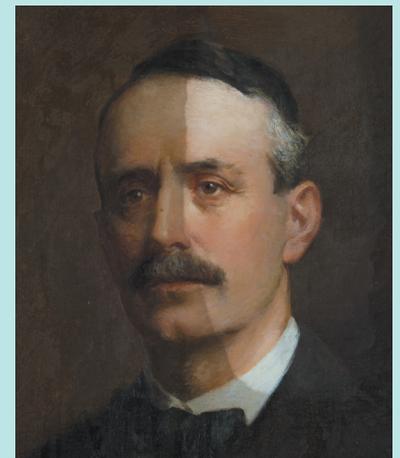
program to municipal work and be part of positive change. "It's the whole reason I got into the field; I felt it was a place where I could exact change personally that would somehow last," says Dustin. "It could last for 100 years possibly." ■

Sam Green is Back!

Two years ago, the Department of Forest Resources solicited donations to help restore the portrait of Professor Samuel Green, founder of the University's forestry program. The portrait, painted in 1910, had hung in Green Hall for many decades. Keeping an eye on the students is no easy task, though, and the portrait was in much need of restoration.

The photo to the right shows the restoration process partway through; what an amazing difference! The restoration artists at The Midwest Art Conservation Center not only cleaned the portrait but also patched some physical damage to the canvas.

We would like to thank those who kindly donated to help restore the portrait and to preserve this piece of our history: Ted Hullar, A. James Phillips (deceased), Dick and Pauline Skok, David Thorud and Ann Goss, Tom and Janelle Schnadt, Alan and Carolyn Ek, and one donor who requested to remain anonymous. The restoration project is now complete, and we look forward to having Sam Green back in his building for many years to come.



2013 Newman Awards

This year's Richard C. Newman Award recipients highlight the outstanding efforts of our faculty. The awards are made possible by the generosity of Richard C. Newman, an alumnus of the School of Forestry, Class of 1951. The Art of Teaching Award is presented annually to a faculty member who focuses on the natural resource sciences, achieves excellence in teaching, and has a positive impact on students. The Community Impact Award is presented annually to a faculty member who achieves excellence in designing and delivering outreach programs in the natural resource sciences that have a positive impact on external communities and Minnesota citizens.

2013 Art of Teaching Award Recipients: Andrew Jenks, Forest Resources, and David Schmidt, Bioproducts and Biosystems Engineering

2013 Community Impact Award Recipient: Mae Davenport, Forest Resources

Congratulations to this year's recipients, and thank you for your many contributions!

Student Life

The Department is always proud of its student groups and all they do. We have wonderful students who are engaged in the program, excited about the field, and are great representatives of what this department is all about. In this issue, we bring you a Q & A with the presidents of two of our most active clubs.

Matt Suzukida, President of the Forestry Club

What has been your favorite club activity this year?

My favorite club activity was Conclave. A lot of students went and it was fun to go on a road trip somewhere. Also, we have gotten to know students from the other schools, so it is always fun to see them. I also like the competition of the events.

What club accomplishment are you most proud of?

I am most proud of the Christmas Tree lot. The club puts in a lot of time and effort from working at Carl's Christmas tree farm to working 20+ hours a week for a month at the lot. The money raised from the tree lot funds many of our activities and allows the club to give out scholarships at the end of the year to club members, which I think is really cool.

What was the biggest challenge?

The biggest challenge is the time commitment as the president. I probably spend more time on the club than any of my classes.

What is your advice for next year's president?

My advice would be to do things early and don't wait for the last minute. Things come up a lot when planning events so it helps to start organizing events early to give yourself plenty of time. Also, as the previous president told me, treat this like a class and set due dates for things.

Sawyer Scherer, President of the Society of American Foresters UMN Student Chapter

What has been your favorite club activity this year?

My favorite activity for the year was absolutely being able to attend the national convention in Spokane, WA. The ability to meet with other schools, interact with professionals, and attend seminars on the cutting edge research is such a great experience for all of us. I look forward to heading to Charleston for next year's convention!

What club accomplishment are you most proud of?

I am very proud of being able to organize the trip to Lynn Mizner's farm in Palisade, MN, to work on pruning and thinning. My goal this year was to increase opportunities for students to receive hands on field experience, and I think this trip was a great start.

I hope that next year we can add several more opportunities such as black walnut pruning and chainsaw training.

What was the biggest challenge?

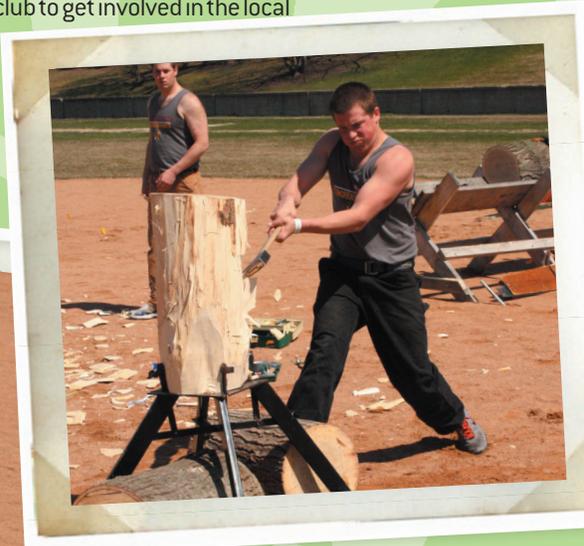
Certainly the biggest challenge of being a student organization leader is balancing time. Being a good president requires some serious time commitments, and that can be tough to balance. Luckily I have had the help of some great students and excellent staff and faculty.

What are your goals as President next year?

I hope that next year I can increase involvement in SAF events. I would like to add more opportunities for field experience on and off campus. Also, I would like the club to get involved in the local community and the Minnesota forestry community.



Left to right: Sawyer Scherer, Ben Whelan, Paul Swanson, Matt Suzukida, David Rudolph, Lauren Stufft, and Emmie Peters at the SAF convention



(left) Juniors David Rudolph and Sawyer Scherer at the holiday tree sale. (middle and right) Forester's Day: Junior Stephanie Zahler on the double buck and Junior Ben Whelan demonstrating the standing block chop



Department of
**FOREST
RESOURCES**

115 Green Hall
1530 Cleveland Ave. N.
St. Paul, MN 55108

College of Food, Agricultural
and Natural Resource Sciences

UNIVERSITY OF MINNESOTA



Department of
**FOREST
RESOURCES**
UNIVERSITY OF MINNESOTA

Dept. of Forest Resources
Attn: Jenna Williams
115 Green Hall
1530 Cleveland Ave. N
St. Paul, MN 55108
Phone: 612-625-3107
E-mail: jwill@umn.edu

Visit us at

www.forestry.umn.edu

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SAVE THE DATE!

Mark your calendars for September to join us for the **Cloquet Alumni and Friends Day** on **September 7th, 2013**. All are welcome to come to the Cloquet Forestry Center and learn about Minnesota's oldest research and education forest. Enjoy tours, talks, and a barbecue dinner and social.



Plus! A special note for graduates of **1962, 1963, and 1964**: in addition to the Alumni and Friends day, you are invited to a combined 50-year class reunion! First, join your classmates in the Twin Cities on Friday, September 6th, 2013. The day will include a morning coffee and conversation, a tour of St. Paul campus, and a class luncheon. Then, everyone is invited to join the fun at the Cloquet Forestry Center for the Alumni and Friends Day. Lodging is available for both Friday and Saturday nights at the Cloquet Forestry Center or nearby.

Class of 1962 contact: Larry Revier at 218-204-1140 or rev@arvig.net
Class of 1963 contact: Darrel Kenops at 208-884-1076 or dkenops@msn.com
Class of 1964 contact: Alan Ek at 612-624-3400 or aek@umn.edu

More details to come for both events!