

Forestry Matters

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.”

— Charles Darwin

February 2010



Dates to Remember

- March 5-7 MFC field trip to North Bay
- March 8 Special Seminar at noon in Room 4001.
Don Roberts. Managing Director with CIBC World Markets Inc.
- March 12 UofT's Sustainable Energy Fair-2010. Hart House
- March 17 St. Paddys Day. Think Green and Be GREEN

A Brief History Of The Haliburton Meteorological Tower

By Mike Fuller and Sean Thomas

During the Summer of 2008, members of the Faculty of Forestry, along with members of the Departments of Chemistry and Geography, constructed a new 30m meteorological tower within a remote, managed hardwood stand in the Haliburton Forest and Wildlife Preserve. The tower, which will support a broad range of faculty and student research projects, was the brain-child of Faculty professor Sean Thomas. The tower was funded through a Strategic Grant, in collaboration with U of T professors Jennifer Murphy (Chemistry) and Nathan Basiliko (Geography). Here, I provide an introduction and short history of the tower, and a summary of the project goals.

The principal goals of the Haliburton tower are to measure the flow of nutrients, water, and energy into and out of managed temperate forest, and to determine the environmental conditions that most influence plant growth and ecosystem processes in this system. The information acquired from the tower will help researchers better understand the ability of forests to buffer global ecosystems against the impacts of greenhouse gas emissions. In addition, the environmental data that is continuously recorded at the tower will be a boon to research on post-harvest stand development, which seeks to improve the sustainability of harvest practices and increase our understanding of the effects of global climate change on local and regional forest growth and biodiversity.

The ability of forests to absorb and sequester carbon is controlled, in part, by the growth rate of vegetation. In the Northern Hemisphere, plant growth is typically limited by low soil nitrogen concentrations (which is why fertilizer contains nitrogen). As global use of fertilizer and fossil fuels has soared, so have levels of nitrogen compounds in the environment.

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Remember When?

It was back in the mid 1990's that the Faculty of Forestry was in the midst of trying to keep the B.Sc.F here at the University. Thanks to Cheryl Leger for submitting this picture of our students organizing a rally at Queens Park



Sports and Stuff

Woodsmens Team

Our Woodsports team had a great showing at the Woodsmen's Competition at McGill this month. Our team overall beat both Dartmouth College and Suny College, and placed well in the Quartersplit event and Pulp toss events. However, the highlight of the competition came late in the day at the water-boil event. With the temperatures plummeting to below -20, many competitors were fumbling to light their fires; this was not the case with Eric Davies. Eric ripped through the event in just 5 minutes and 27 seconds, beating all other competitors by 45 seconds or

more to take home UofT's first ever competition victory! Our team let out a thunderous applause at the awards ceremony and our team earned a hearty applause from the rest of the competitors. The chalice that was awarded to Eric will be proudly on display in the faculty's display case throughout week for all to see!

On behalf of the team I would like to thank the support from the faculty in making our trip possible, and to everyone who wished us luck!

Cheers,
Adam



He Can Relax!!!!!!

Cheryl Leger also supplied this picture of me from many years ago. I guess once upon a time I could sit still and relax but get a load of those cool shades.

SPECIAL CONFERENCE NOTICE

GETTING BACK TO OUR ROOTS

**ISAO'S 61st Annual Educational Conference & Trade Show
February 10-12, 2010, Niagara Falls, Ontario**

I was in Niagara Falls the week of Feb 0-12 for the International Society of Arboriculture - Ontario Chapter Conference and AGM. It was a very informative conference; the theme this year was urban soils. Many different issues were discussed, including basic soil science; methods for remediation of compacted urban soils, new soil preservation technologies and soil biology. One of the main speakers this year was James Urban, a renowned landscape architect and soil scientist. As a certified arborist, this knowledge should be at the forefront when discussing problems with trees. If an adequate growing medium is not available, the trees we hope to cultivate in the urban forest do not have a chance to reach their full potential and we cannot reap their benefits to the fullest. One of the most interesting aspects of the conference was the extended invitation to Landscape Architects; they are the designers and the people that set out the specifications for tree planting. Increasing the knowledge base to include the fundamentals of the growing medium provided, and the necessary spacing for trees will play an invaluable role in the landscape planning process and enhance success for the urban forest. More information on the International Society of Arboriculture is available at: www.isa-arbor.com or for the Ontario chapter - www.isaontario.com.

Laura Storozinski



In early February I attended the week long joint meeting of the Cooper Ornithological Society, the American Ornithologists' Union, and the Society of Canadian Ornithologists in San Diego, California. I received a student travel award from the AOU which allowed me to attend the conference and give a presentation entitled "Does single-tree selection influence nestling provisioning rates in Rose-breasted Grosbeaks?"

Also, while at this conference and at CONFOR I got a lot of questions about the future of our Faculty of Forestry, and without exception everyone who had heard the rumours immediately expressed both dismay and concern.

Sonya Richmond
PhD Candidate

Paul Cooper went to the South Eastern Utility Pole Conference in Memphis Tenn. Feb 22-23 to present a paper on Management/disposal of poles removed from service.

Andy Kenney and Shashi Kant attended the International Conference on Urban Forestry in India Feb 16 to March 2nd. Both will be delivering some lectures to Indian Forest Service Officers.

Tat Smith travelled to Sweden and Nova Scotia on Bioenergy related responsibilities in mid-February and early March:

- 13-19 Feb – IEA Bioenergy Task 43 national team leader meeting in Göteborg, Sweden and a bioenergy course planning meeting at SLU in Uppsala.
 - 25 Feb – 3 March – invited paper at a Bioenergy conference in Halifax, NS and a 2-day contribution to the bioenergy course at SLU in Uppsala.
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RESEARCH UPDATES

Haliburton Forest Mega-Plot.

Sean Thomas' research group has been working on completion of the Haliburton Forest "mega-plot". Data was collected through November, and final determinations of difficult species (such as spruces – of which many hybrids occur in the plot) are now (nearly) complete. From Feb. 14-18 Sean attended a data management workshop held by the Smithsonian's Center for Tropical Forest Science at Bradley University in Peoria Illinois, to learn the database programming language SQL. The Haliburton mega-plot includes records of the species, stem diameter, and precise spatial location of 45,657 trees. Of Peoria, Sean says "it's a great place to really be able to focus, free from distraction, on the exciting world of database management programming".

Graduate Student Profile

During a 2010 summer field season, Ms. Quinn will be collecting data to investigate age-related crown-thinning in tropical trees on Barro Colorado Island, Panama, in collaboration with Smithsonian Tropical Research Institute. The main questions she hopes to address are:

1. Does age-related crown-thinning occur in common canopy-dominant tropical trees?
2. How do age-related thinning trends compare among different species?
3. Do lianas and epiphytes offset crown-thinning signals?
4. How closely does LiDAR derived LAI data correspond to ground measurements of crown-thinning?
5. Are there differences in species composition or richness of understory vegetation related to crown-thinning?



Seedling census in Luquillo Forest, Puerto Rico

Special Book Offer!!!!!!

Copies of the book "One Hundred Rings and Counting: Forestry Education and Forestry in Toronto and Canada, 1907-2007" are still available for purchase at the special Faculty price of \$40 (plus shipping). Contact Kathy at kathy.giesbrecht@utoronto.ca for the order form and instructions.

DANCING WITH THE STARS HAS NOTHING ON "FORESTRY'S SALSA NIGHT"

Instructors, Natalia Kusendova and Marcin Lewandowski were very patient with all their dance students while teaching them the how to SALSA. What a great way to spend a winter weekday evening and better use of a classroom.



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These nutrients can be transported long distances and deposited with rain far from the original source, influencing plant growth and the composition and diversity of plant communities. An important goal of the joint research project is to establish the deposition rate of nitrogen at Haliburton forest, and its effect on the carbon budget and other community properties. The information gathered at the Haliburton tower can then serve as an estimate of regional deposition rates and their influence throughout the forests of central



Ontario. Related projects will examine the ability of biochar, a form of carbon-rich soil amendment derived from burned mill waste, to improve forest growth and carbon sequestration.

But before any projects can proceed, the tower must be outfitted with meteorological instruments and data logging equipment. Once tower construction was completed in the Fall of 2008, an ongoing process of establishing the necessary infrastructure began with the installation of solar panels and batteries, along with the first set of sensors for wind, temperature, rain, and light levels. A separate, small

weather station was also set up beneath the tower for monitoring ground-level conditions. The first data logging units were battery powered and required periodic visits to download the recorded data and change the batteries. Several hardy forestry members made tower visits during the winters of 2009 and 2010, via snow mobiles, to keep the data loggers up and running. It was during the first winter that we discovered how well the tower, and its instruments, hold up against the harsh Canadian conditions. Wind, snow, ice, and the fall of snow-laden branches took their toll on the less robust sensors, and many had to be replaced.



Work on the tower continued throughout 2009, with the installation of additional instruments, including a sonic anemometer and gas analyzer that take extremely precise measurements of trace-gas fluctuations. Much to the delight of researchers, in early Summer 2009 the primary data logger was replaced with a solar-powered unit capable of



transmitting data via cellular phone. Data transmitted by the cellular logger can then be downloaded via the Internet, saving time, reducing effort, and allowing researchers to more closely monitor conditions at the tower. As of February 2010, instrumentation, sensor calibration, and tower maintenance are ongoing. As recently as January 2010, we installed a new sonic sensor that will record changes in snow levels at the base of the tower.

Many students and staff members of the Faculty of Forestry have participated during the crucial instrument set-up period, including Sean Thomas, Mike Fuller, Fraser Smith, Adam Martin, Jon Schurman, and Jessica Stokes.

The installation of the Haliburton meteorological tower opens a new chapter in forest research at the University of Toronto. By establishing a foundation for environmental studies and multi-factor monitoring, the tower provides a solid platform for future studies, including student research, into the complex interactions between managed ecosystems, nitrogen eutrophication, and climate.



Ontario Forestry Association Annual General Meeting

It was great to see the Faculty of Forestry so well represented at the meeting held on Feb 5, 2010. In attendance were our academic staff, current students and a large group of our alumni. Our MFC graduates were noticeably well represented.

Photo's Courtesy of Mike Clarke





The future of the forest

Ning Yan is adding value to the forestry industry by *Jenny Hall*

Canada's western forests are under attack. An infestation of mountain pine beetles has decimated hundreds of thousands of hectares of trees, leaving behind only degraded wood and bark.

Nobody wants bark. Even in the context of healthy trees harvested by the forestry industry, bark is considered waste. In sawmills it's either burned—inefficiently—for heat after the rest of the tree has been processed or simply thrown away.

Where everyone else sees waste, Ning Yan of the Faculty of Forestry sees opportunity. "If you look at bark from a chemical composition point of view, it's very good," she says. "Bark offers protection to the tree. It has unique antifungal and antioxidant properties. It contains components and chemicals we can use."

Her research group is experimenting with bark to make green adhesives that could replace synthetic petroleum-based glues for all kinds of applications. "The idea here is that we are using waste biomass to make a renewable chemical that can replace a chemical that comes from petroleum resources."

She is also using bark to create a product that could replace particle board. Because the chemicals in bark have natural adhesive properties, she is able to make 'bark board' in the lab without any glue at all. "With traditional particle board you need to use glues. You need to add chemicals. We are thinking that the bark will stick to itself."

Yan's work with bark is one of many projects she has on the go. She is breaking down wood fibre and making nanocrystals out of it. These could be used to make new materials that can substitute for similar nanomaterials made from petroleum-based sources. She is working on 'bioactive paper,' depositing bioactive agents on paper to make inexpensive diagnostic sensors to detect disease outbreaks or waterborne contaminants. She is making lighter wood panels for use in furniture construction by replacing either solid wood or particle board with paper honeycombs that provide all of the strength at a much lower weight and cost.

Underlying all her projects are two intertwined philosophies. The first is a belief that forest-based products can be used to replace non-renewable petroleum-based products in a variety of applications.

"We have this tree, which is very good material," she says. "The convention is to make furniture or lumber out of it, and that's fine. But maybe we can make something even more valuable."

She also believes that traditional forest products can be made more sensibly and sustainably.

"Nature has engineered wood to be the perfect material. We can try to imitate it but we cannot do better. It's lightweight, strong, insulating, biodegradable, and renewable if managed properly. We are going to keep using wood in our daily lives. But how can we use it in a smart way, more responsibly, more sustainably?"

All this makes sense environmentally, but it's also good for Canada's bottom line, she says.

"The forest industry is a major economic engine for Canada. But it's not doing well. It has been focused on taking trees and making them into simple products. These are products that everyone can make—now we have competitive pressure from China, Brazil, and other places. Manufacturing costs are high here and we use very outdated machinery.

"As researchers we try to find new, innovative ways to use these raw materials that are not only more environmentally friendly but also can generate more value."

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"Why did the bear eat the phone?...Because it is a blackberry!"

Composed and submitted by 6 year old Ayleen Farnood

and not to be outdone by her older sister:

"Why did the horse eat the phone?...why?... It is an apple!"

Composed and submitted by 4 year old Eila Farnood