

Branch LINES

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From the Dean's Desk



In previous editorials I have spoken of the three **R**s of forestry, namely **R**esearch, **R**einvention and **R**ecruitment. I covered Research in my March editorial and, with the start of a new academic year, Recruitment would seem to be an appropriate topic for this autumn issue of **Branch Lines**.

During the past few days another of the federal government's Innovation Summits was held in Vancouver with Minister Alan Rock encouraging the 250 participants to develop their ideas in the four "innovation challenges" of Innovation Environment, Strengthening Communities, Knowledge Performance, and Skills and Learning. Although all four of these topics are of direct relevance to the forest sector, it is the latter three areas which are directly related to the alarming trend of globally declining undergraduate student enrolment in the natural resources sector. Although we have yet to have a final tally of enrolment numbers from North American forest-related faculties/schools, the figures that we do have show a continued decline in all parts of the country with the biggest decline occurring in the traditional core discipline of forest management. What makes these trends even more concerning are the indications that the average age of many forest sector employees is in the late 40s to early 50s with many trades-people, such as plant engineers, showing a significant retirement bulge in the next 5 to 10 years. This is occurring while the federal government works to move Canada into the top five of "competitive countries" with one of the mainstays of this strategy being the doubling of skilled and qualified people in key areas of the Canadian economy.

Thus, at the same time as the federal government is encouraging investment in people at the undergraduate and graduate

level so that we can move into a more competitive, innovative position, the forest sector continues to have problems in attracting the quantity and quality individuals that we need firstly to replace our imminent retirees! Although several of my colleagues have the opinion that this decline in student enrolment reflects the cyclic nature of our forest sector, I suspect that the next few years will be critical in how we position ourselves to attract the "brightest and best" into a career that can be at least as exciting, significant and strategic as any other area. However, we have some major obstacles to overcome, from the perceptions that the forest sector is low-tech, sunset, environmentally suspect, unrewarding and insignificant to the lack of cohesion and belief in how essential a vibrant forest sector is to the future well-being of our B.C. and Canadian economy. These issues are bigger and more multifaceted than we at the Faculty of Forestry can deal with alone and it is gratifying to see groups such as the rapidly evolving FPAC (Forest Products Association of Canada) co-ordinating the forest sector's response to the HRDC (Human Resources Development Canada) challenge of addressing the Skills and Training component of the federal Innovation Agenda. However, considerably more has to be done with all components of Canada's forest sector working together to not only dispel the unflattering myths and perceptions that I have mentioned above but also to show why training and excellence in fields from engineering to anthropology,

economics to genetics and conservation to marketing are all relevant and necessary for a globally competitive Canadian forest sector.

In this coming year, we at UBC Forestry have committed considerable resources to working towards attracting the brightest and best students to our undergraduate programs. Dr. Simon Ellis has taken on the role of Director of Recruitment and Co-op and, as described in more detail in this issue of **Branch Lines**, Steve Baumber and Geoff Anderson have joined Sandy McKellar and Barbara Bremner to establish our recruitment and co-op "strategic mission team".

We have developed the tag line "**Creating Leaders Rooted in Science**" to highlight what we see as our core mission here in the Faculty of Forestry, and are confident that we have the facilities, faculty and staff to achieve this goal. Our collective challenge is to show our young people that the forest sector continues to be an increasingly exciting and vibrant place to develop a career.

You can reach me in person, by letter, fax 604-822-8645, phone 604-822-2467, or e-mail saddler@interchg.ubc.ca.

Jack Saddler



FORESTRY

Creating Leaders Rooted in Science

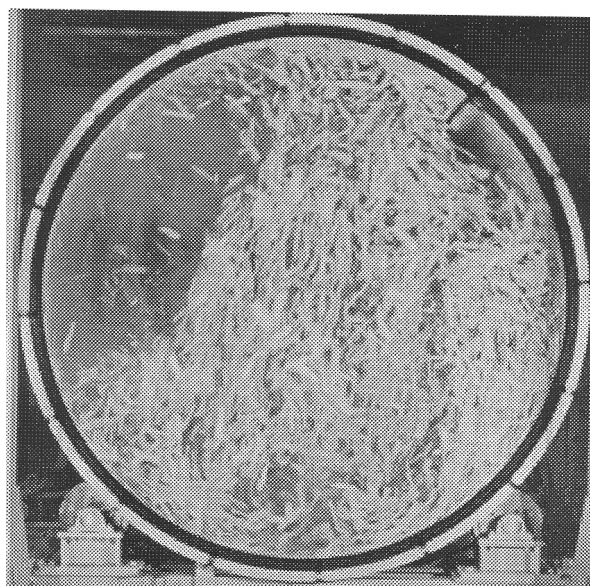
RESEARCH HIGHLIGHT

Optimizing resin usage for strand-based wood composites

ADVANCES in technology over the past forty or so years have led to the development of reconstituted strand-based wood composites, where the intrinsic properties of wood and resin are combined and the properties of the final wood composite product are tailored to meet the requirements of its application. One composite wood product that has had tremendous market growth over the past 10 years is oriented strand board (OSB). This is a panel product that is often used as a replacement for plywood. Whereas plywood is composed of layers of veneer oriented at right angles to each other, OSB is composed of layers of strands at right angles to each other. Unlike plywood, which has a continuous film of resin between veneer sheets, OSB is bonded together by droplets of resin covering only 5 to 10% of the strand surface. The cost of the resin used in OSB is significant with an average-sized OSB plant using as much as US\$10,000,000 of resin per year.

One of the main focuses of the Wood Composites Group at UBC has been on the blending of OSB. Industrial strands are often not uniformly coated with

resin droplets but have areas with excess resin and areas with resin deficiency. Although the strands coated with excess resin will bond quite well with the other strands, one is wasting resin and money. That resin would be better used if it was



Direct observation of the tumbling behaviour of strands in the modified 6-foot diameter rotary drum blender.

applied to those areas on a strand with either a resin deficiency or no resin at all since these areas will substantially reduce the board properties.

Joint funding from Forintek Canada Corp. and the National Science and Engineering Research Council of Canada has enabled the Wood Composites Group at UBC to purchase a specially modified blender to help us investigate the blending process. The front of the blender (see figure) is made of glass to allow the tumbling action of the strands to be directly observed. This equipment permits the size, shape, and number of flights and placement of resin-ation system within the blender drum to be optimized. We are currently investigating how strand size affects the tumbling behaviour of the strands. This information will assist us in determining if modifications to the atomization system are required in order to uniformly coat the strands with resin and if those modifications do, in fact, produce more uniformly coated strands.

Visitors are always welcome to drop in and see the facilities and discuss research issues.

For further information, please contact Dr. Greg Smith at 604-822-0081, fax 604-822-9104 or e-mail gsmith@interchg.ubc.ca. □

DEPARTMENT NEWS

Dr. Dave Cohen attended the Association for Investment Management and Research Forest Products Industry conference, in Seattle Washington, and on June 17 presented a paper entitled *“Global Channels of Distribution for Solid Wood Products.”*

On August 21, Dr. Phil Evans chaired and co-organized a conference on *“Wood Finishing 2002: Improving Processes and Profits”* in Atlanta, Georgia.

Dr. Robert Kozak co-authored a chapter in the United Nations Forest Products Annual Market Review, 2001-2002 on *“Trends in Sawn Softwood Markets”*, with Dr. Chris Gaston from Forintek.

Dr. Frank Lam attended the 2002 World Conference on Timber Engineering held in Shah Alam, Malaysia and presented a paper entitled *“Modeling the Dynamic Response of 3-Dimensional Timber Light-frame Buildings”* which was co-authored with Ming He and Ricardo Foschi.

Drs. Shawn Mansfield and Jack Saddler co-organized the Payen Symposium entitled *“Applications of Enzymes to Lignocellulosics”* sponsored by Cellulose and Renewable Materials division of the American Chemical Society, held in Orlando, Florida, April 7-11, 2002. Shawn gave a presentation entitled *“Wood and Fibre*

Quality – Opportunities for Selection of Superior Clonal Material” at the Canadian Tree Improvement Association Annual Meeting in Edmonton, July 22, 2002.

Ms. Sandy McKellar (undergraduate promotions and public relations) has been appointed to the Board for two organizations, Festival of Forestry and Canadian Women in Timber.

Dr. Paul McFarlane has been appointed to the Management Team for the Sustainable Forest Management Network. Paul will be the leader for the Value Added/Alternative Products research area. □

RESEARCH HIGHLIGHT

Forest carbon accounting at the forest management unit scale

PRIME Minister Jean Chretien announced at the RIO + 10 summit in South Africa that he intends to hold a vote in parliament by the end of 2002 to ratify the Kyoto Protocol. Needless to say this has stirred considerable interest. Under the agreement, Canada is committed by 2012 to reducing its national GHG emissions by 6% from 1990 levels. At present, one government report indicates that the surplus, or 'gap', between the predicted and Kyoto target emissions for 2012 is 33% or 240 Mt C/yr.

One part of the solution to this challenge is to quantify forest and soil carbon sinks and subsequently trade in forest carbon credits. Canada has successfully negotiated that the total potential forest management contribution will be 21 Mt C/yr. If forest stakeholders can work together to determine how best to store carbon while continuing to produce timber for wood products there is a possibility that a forest carbon market can be created in B.C.

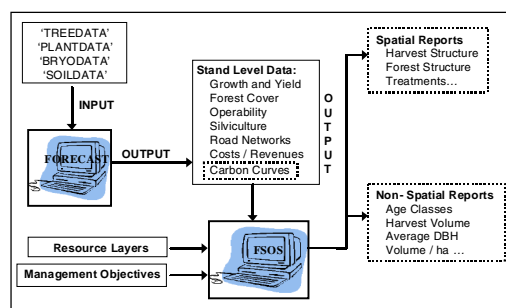
The forest products industry, and other key industrial sectors, will likely be forced to help Canada meet its Kyoto commitments. Thus the forest products industry faces a potential liability problem when governments allocate emission caps. In forestry, it is plausible that individual industries will be held accountable for emission and sequestration of carbon as well as storage of carbon in forest products.

Thus far, the nature of the transactions between buyers and sellers are largely unclear. However, we do know that forest car-

bon management is likely one of the lowest cost solutions to reducing net emissions. Our greatest challenges are to develop better forecasting models, information technology tools and create a regulatory, legal and institutional framework which allows the development of a credible tradeable product – carbon credits.

To examine the potential of a forest carbon markets we have developed an operational forest carbon accounting procedure. We modified ecological, stand level and spatial forest landscape models to account for carbon over time. To demonstrate the utility of this approach we worked with a local forest products company in developing the reasonable assumptions which would allow us to examine the joint production possibilities of timber and additional forest carbon storage in the natural forest.

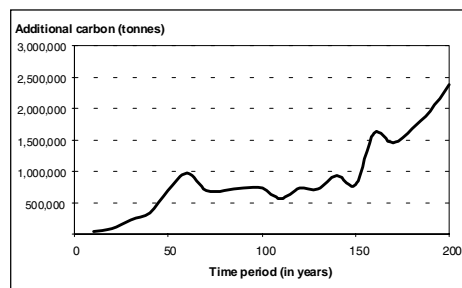
The figure below shows the linkages of the stand level ecological model, FORECAST, with the spatial forest landscape model, Forest Simulation Optimization System (FSOS). Over 2,000 carbon yield curves were



Linking FORECAST to the Forest Simulation Optimization System.

generated and fed into FSOS which was able to account for all carbon pools in over 125,000 stands while creating timber supply projections.

We were then able to determine forest and soil carbon stored or lost as a result of management practices. The graph illustrates the additional carbon stored as a result of an aggressive fire suppression policy on the



Additional carbon sequestration.

non-timber harvesting land-base. It demonstrates that it is possible to quantify, under Kyoto rules, changes in carbon stock over time. The next challenge is to change this carbon stock into tradeable carbon credits so that potential buyers can assess the product's relative price and attractiveness.

We continue to work with energy, forest products and insurance companies, verification agents, researchers, ENGOs and governments to further develop accounting procedures, standards and regulatory frameworks to make the trade in forest carbon possible. There is much that still needs to be done. Once the complex scenario planning tools are fully developed we envision providing quarterly reports on carbon balance and the financial implications to all stakeholders concerned with a market response to the climate change problem.

For additional information, please contact Dr. Gary Bull at 604-822-1553, fax 604-822-9106 or e-mail gary.bull@ubc.ca. □

DEPARTMENT NEWS

Drs. Y. Alila and R.D. Moore organized an Exploratory Workshop funded by the Peter Wall Institute for Advanced Studies in June. The objective of this international workshop was to examine research questions related to scaling and non-linearity in watershed response and to explore the role that the B.C. academic community could play in answering some of these research questions, in collaboration with their international partners. For more information

refer to the web site <http://www.forestry.ubc.ca/pwall/scaling/index.htm>.

Dr. George Hoberg was consultation director for the government's results-based forest practices code this summer. All materials, including the final report, are posted on www.resultsbasedcode.ca.

In collaboration with Forest Trends, the Department and the Faculty hosted an international conference on Global Perspectives on Indigenous Peoples Forestry: Linking Communities, Commerce and

Conservation, June 4-6, 2002. Proceedings are available at <http://www.foresttrends.org/whoweare/pdf/indigenousforestryproceedings.pdf>.

In September, Dr. Jonathan Fannin gave an invited keynote lecture at the 7th International Conference on Geosynthetics, Nice, France, on the topic of geotextiles for erosion control and soil stabilization.

Dr. David Tindall was granted tenure and promoted to Associate Professor, effective July 1, 2002. □

RESEARCH HIGHLIGHT

Conifer defense against insect pests

OUTBREAKS of mountain pine beetle are a major economic and ecological concern of forestry in British Columbia. Pest management in agriculture uses crop rotation and pesticides, but these options do not apply to forestry. Searching for acceptable methods of tree protection prompts two questions: What do we know about a tree's natural defense mechanisms? How can we harness these for tree protection?

Conifers are among the most successful species on earth. They are difficult to colonize as living hosts by most insects or pathogens. But conifers are challenged by a short list of destructive specialist insect species (e.g. bark beetles, weevils, budworms). Resin terpenes (oleoresin) are the most prominent chemical defense of conifers, in addition to a suite of other tree chemicals (e.g. phenolics). Oleoresin defenses can be constitutive or induced by pests. Complex biochemical pathways control the formation of a plethora of resin terpene compounds in conifers. The products of these pathways accumulate in resin canals or blisters, which are physical and chemical barriers for many potential insect pests and pathogens. In a recent study, Jörg Bohlmann's group found that a plant produced signal compound (methyl jasmonate, MeJA), when applied

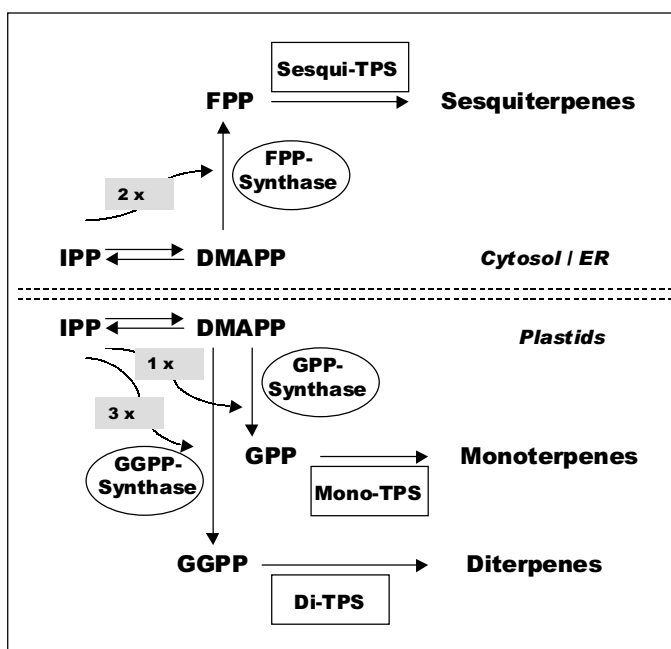
on Norway spruce, triggers massive resin defense reactions. These MeJA-induced defenses are manifested in *de novo* formation of xylem resin canals and increased resin accumulation. Traumatic resinosis is the result of MeJA-induced defense gene activation. MeJA and related compounds are among the most potent plant signal molecules and they resemble prostaglandins in the defense against pathogens in animals.

Conifers also emit terpenes as airborne volatiles that are recognized by insects as

chemical "barcodes" for long-range identification of suitable host or non-host trees. In addition to resin defense activation, treatment of spruce with MeJA induces trees to emit new terpene profiles, drastically changing the tree's "odor". We are testing if these stress-induced odor changes elicit positive or negative chemotactic responses in insects.

Induced defenses are naturally occurring with a delay of several days when insects such as bark beetles or weevils attack trees. It is conceivable that this time lag between infestation and defense enables specialist insects to undermine or outrace a tree's genetic resistance. We are now exploring if pre-activation of host defenses by MeJA can provide enhanced resistance against insect attack or fungal infestation in spruce, pines and Douglas-fir in collaboration with the Pacific Forestry Centre (Rene Alfaro, Rona Sturrock) and the BC Ministry of Forests Research Branch (John King). Our UBC Forestry Genome Laboratory (funded by Genome BC) contributes to this program with genome-wide profiling of conifer defenses.

For further information, please contact Dr. Jörg Bohlmann at 604-822-0282, fax 604-822-2114 or e-mail bohlmann@interchg.ubc.ca, or see <http://www.biotech.ubc.ca>. □



Biochemical organization of MeJA-inducible terpenoid (resin) defense pathways in conifers.

DEPARTMENT NEWS

The department has welcomed three new faculty members in the past few months. One faculty member resigned in June and another two members have retired. Details of the appointment of new faculty members (Drs. Maja Krzic, Suzanne Simard and Bruce Larson) are included on page 5 of this newsletter. Dr. Susan Glenn resigned her position, effective June 30, to take up an appointment at Gloucester College in New Jersey. The department is currently conducting a search to fill her position in forest landscape ecology.

Drs. John Barker and Karel Klinka retired from the Faculty at the end of June. Karel was recognized as the "Silviculturist of the Year" at the Coastal Silviculture Committee meeting in June.

Dr. Sally Aitken is currently taking her sabbatical leave in Avignon, France, at the Mediterranean Forest Research Unit of the National Agronomic Research Institute of France. Sally has been awarded the **UBC Izaak Walton Killam Memorial Faculty Research Fellowship** for 2002/03.

Dr. Jörg Bohlmann has been awarded the **Faculty of Science Achievement Award**

for Leadership. This is a new award established to recognize exceptional contributions of faculty, staff and students in the areas of teaching, leadership and research.

Dr. Bart van der Kamp has been awarded the **Faculty of Forestry Killam Teaching Prize** for 2002.

In July, Dr. Yousry El-Kassaby presented an invited paper entitled "**Genetic Control of Germination Parameters in North Temperate Conifers**" to the Joint Canadian Tree Improvement Assoc., Western Forest Genetics Assoc. and Poplar Council of Canada 2002 Conf., Univ. of Alberta, Edmonton. □

Faculty News



Dr. **Suzanne Simard** has joined the Forest Sciences Department as an associate professor. Suzanne received her B.S.F. in forest resource management from the University of British Columbia, and her M.Sc. and Ph.D. in forest ecology from Oregon State University. For the past 12 years, she has been a research silviculturist with the B.C. Ministry of Forests, where her research program has focused on vegetation management, broadleaf and mixed stand silviculture, and soil biology. Some goals of her future research are to examine the reciprocal interactions between plants, soil organisms, and soils, and the linkages between ecosystem level responses to disturbance/management and plant/soil functional processes. Suzanne's teaching responsibilities include silvics, biogeoclimatic ecosystem classification, forest ecology, and spring and fall camp.

Suzanne can be reached at 604-827-5163, or e-mail ssimard@interchg.ubc.ca.



Dr. **Bruce Larson** has joined the Forest Sciences Department as professor and FRBC Chair in Silviculture. Bruce received his bachelors degree in biology from Harvard University before going to Yale University for an M.F.S. followed by a Ph.D. from the University of Washington. After a short post-doctoral appointment at Duke University he joined Yale's School of Forestry and Environment where he taught for 17 years. For 10 of those years he was also Director of School Forests. For the past two years he has served as an acting professor of Forest Resources at the University of Washington and was an associate dean for part of the time. Bruce has worked in forest types throughout the United States, boreal Saskatchewan, and Germany. He is probably best known for co-authoring the major forest textbooks *The Practice of Silviculture* and *Stand Dynamics*. As well as more standard research projects in silviculture, Bruce has also been active in the areas of forest certification and carbon sequestration. His teaching responsibilities will be in silviculture.

Bruce can be reached at 604-822-1284 or e-mail blarson@interchg.ubc.ca.



Dr. **Maja Krzic** has joined the Forest Sciences Department (jointly appointed with the Faculty of Agricultural Sciences) as an assistant professor. She obtained her B.Sc. (plant science) and M.Sc. (soil science) from the University of Belgrade, Yugoslavia and Ph.D. (soil science) from the University of British Columbia. For the past six years, Maja has taught soil science courses as a sessional lecturer at UBC while involved in research on the impacts of management practices on rangeland, agricultural, and forest soils. Maja's current research addresses changes in soil quality of disturbed forest soils on rehabilitated landings in the Peace River region of B.C., grazed forest cutblocks in the southern Interior and the Peace River region, and grasslands of the southern Interior. Her long-term research goal is to continue to develop and apply soil quality indicators for assessment of the sustainability of ecosystem management. Maja will be teaching courses in soil science and is currently developing an on-line distance education and technology version of her "Introduction to Soil Science" course.

Maja can be reached at 604-822-0252 or e-mail krzic@interchg.ubc.ca.



Sumeet Gulati has joined the Forest Resources Management Department as an assistant professor (jointly appointed with the Faculty of Agricultural Sciences). He received a masters degree in economics from the Delhi School of Economics, and a masters in agricultural economics from the University of Maryland. He is currently a Ph.D. candidate in agricultural economics at the University of Maryland and expects to receive his degree by the end of 2002.

Sumeet's teaching responsibilities include an undergraduate course "Land and Resource Economics" and a graduate level class "Advanced Economics of Natural Resources with Applications to Forestry." His current research topics include the impact of international trade on the environment, and the optimal management of natural resources during economic development. In future research Sumeet wishes to explore the political and economic origins, and the economic impacts of the current softwood lumber dispute between the US and Canada.

Sumeet can be reached at 604-822-2144 or e-mail sumeet.gulati@ubc.ca.



Katrina Evans has joined the Faculty as our new senior development officer. Katrina recently moved to Canada from Australia, where she worked for nine years in the forestry and the international programs of the Australian Centre for International Agricultural Research, a government statutory authority involved in agricultural aid to developing countries. She was responsible for developing, managing and securing funding for research and development projects. Katrina also brings to this position her background and interest in forestry, with a B.Sc. (Forestry) from the Australian National University in Canberra.

Katrina plans to focus on building a strong relationship between the Faculty, our alumni and our supporters in industry and the government, and on procuring major gifts for priority projects. High priority projects at present include the redevelopment of the Loon Lake Outdoor Education Centre, the Centre for Advanced Wood Processing, chairs in First Nations and Forest Economics, and student awards and scholarships.

Katrina is replacing Shelia Biggers who has left the Faculty of Forestry to take up a position in the central Development Office at UBC.

Katrina can be reached at 604-822-8716, fax 604-822-8645 or e-mail kaevans@interchg.ubc.ca.



Geoff Anderson (L) and **Steve Baumber (R)** have joined the Faculty's student services team. Geoff is the new Cooperative Education Coordinator with responsibility for expanding co-op options into all forestry programs.

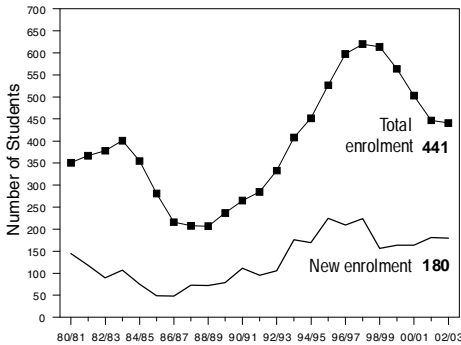
Steve is the new Recruitment Officer for the Faculty with responsibility for promoting and recruiting for all undergraduate programs.

Both Steve and Geoff will be working with Dr. Simon Ellis in Simon's new role of Director of Recruitment and Co-op.

Geoff can be reached at 604-827-5196 (ganderso@interchg.ubc.ca) and Steve at 604-827-5195 (sbaumber@interchg.ubc.ca).

Undergraduate enrolment

These enrolment statistics are preliminary and will be finalized in mid-October.



The number of new students admitted to the Faculty for the 2002/2003 academic year and the number of students enrolled in undergraduate programs remains virtually unchanged from 2001/2002. Year one has the highest level of enrolment, followed by year four; however, low retention rates in years two and three have resulted in the lowest level of enrolment for these years in more than a decade. The largest shift in enrolment has been in the B.Sc. (Forestry) degree, which has witnessed a 51% increase in enrolment in the past three years. Over 70% of

the B.Sc. (Forestry) degree students are registered in first year.

The Faculty has dedicated a large number of resources to improving admission and retention rates, including hiring a second recruitment officer. It is hoped that the new cooperative education initiative for all undergraduate programs will assist in the Faculty's goal of increasing enrolment and retention.

J. Harry G. Smith (1925-2002)

Adapted from an obituary by Robert Kennedy.

Canadian forestry lost an imposing presence in the sudden passing of Dr. Harry Smith on June 3, 2002. Harry joined the teaching staff of the Faculty of Forestry in 1950, a year after receiving a B.S.F. (Hons.), and began a remarkable 40-year career broken only by the briefest possible stint at Yale University to secure his Ph.D.



residence requirements. He was a stimulating educator, an immensely productive researcher, and an administrator/professional forester who gave a great deal to advance his profession.

Although he taught courses only in forest management in his later years, in earlier times he taught all or parts of biometrics, mensuration, silviculture, photogrammetry, economics, forest policy and fire control.

Harry's service to the Faculty was exceeded only by Prof. Malcolm Knapp, who served 41 years before retiring in 1964. Harry was the thesis supervisor of 35 Masters and 17 Doctoral candidates (six of the Ph.D.s serve on Canadian university faculties). He was a committee member of many more. In research, Harry was an

innovator, always interested in shortening rotations and improving efficiency of land management. He has left a living legacy in the form of growth and yield spacing trials, instituted in the 50s at the Malcolm Knapp Research Forest. These will continue to offer insights into optimum yields into the future.

Harry chaired several committees within the Association of British Columbia Professional Foresters, and received their Distinguished Forester Award. He was president of the Canadian Institute of Forestry in 1980, and was editor of the Forestry Chronicle for six years. He was also associate editor of the Canadian Journal of Forest Research for twelve years. When the Faculty was divided into departments in 1983, he was the first head of the Department of Forest Resources Management. Finally, Harry also served as director of Gilbert Smith Forest Products, the family firm founded by his father.

Harry contributed so much to his profession, his university and students, and his family. *We will all miss him.*

Redevelopment of Loon Lake Outdoor Education Centre

Since 1949 the Loon Lake Outdoor Education Centre at the Malcolm Knapp Research Forest in Maple Ridge has provided a unique educational environment, not only for our students and faculty, but also more recently for numerous community groups that have used the facility for youth camps, retreats and recreational activities. Unfortunately, many of the original buildings are in various stages of disrepair. Plans are now underway to begin a major redevelopment of the Centre as a world-class education and recreation facility. However, we still need the support of our forestry family and friends to bring this exciting project to fruition. We will keep you posted on our progress in future newsletters.

For further information, contact Katrina Evans at 604-822-8716 or kaevans@interchg.ubc.ca.

Jubilee Lectures Continue

Our second season opened with a talk by George Hoberg, Head of Forest Resources Management at UBC, entitled "*Finding the Right Balance: Designing Policies for Sustainable Forestry in the New Era*". This talk is now available at our Faculty web site, or can be ordered as a hard copy from the address below.

On October 7, at 5:30 pm, Tim Synnott, former Executive Director of the Forest Stewardship Council, will be talking on "*The End of Forestry?*" at UBC's Robson Square location. The lecture will be repeated at the Forest Sciences Centre on October 8, at 5:15 pm.

On December 2, Scott Hinch of the Forest Sciences Department will be talking on "*Salmon at their Southern Edge: Current Challenges to Survival and Prognosis for Long-Term Sustainability*" in the Forest Sciences Centre at 5:15 pm. Further information on these lectures is available from our web site.

Burgess-Lane Lecture

On Friday September 20, Robert Evans of CSIRO, Australia gave the 18th Burgess-Lane Lecture. Robert's talk entitled "*Art, Science and Informatics—Visualization of Large, Complex Data Sets in High-Speed Measurement of the Microstructure of Wood*" is available at our web site or can be ordered as a hard copy from the address below.

NEWSLETTER PRODUCTION

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