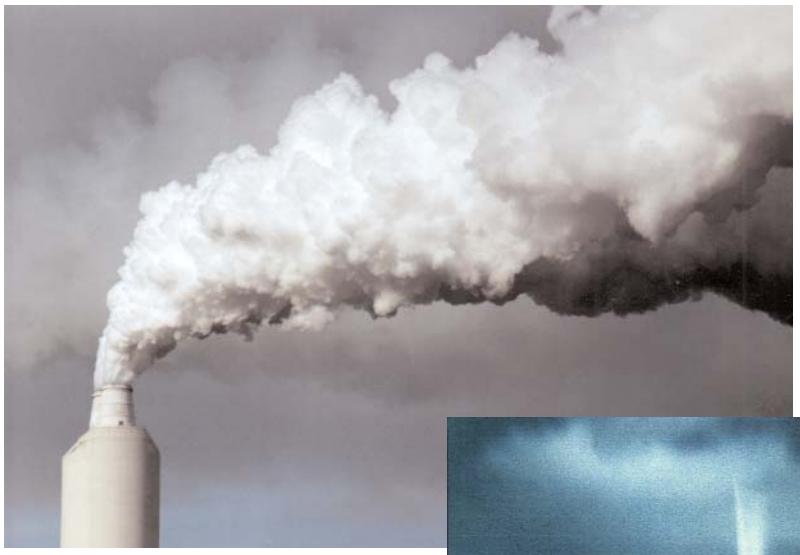
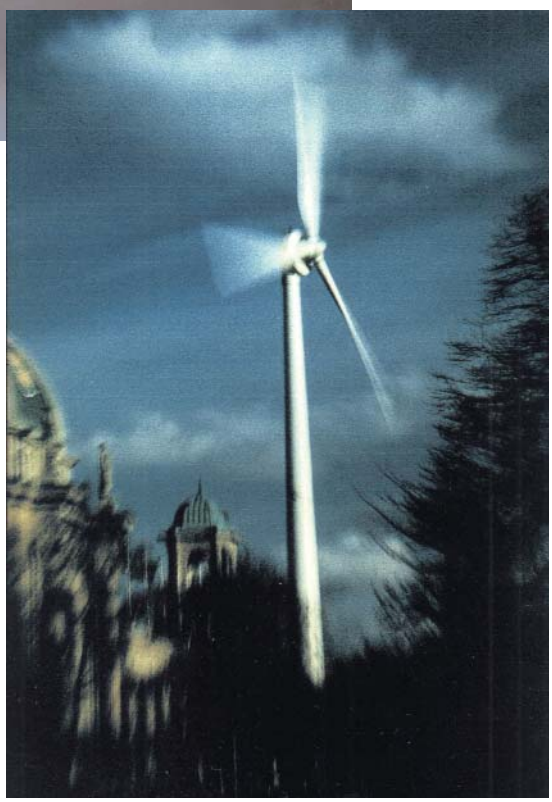
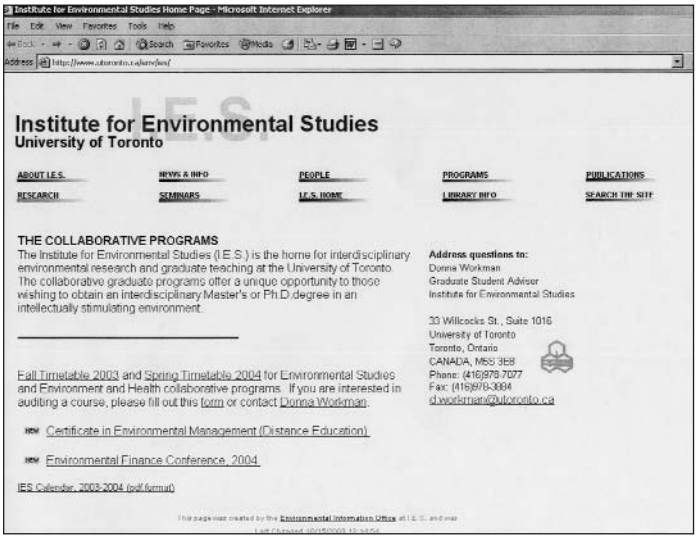
Institute for Environmental Studies

University of Toronto

2002/03 ANNUAL REPORT







IES online: www.utoronto.ca/env/ies

The IES web site offers up-to-date information on faculty and student research, events, publications, program and course offerings.

Environews: www.utoronto.ca/env/envnews.htm

Available on the web and in hardcopy, this newsletter highlights news of IES and the University of Toronto environmental community. It features articles on faculty and student research, events, publications, courses, and awards.

Institute for Environmental Studies

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October 2003. Edited and designed by Mona El-Haddad. All photos by Mona El-Haddad except where noted.

ON THE COVER

Our cover features the Lambton power plant, one of the Ontario Power Generation's coal-fired power plants and a power generating wind turbine onToronto's lakeshore. The wind turbine was installed by Windshare, a project developed by the Toronto Renewable Energy Co-operative.
Photos by Jesse Gibb (left) and John Wellner (right) submitted to Ontario Clean Air Alliance.

TOP: Waste-Econ Program: clean up of Vietnam's Halong Bay. RIGHT: China Carbon Sequestration Project: fieldwork led by Sean Thomas.

Contents

TOP: Commissioner of the Walkerton enquiry, Justice Dennis O'Connor (middle) invited to meet with U of T researchers. RIGHT: Environmental Career Day and Exposition.

DIRECTOR'S FOREWORD

Learning to live with climate change

by Rodney White, Director

The struggle to comprehend the implications of climate change is partly scientific, partly ideological and partly experiential. It is the scientific dimension that is the easiest to understand despite the considerable uncertainties surrounding the regional implications and the rate of change. Uncertainties about the speed with which the climate will change are largely a function of the speed of the human response to mitigate the threat by taking decisive action to reduce greenhouse gas emissions.

The ideological dimension of the varied pattern of response has been implicit for some time. Some European countries have been electing green party candidates for several years and some have participated in coalition governments. Environmental quality is a mainstream issue that is of concern almost across the traditional ideological spectrum. Thus, it is not surprising that European insurance companies have taken the lead is advocating the need for significant mitigation efforts. In the United States, where even the insurance industry has been sceptical about the issue, a recent survey suggested that behind the expressed scepticism about the science was a negative association of all environmental issues with the hated Superfund legislation and a suspicion of anything associated with the United Nations, such as UNEP and the IPCC (Mills, Lecomte and Peara, 2001). However, although the federal government has withdrawn the United States from the Kyoto process, there is widespread activity at the state level ranging from carbon sequestration from minimum tillage (Nebraska) to credits for providing electricity from renewable sources (Texas) (Rabe, 2002). Even Exxon Mobil - once the staunchest supporter of the Climate Change Coalition, the anti-Kyoto lobby group - has recently promised $100m to Stanford University for research into climate change. Even more recently the Carbon Disclosure Project published its first report on activities being undertaken to address climate-related risks by the FT500 companies. The Project was supported by "pension funds, fund managers and insurance companies who jointly represented assets in excess of $4.5 trillion" (Whittaker et al., 2003). Thus, although an ideological dimension does remain behind attitudes toward climate change, there has been a considerable shift

in where the line has been drawn.

Likewise the experiential dimension can be quite mixed. Ontario has just experienced a cold winter for the first time in 4 years followed by a cool, wet spring and a cool, wet July. In comparison Europe has been wracked by heat waves; July brought a major storm in western France (in which several campers were killed and injured), and a forest fire swept much of Provence. There has been a drought in northern Italy and Switzerland. The River Po has run dry and power stations have been shut down for lack of cooling water. Meanwhile, West Nile fever, an insect-born disease of tropical origin, is spreading through North America.

Despite scientific uncertainty, an ideological predisposition to dismiss the threat, and a tendency to rely on personal, localised experience to make a global judgement, a consensus is emerging. Climate change is real and is already forcing us to reconsider our actions at every level, from the individual to the international. In the words of the report of the Carbon Disclosure Project: "Investors failing to take account of climate change and carbon finance issues in their asset allocation and equity valuations may be exposed to significant risks which, if left unattended, will have serious investment repercussions over the course of time" (Whittaker et al., 2003; 2).

References cited:

Mills, E., Lecomte, E. and A. Peara. 2001. *U.S. Insurance Industry Perspectives on Global Climate Change.* Lawrence Berkeley National Laboratory, Berkeley.

Rabe, B. G. 2002. *Greenhouse and Statehouse. The Evolving State Government Role in Climate Change.* Pew Center on Global Climate Change, Alrington.

Whittaker, M., Kiernan, M. and P. Dickinson. 2003. *Carbon Finance and the Global Equity Markets.* The Carbon Disclosure Project. New York, Innovest Strategic Value Advisors. Further information on the Project - including many company responses - is available at www.cdproject.net

Research Directions

by Virginia Maclaren, Associate Director, Research

IES has a thriving multi-disciplinary environmental research program that is tackling a wide range of topics, both internationally and in Canada. The newest research project is a CIDA-funded project led by **Beth Savan** that is developing a climate action plan for Cuba ***(see page 19)***. Other active research projects include: sustainable water management in China ***(page 23)***, carbon sequestration in China ***(pages 22-23)***, waste management in Vietnam, Cambodia and Laos ***(pages 20-21)***, and integrated mapping assessment in Canada ***(page 24)***. Environment Canada's Adaptation and Impacts Research (AIR) Group, which has resident members at IES, continues to make a substantial contribution to IES research with ten projects underway or completed during the last year ***(page 25)***. Planning is almost complete for another major initiative at IES, which will be the hosting of a conference on Environmental Finance in 2004 ***(page 28)***. The conference will target Chief Financial Officers at large resource-based companies.

Graduate Programs

Research topics, awards and profiles of students and recent graduates are on pages 30-37. For more information on programs, please see http://www.utoronto.ca/env/ies or contact: Donna Workman, Graduate Student Advisor, d.workman@utoronto.ca, 416-978-7077.

Environmental Studies Program

Andy Kenney, Graduate Coordinator

Collaborating departments and faculties include Anthropology, Botany, Chemistry, Economics, Forestry, Geography, Geology, Information Studies, Management, OISE/UT (Adult Education, Community Development and Counselling Psychology; Curriculum, Teaching and Learning; and Sociology and Equity Studies in Education), Philosophy, Political Science, Sociology and Zoology. By special arrangement, students may be admitted from other departments.

Frances Silverman, Director, Environment and Health Program and Andy Kenney, Graduate Coordinator, Environmental Studies Program.

Environment and Health Program

Frances Silverman, Director

Collaborating departments include Community Health; Geography; Health Policy, Management and Evaluation; and the Institute of Medical Science. By special arrangement, students may be admitted from other departments.

We currently have students from the Department of Anthropology and OISE/UT's Department of Adult Education, Community Development and Counselling Psychology.

Toxicology Program

Effective September 2002, this program moved from IES to the Institute for Drug Research (IDR) at the Department of Pharmacology, offering a program specializing in biomedical toxicology. Students interested in environmental toxicology are encouraged to enrol in IES' Environment and Health Program.

For more information on IDR's new program, please see www.utoronto.ca/grdpharm or contact: Diana Clark, Graduate Studies Assistant, gradpharm.info@utoronto.ca, 416-978-5244.

New! IES offers web-based distance education: Certificate in Environmental Management

*By **Kymberley Snarr**, Certificate Instructor; **Rodney White**, IES Director; and **Donna Workman**, IES Student Advisor*

IES is pleased to offer a web-based distance learning program towards a Certificate in Environmental Management starting in September 2003. This certificate program will be offered in a completely online e-classroom environment, without the requirement to physically meet face-to-face. It is intended to respond to a growing need in the community for skills and knowledge in the environmental area, enabling participants to appreciate the global perspective in which all environmental problems and solutions have to be measured. It will emphasize the necessity for sustainability in development and the use of market-driven solutions through the examination of uniquely Canadian problems. Graduates are eligible to apply for the Canadian Certified Environmental Practitioner designation under the Canadian Environmental Certification Approvals Board's national certification program for Canadian environmental practitioners. Individual courses also meet the professional development criteria required to maintain environmental certification.

Program Courses

A new module will be introduced weekly in each 10 week course. Student interaction occurs through threaded discussion forums, live chats and email. Course materials will include electronic lectures, links to support information, electronic article reserves, and hardcopy texts. Assignments are submitted and returned using an electronic dropbox.

CEM 400: Fundamentals of Environmental Management

This course concentrates on the relevant issues related to approaches, processes, and problems associated with making decisions related to environmental management. Through the introduction of a wide variety of course materials, problem solving exercises, ongoing discussions, and through individual and team work assignments, students will become equipped to engage in the cooperative resolutions of complex environmental issues.

CEM 401: Environmental Case Management

Using a timely case study, this second core course allows the student to practice the wide range of skills they have been exposed to in the first course. Through the employment of these skills in a dynamic learning setting, the student experiences how to research and communicate results in an interdisciplinary setting. In 2004, the course focuses on the Kyoto Protocol.

Kymberley Snarr, a Ph.D. candidate in the Department of Anthropology and IES, is the developer and instructor of the courses offered.

For more information, please see http://www.utoronto.ca/env/ies or contact Donna Workman, d.workman@utoronto.ca or 416-978-7077.

COURSES

The following is a list of graduate courses offered by IES. For more information, please see the IES website, www.utoronto.ca/env/ies, or contact Donna Workman, 416-978-7077, d.workman@utoronto.ca.
Please see pages 9-17 and 26-27 for profiles of 2002/03 Instructors.

Core Courses

IES 1001H Environmental Decision Making
***Phil Byer**, Civil Engineering/IES and*
***Ingrid Stefanovic**, Philosophy.*

IES 1002H Environmental Management Case Studies
*2002/03 Instructors: **Scott Prudham**, Geography/IES and **Peter Timmerman**, Faculty of Environmental Studies, York U. 2003/04 Instructors: **Peter Timmerman**, Faculty of Environmental Studies, York U. and **Mark Winfield**, Division of the Environment.*
(See article on open house poster session below.)

IES 4001H Graduate Seminars in Environment and Health (for Ph.D. students)
(Not offered in 2002/03 and 2003/04.)

MSC 4000H Seminars in Environment and Health
***Frances Silverman**, Gage Occupational & Environmental Health Unit/Medicine; **Rodney White**, Geography/IES; and **Lesbia Smith**, Ontario Ministry of Health.*
(Not offered in 2003/04.)

Other Courses

IES 1410H Analytical Environmental Chemistry
***Scott Mabury**, Chemistry.*

IES 1433H Regional Resource Ecology: Evaluation of Natural Capital
***Roger Hansell**, Zoology/IES.*

IES 1701H Environmental Law
***Paul Muldoon**, Canadian Environmental Law Association.*

IES 1703H Water Resources Management
***Lino Grima**, Associate Member, IES Graduate Faculty.*

IES 1704H Environmental Risk Analysis and Management
***Lino Grima**, Associate Member, IES Graduate Faculty;*
***Rodney White**, Geography/IES;*
***Jim Dooley**, IES Associate Faculty Member.*

IES 1705H Corporate Perspectives on the Environment
***David Powell**, Innis College.*

IES 1002H: Posters showcase class research

*By **Peter Timmerman** and **Scott Prudham**, Course Instructors*

On April 11 2003, the campus community was invited to attend a poster session, the result of the classwork of the graduate course IES 1002H *Environmental Management Case Studies*, an environmental management case study course, centred on individual and group research devoted to one issue per year.

This year the course focussed on *"The Commodification of Life: Where Are We and Where Are We Going?"*, looking at genetic engineering of varying kinds, sparked in part by the decision of the Supreme Court of Canada on December 5 2002, denying patent rights to Harvard University over the "oncomouse" (a mouse genetically designed to have cancerous tumours). This decision - and the arguments associated with the decision - highlighted the range of social, ethical, economic, political, and legal concerns raised by the spectre of the commodification of life forms. The students combined their individual research with group explorations to make the following three posters:

1. *Biotechnology: The Great Uncontrolled Experiment*. The elements of the scientific dimensions of biotech, focussing especially on impacts.
2. *Biotechnomics: Growth as Goods.* Biotech research, ranging from the international dimensions of agricultural trade to the changing dynamics of university-based research.
3. *Response-ability.* The ethical, spiritual, and legal dimensions of responding to the challenge of genetic research and its implementation.

Peter Timmerman and Scott Prudham were the Instructors of IES 1002H in 2002/03. Peter Timmerman is an Assistant Professor at the Faculty of Environmental Studies, York University; Scott Prudham is an Assistant Professor, Department of Geography and IES.
Students participating were: Martha Barriga, Anna Chase, Adam Fenech, Munya Kabba, Tanya Labencki, Angela Loder, Amy Mader, Jennifer McKelvie, Amanda Mongeon, Albert Osei, Dave Partlow, David Sandomierski, Nikki Simms, and Adam Watson.
For more information, please email ptimmerman@ifias.ca or scott.prudham@utoronto.ca

At the IES 1002 poster session, student Albert Osei explains the class poster "Biotechnomics: Growth as Goods" which examined political and economic issues surrounding genetic engineering and patenting.

IES 1706H Natural Hazards and Natural Disasters
David Etkin *and* ***Monirul Mirza****, Adaptation and Impacts Research Group, Environment Canada.*

IES 1707H Environmental Finance: Risk Management and Business Opportunities
Martin Whittaker*, Innovest Strategic Value Advisors.*
(New course offering in 2002/03; see article below.)

IES 2000H/Y Independent Study

IES 2001H Special Topics:
International Environmental Agreements: Implications for Canadian Environmental Management
(Not offered in 2002/03.)

IES 2002HF Special Topics: Environmental Governance in the New City of Toronto
2002/03 Instructor: ***Pamela Robinson****, Innis College.*
2003/04 Instructor: ***Quentin Chiotti****, Pollution Probe.*

IES 2002HS Special Topics: Community Based Environmental Research
Beth Savan*, Innis College.*
(New offering for 2004 spring term.)

IES 2501H Pollution Prevention and Control
Stefan Salbach*, Associate Member, IES Graduate Faculty.*

JGE 1212H Contaminants in the Environment
Miriam Diamond*, Geography.*

JGE 1420H Urban Waste Management: An International Perspective
Virginia Maclaren*, Geography.*

JGN 2607H Advanced Techniques in Hydrogeology
Ken Howard*, Physical Sciences, Scarborough.*

JNC 2503H Environmental Pathways
Charles Jia*, Chemical Engineering and Applied Chemistry.*

JPV 1201H Politics, Bureaucracy and the Environment
Richard Stren*, Political Science.*

JVP 2147H Environmental Philosophy
Ingrid Stefanovic*, Philosophy.*
(Not offered in 2002/03 and 2003/04.)

JEI 1901H Technology, Society & Environment I
Willem Vanderburg*, Mechanical & Industrial Engineering/IES.*

IES 1707H: New course on fast-emerging field of Environmental Finance

By ***Martin Whittaker****, Course Instructor*

Environmental finance is a fast-emerging field involving the application of financial market instruments and practices to the management of environmental - and social - issues. Drawing from the experiences of the instructor working day-to-day in this field, the course examined how retail banks, insurance companies, investment banks, venture capitalists and professional financial services companies are becoming increasingly engaged on the sustainability issue.

The new course, IES 1707H *Environmental Finance: Risk Management and Business Opportunities,* was naturally highly inter-disciplinary, but no prior knowledge of finance or economics was needed; in the course's inaugural session in the fall of 2002, student backgrounds included forestry, business, engineering, planning, public administration and environmental studies, as well as finance and accounting. Indeed, the intention was to introduce students to the basic concepts of environmental finance and some of the critical fundamental trends driving this agenda, namely:

- the recognition that environmental management issues can directly affect the profitability and shareprice of corporations of all sizes and types;
- the increasing reliance by government policymakers and regulators on market-based instruments to achieve environmental policy objectives;
- the appreciation within mainstream financial circles of the importance of new sources of environmentally-driven risk and return;
- the expansion of venture investing in environmentally-related technologies and solutions; and
- the evolving scope and sophistication of the global securities industry and the growth of "sustainability" and "socially responsible" investing.

In terms of organization, the course examined how established practices and tools from within the mainstream financial markets are being adapted to the pursuit of environmental and financial goals, using real-world examples and experiences.

Specific areas of interest that were examined in closer detail included climate change, emissions trading, sustainability/socially-responsible investing and venture investing. Coverage of these topics was greatly enhanced by the use of guest lecturers, who included **Bill Tharp**, CEO of one of Canada's leading clean energy private equity firms; **Corinne Boone**, Managing Director of CO2e.com (a leading global GHG broker); **Martin Grosskopf**, a sustainability analyst at Acuity Investment Funds; and **Matthew Kiernan**, CEO of Innovest Strategic Value Advisors.

The 2003 fall term course will adopt a similar approach, and will include an equally strong roster of guest speakers.

Martin Whittaker is the Managing Director of Innovest Strategic Value Advisors. For more information on this course, please see the course outline at www.utoronto.ca/env/ies or contact Martin Whittaker, mwhittaker@look.ca, or Donna Workman, Student Advisor, d.workman@utoronto.ca

Environmental Information Office:
U of T's environmental activities profiled online

*By **Judith Wilson**, Manager, Environmental Information Office*

The Environmental Information Office at IES uses web technology to "virtually" pull together environmental research and teaching activities from over twenty academic units of the University of Toronto. The "Environmental Research and Teaching at the University of Toronto" web site can be found at: **http://www.utoronto.ca/env**

Content Management Systems/Database Driven Web Sites

Most of our efforts for the last year have centred on the further development of four Database Driven Web Sites. These may be viewed at: **http://ies.utoronto.ca/**

1. The Environmental Research and Teaching at U of T Faculty and Staff Directory

This database includes contact information and research interests of approximately 300 members of faculty and staff of the University of Toronto who are involved in environmental research (http://ies.utoronto.ca/envstaff). The new interactive feature allows individuals to update their own information.

2. The IES Courseware Site

Research in previous years indicated that faculty need an intuitive, simple program to create and update web information for their courses. The IES courseware program provides such a tool. No knowledge of html (Hypertext Markup Language), or even any special program to create html, is needed. The instructor types or "cut and pastes" in information and web pages are created and published to the server computer. Any future distance education courses will likely make use of this technology. A tutorial has recently been developed for this courseware. To view the course pages, update your page and view the tutorial, go to: http://ies.utoronto.ca/iescourseware

3. The Environmental Research and Teaching at Selected Universities Database

This is a large matrix of environmental undergraduate and graduate degree programs and research listed by faculty/department/centre or institute at various different Canadian, U.S. and European universities. The goal is to provide current, easily accessible information for prospective students and researchers around the world. The interactive part of this database is still in development but partial information can be viewed at http://ies.utoronto.ca/universities/ and is being updated manually. It is hoped that the database will be expanded to include as many universities as want to participate and to ensure the information is current by giving each department the ability to update their own information. Currently, all universities listed or interested in participating are invited to send information/corrections/updates to ies.proj.response@utoronto.ca. The original matrix can be found at http://www.utoronto.ca/env/res_proj

4. The IES Alumni Database

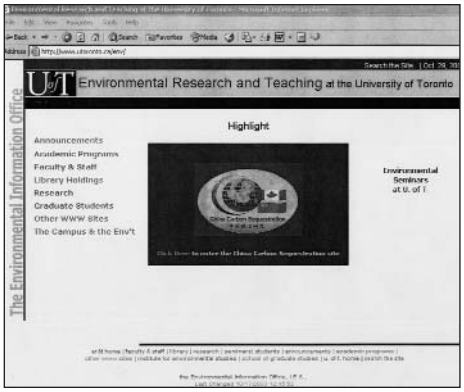
The Environmental Information Office helped with the development of the Web interactivity for the Alumni Database. Still in progress, when fully developed, this system will allow all IES alumni to enter their own current information. To view the input page go to: http://ies.utoronto.ca/alumni/alumnipage.htm. Current information can be found at: http://ies.utoronto.ca/alumni/list.asp. For more information on IES alumni, please go to www.utoronto.ca/env/ies/people.htm then click on students).

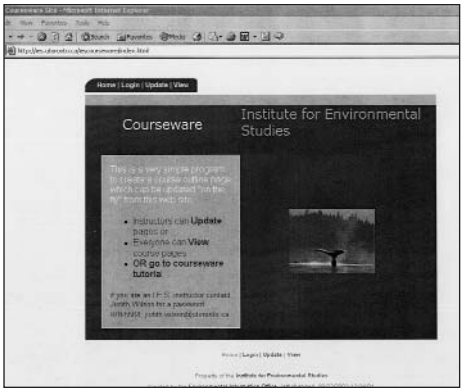
Work/Study Program

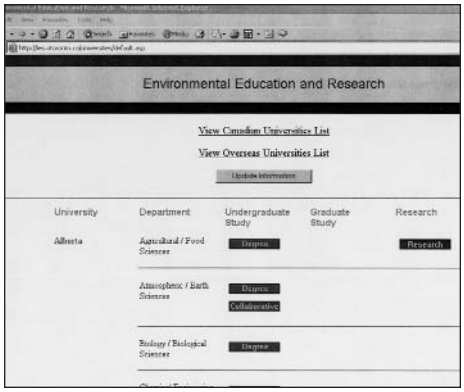
Undergraduate computer science student **Bencher Zhu** was hired for 2002/2003 through the Work/Study program of U of T Admissions and Awards. He worked for the most part on the Environmental Research and Teaching at Selected Universities Database (see above).

Judith Wilson has taken early retirement and continues to assist IES' Environmental Information Office. (See article on her 25 years at IES on page 7.) For more information, please contact Judith at judith.wilson@utoronto.ca or 250-754-4754.

Examples of various web pages and databases created by the Environmental Information Office.
LEFT: Environmental Research and Teaching at U of T: http://www.utoronto.ca/env
CENTRE: IES' courseware site enables instructors to update and upload course information: http://ies.utoronto.ca/iescourseware
RIGHT: A database that provides links and compares environmental research and teaching at selected Canadian and international universities: http://ies.utoronto.ca/universities







Mona El-Haddad

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In addition to being the Director's Assistant, Mona is the editor of the IES Annual Report and *Environews* newsletter and coordinator of the IES seminar series and annual Research Day (see page 29). Mona also edits the pages on the IES Web site which include research projects, faculty, student and staff information, seminars, and *Environews*.

IES adminstrative staff from left : Mona El-Haddad, Laurane Harding and Donna Workman.

(Centre and right photos: Donna Workman)

Laurane Harding

Business Officer
(416-978-2584, laurane.harding@utoronto.ca)
Laurane administers all of IES' income and expenditures. She is responsible for budget reports and financial statements, purchases and leasing of equipment, and setting up and monitoring of all Institute accounts including all research contracts and grants, and payroll documentation for employees.

Donna Workman

Graduate Student Advisor
(416-978-7077, d.workman@utoronto.ca)
Donna administers IES courses and its graduate collaborative programs. She advises students on eligibility, programs, policies and procedures; liaises with academic and administrative staff on program and educational matters; and is the program co-ordinator for the distance learning Certificate in Environmental Management. (See pages 3-5.)

Judy Wilson retires after over 25 years at IES

*By **Mona El-Haddad***
In September 2002, we said goodbye to Judith ("Judy") Wilson just before she headed out to beautiful Vancouver Island. Judy moved to Nanaimo with her partner, **John Holmes**, who was offered the position of research scientist at the Pacific Biological Station of Fisheries and Oceans Canada. During the last year, she continued working for IES "at a distance" until her early retirement in July 2003. She now continues to work on a casual basis for IES while living happily on the side of Mount Benson with John and their dog and two cats.

Judy started at IES in 1973 just before it changed its name from "the Institute for Environmental Sciences and Engineering". She managed the extensive collection at IES' Resource Centre until its closure in 1995 when IES moved from the Haultain Building to the Earth Sciences Centre. Before the Resource Centre was closed, she developed the Environmental Database and Networking Initiative (later renamed the Environmental Information Office) which "virtually" pulls together U of T's varied environmental research and teaching activities. Judy also created and managed the IES' web site as well as many web sites for IES collaborative partners. (See page 6 for more information.)

Judy Wilson, her partner John Holmes and new puppy Natasha "Natty", on their property in Nanaimo. Mount Benson is in the background. (Photo by John Holmes.)

Others at U of T know Judy for her many years of service on behalf of administrative staff. She served as President of the U of T Staff Association from 1990 to 1993. She was then elected to the University's Governing Council in 1995 as an administrative staff representative where she was a member of the Council's Executive Committee, Business Board, Planning and Budget Committee and Elections Committee. She also served on U of T's Environmental Protection Advisory Committee. She resigned from Governing Council in 2000 and ran successfully for the position of Trustee on the newly formed Steelworkers Local 1998 Executive Committee and also worked as a Steward for the local until 2003. In November 1998, when she received a pin for her 25 years at U of T, Judy was asked to give a small speech on behalf of administrative staff to a full house in Hart House's Great Hall.

We truly miss her and wish her and her family much happiness in B.C.!

Graduate Faculty

The following are members of IES Graduate Faculty; primary affiliations or departmental appointments are shown. Research profiles of faculty who held administrative appointments, were Instructors of IES courses and/or Prinicipal Investigators of IES research grants and contracts in 2002/03 are on pages 9-17 and 26-27.

Full Members:

Jonathan Abbatt, *Chemistry*
Barry Adams, *Civil Engineering*
Robert Andrews, *Civil Engineering*
David Bagley, *Civil Engineering*
Spencer Barrett, *Botany*
Terry Blake, *Forestry*
Rorke Bryan, *Forestry*
Michael Bunce, *Geography, Scarborough*
Frances Burton, *Anthropology*
*Phil Byer, *Civil Engineering*
Terry Carleton, *Forestry/Botany*
Catherine Chalin Clark, *Public Health Sciences*
Jing Chen, *Geography*
Joan Cherry, *Information Studies*
Rhonda Cockerill, *Health Administration*
Paul Cooper, *Forestry*
Paul Corey, *Public Health Sciences*
Ferko Csillag, *Geography, Mississauga*
Helene Cyr, *Zoology*
Amrita Daniere, *Geography*
Anthony Davis, *Geography*
George Dei, *Sociology & Equity Studies in Education (OISE/UT)*
Donald Dewees, *Economics*
Miriam Diamond, *Geography*
James Eckenwalder, *Botany*
Margrit Eichler, *Sociology & Equity Studies in Education (OISE/UT)*
Mark Engstrom, *Zoology/ROM*
Greg Evans, *Chemical Engineering & Applied Chemistry*
Roberta Fulthorpe, *Botany*
William Gough, *Environmental Science, Scarborough*
Hugh Gunz, *Management*
*Roger Hansell, *Zoology*
Patricia Harper, *Hospital for Sick Children*
L. Danny Harvey, *Geography*
Grant Henderson, *Geology*
D. Linn Holness, *Public Health Sciences*
Tad Homer-Dixon, *University College*
Susan Horton, *Economics*
Ken Howard, *Physical Sciences, Scar.*
Reiner Jaakson, *Geography*
Charles Jia, *Chemical Engineering & Applied Chemistry*
Shashi Kant, *Forestry*
Bryan Karney, *Civil Engineering*
Chris Kennedy, *Civil Engineering*
J. Gary Knowles, *Adult Education, Community Development & Counselling Psychology (OISE/UT)*
Nancy Kreiger, *Public Health Sciences*
Ulrich Krull, *Chemistry*
Hy van Luong, *Anthropology*
Scott Mabury, *Chemistry*
John MacDonald, *Physiology*
Laurel MacDowell, *History*
Virginia Maclaren, *Geography*
(IES Associate Director, Research)
Heather MacLean, *Civil Engineering*
Jay Malcolm, *Forestry*
Loraine Marrett, *Public Health Sciences*
David Martell, *Forestry*
Andrew Miall, *Geology*
William Michelson, *Sociology*
G.W. Kent Moore, *Physics*
Glenn Morris, *Zoology*
D. Scott Munro, *Geography, Mississauga*
Edmund O'Sullivan, *Adult Education, Community Development & Counselling Psychology (OISE/UT)*
James Purdham, *Public Health Sciences*
Helen Rodd, *Zoology*
Rowan Sage, *Botany*
Mohini Sain, *Forestry*
K. Richard Sandbrook, *Political Science*
Andrea Sass-Kortsak, *Public Health Sciences*
Lawrence Sawchuk, *Anthropology, Scarborough*
David Selby, *Curriculum Teaching and Learning (OISE/UT)*
Barbara Sherwood Lollar, *Geology*
Krystyna Sieciechowicz, *Anthropology*
Frances Silverman, *Medicine*
(IES Associate Director; Director, Environment & Health Grad Program)
Grace Skogstad, *Political Science*
Sandy Smith, *Forestry*
W. Gary Sprules, *Zoology*
Ingrid Stefanovic, *Philosophy*
Richard Stren, *Political Science*
Susan Tarlo, *Public Health Sciences*
Vic Timmer, *Forestry*
Carolyn Tuohy, *Political Science*
*Willem Vanderburg, *Mechanical & Industrial Engineering*
Frank Wania, *Physical Sciences, Scarborough*
*Rodney R. White, *Geography*
(IES Director)
Ann Zimmerman, *Zoology*

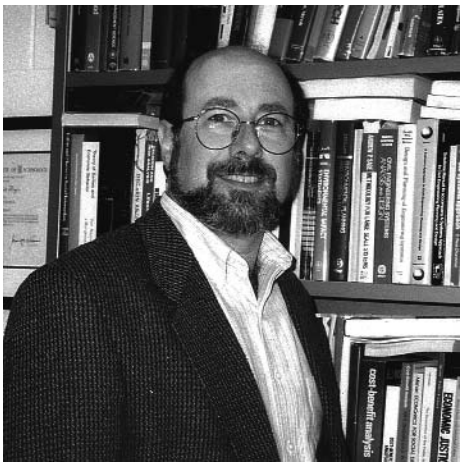
Associate Members:

David Balsillie, *Forestry*
Brad Bass, *Environment Canada*
Reina Bendayan, *Pharmacy*
Alana Boland, *Geography*
Paul Bozek, *Gage Occupational & Environmental Health Unit*
Donald Cole, *Public Health Sciences*
David Etkin, *Environment Canada*
A.P. (Lino) Grima, *Geography*
H. Roland Hosein, *GE Canada Inc.*
Andy Kenney, *Forestry*
(IES Graduate Coordinator, Environmental Studies Graduate Program)
Sonia Labatt
Abdel Maarouf, *Environment Canada*
Douglas Macdonald, *Innis College*
Patricia McCarney, *Political Science*
Monirul Mirza, *Environment Canada*
Paul Muldoon, *Canadian Environmental Law Association*
Barbara Murck, *Earth Sciences, Mississauga*
David Powell, *Innis College*
*Scott Prudham, *Geography*
Pamela Robinson, *Innis College*
Stefan Salbach
Marie Sanderson, *Environment Canada*
Beth Savan, *Innis College*
Stephen Scharper, *Religion*
M. Ronald Shimizu
Lesbia Smith, *Public Health Sciences*
Roger Street, *Environment Canada*
Peter Telford
Peter Timmerman, *York University*
Douglas Whelpdale, *Environment Canada*
Martin Whittaker, *Innovest Strategic Value Advisors*
Mark Winfield, *Division of the Environment*
Cindy Woodland, *Pharmacology*
Barbara Zimmerman, *Forestry*

Members Emeriti:

Paul Aird, *Forestry*
Ian Burton, *Environment Canada*
James Dooley
David Dunham, *Zoology*
Donald Mackay, *Chemical Engineering and Applied Chemistry (currently at Trent University)*
Robert E. (Ted) Munn
David Nowlan
Henry Regier
D.N. Roy, *Forestry*
Joseph Whitney, *Geography*
G. Ronald Williams, *Biochemistry*

*Administrative cross-appointment to IES



Philip Byer

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S.M. (Civil Eng.), S.B. (Electrical Eng.), Ph.D. (Civil Eng.), Mass. Inst. of Technology
Professor, Dept. of Civil Engineering and IES; Chair, Division of Environmental Engineering.
Co-Instructor of IES 1001H *Environmental Decision-Making.*

Research Interests:
Environmental planning and decision making; multiobjective project evaluation; environmental assessment;
risk management; environmental policy development; solid waste management.

Recent Publications:

Tam, E.K.L. and P.H. Byer. 2002. Remediation of contaminated lands: a decision methodology for site owners. *Journal of Environmental Management* 64(4): 387-400.

Byer, P. and E. Tam. 2001. Addressing new directions of globalization, environmental management systems and sustainable development in the curriculum. Proceedings, 12th Canadian Conference on Engineering Education, University of Victoria, August 23-25, 2001, pp. 313-317.

Pontarollo, J., D. Hooton and P. Byer. 2000. Environmental life-cycle cost analysis of asphalt and concrete pavements, CSCE 2000, *6th Environmental Specialty Conference,* London, June 7-10, 2000.

Jing Chen

Jing Chen

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www.geog.utoronto.ca/info/faculty/Chen.htm

B.Sc. (Meteorology), Nanjing Institute of Meteorology, China; Ph.D. (Meteorology), Reading University, UK
Professor, Department of Geography.

Research Interests:
Remote sensing, geographical information systems, biogeochemical cycle modelling, hydrology, micro-meteorology. Principal investigator of IES/Geography/Forestry project *Combating global warming: enhancing China's capacity for carbon sequestration* ***(see pages 22-23)***.

Recent Publications:

Chen, J. M., J. Liu, S. G. Leblanc, R. Lacaze, and J.-L. Roujean. 2003. Multi-angular optical remote sensing for assessing vegetation structure and carbon absorption. *Remote Sensing of Environment* 84: 516-525

Chen, J. M., W. Ju, J. Cihlar, D. Price, J. Liu, W. Chen, J. Pan, T. A. Black, and A. Barr. 2003. Spatial distribution of carbon sources and sinks in Canada's forests based on remote sensing. *Tellus B* 55(2): 622-642.

Chen, J.M., G. Pavlic , L. Brown, J. Cihlar, S.G. Leblanc, H.P. White, R.J. Hall, D. Peddle, D.J. King, J.A. Trofymow, E. Swift, J. Van der Sanden, and P. Pellikka, 2002. Validation of Canada-wide leaf area index maps using ground measurements and high and moderate resolution satellite imagery. *Remote Sensing of Environment* 80:165-184.

Miriam Diamond

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www.geog.utoronto.ca/deptinfo/mld.html

B.Sc. (Biology), Toronto; M.Sc. (Zoology), Alberta; M.Sc.Eng. (Mining Eng.), Queen's; Ph.D. (Chemical Eng. and Applied Chemistry), Toronto.
Professor, Department of Geography, U of Toronto; Full member, IES Graduate Faculty. Instructor of joint Geography/IES course JGE 1212H *Contaminants in the Environment.*

Research Interests:
Fate and transport of inorganic and organic contaminants in the environment, particularly lakes and urban areas; development of mathematical fate models, measurement of contaminants and fate processes in the environment.

Recent Publications:

Hodge, E.M., M.L. Diamond, B.E. McCarry, G.A. Stern and P.A. Harper. 2003. Sticky windows: chemical and biological characteristics of the organic film derived from particulate and gas-phase air contaminants found on an urban impervious surface. *Archives of Environmental Contamination and Toxicology* 44: 421-429.

Liu, Q.-T., R. Chen, B.E. Mccarry, M.L. Diamond, B. Bahavar. 2003. Characterization of polar organic compounds in the organic film on indoor and outdoor building glass windows. *Environmental Science and Technology* 37: 2340-2349.

Helm, P.A., M.L. Diamond, R. Semkin, Strachan, C. Teixeira and D. Gregor 2002. A mass balance model describing the multi-year fate of organochlorine compounds in a high arctic lake. *Environmental Science and Technology* 36: 996-1003.

James Dooley

tel. 416-499-9296;
james.dooley@utoronto.ca
B.A.Sc. Hons. (Mechanical Eng.), M.A.Sc. and Ph.D. (Industrial Eng.) Toronto.
Associate Member, IES Graduate Faculty.
Co-Instructor IES 1704H *Risk Analysis and Management.*

Research Interests:
Development of a unified set of concepts in the risk field encompassing analysis, management, and policy applicable to a broad range of situations including health, safety, and the environment. Application areas include: corporate risk management; and environmental policy formulaton in S.E. Asia. Recent research is the examination of the socio-economic and environmental impact on villages as traditional craft textiles evolve into a more traditional economic sector in Thailand, Laos, and Vietnam.

Publications:
Dooley, J. 1996. Risk Analysis and Management Training Manual, prepared for the Environmental Studies Centres Development in Indonesia Project. (Translated into Bahasa, Indonesia).
Dooley, J. 1995. *Regulations and Infrastructure to Monitor Compliance*. Report for the Canadian-ASEAN Centre, Academic Support Program.
Dooley, J. 1990. *Risk Analysis for Health and Environmental Management.* Environmental Management Development in Indonesia Project, Dalhousie University.

Adam Fenech

IES Office: 1047A Earth Sciences Centre; tel: 416-946-5335; adam.fenech@ec.gc.ca; mailing address and fax on inside cover. Environment Canada Office: Atmospheric and Climate Science Directorate, Meteorological Service of Canada, 4905 Dufferin Street, Downsview, Ontario, M3H 5T4; tel:416-739-4267; fax: 416-739-4265.
B.A. (Hons.), Toronto; M.E.S. (Environmental Studies), York.
Ph.D. Candidate (Geography and IES), Toronto.
Science Advisor, Office of the Director General, Atmospheric and Climate Science Directorate, Meteoro-logical Service of Canada.

Research Interests:
Integrated environmental modelling; ecosystem changes; international environmental agreements; valuing ecosystems and biodiversity; land-use change; atmospheric change; impacts of climate change on ecosystems; monitoring biodiversity; environment and the media; ecological monitoring networks; and environmental information management.
Co-Director, Integrated Mapping Assessment Project lab at IES ***(see page 24)***.

Recent Publications:
Fenech, A., J. Foster. K. Hamilton and R.I. Hansell. 2003. Natural capital in ecology and economics: an overview; and R.I. Hansell, T.M. Hansell and A. Fenech. 2003. A new market instrument for sustainable economic and environmental development. *Environmental Monitoring and Assessment* 86(1-2): 3-17; 203-209.
Lumb, A, A. Hopkin, H. Shear, A. Fenech and Hague Vaughan (eds). 2003. *Monitoring Ecological Change in Canada Part - II,* special Issue of *Environmental Monitoring and Assessment* 88(1-3). (In press.)

A.P. Lino Grima

Institute for Environmental Studies, 1048B Earth Sciences Centre; tel: 416-978-3486; lino.grima@utoronto.ca; http://myprofile.cos.com/grima; mailing address and fax on inner cover.
B.A. Hons. (Geography), Manchester; Dip. Ed., London; M.A. and Ph.D. (Geography), Toronto.
Associate Member, Geography/IES Graduate Faculty.
Instructor of IES 1703H *Water Resources Management* and Co-Instructor of IES 1704H *Risk Analysis and Management*.

Research Interests:
Market mechanisms for sustainable development; water resource management; demand management (water and energy resources); risk communication and management; public participation; environmental education; Great Lakes; ecological economics. Member of research team of IES project *Water Resources Management Policies for the Beijing-Tianjin-Tangshan Region* ***(see page 23)***.

Recent Publications:
Grima, A.P., S. Horton, S. Kant. 2003. Introduction: natural capital, poverty and development. In S. Horton, S. Kant, A.P. Grima and A. Fenech (eds.) *Natural Capital, Poverty and Development*, special issue of *Environment, Development and Sustainability*, pages 1-18. (In press.) ***(See page 18.)***
Grima, A.P. 2001. Demand management; Effluent charges; IJC Environmental Programs and Action Plans; State-of-the Environment Reporting. *Encyclopaedia of Global Environmental Change*, Vol. 4. John Wiley & Sons Chichester, U.K.

Roger Hansell

Department of Zoology, 25 Harbord St., tel: 416-978-5031; roger.hansell@utoronto.ca; www.utoronto.ca/env/hansell/hansell.htm

B.Sc. Hons. (Biology), Toronto; Ph.D., California, Riverside. Professor, Department of Zoology and IES. Instructor of IES course 1433H *Regional Resource Ecology*.

Research Interests:

Natural Capital and sustainability of ecosystem processes; evolution of complex systems: analysis of the processes by which systems increase in complexity through time; response of Arctic and tree-line communities to environmental change; the ecology and energetics of cities: vertical gardens and green canopies for urban environments.

Recent Publications:

Hansell, R.I.C., T.M. Hansell and A. Fenech. 2003. A new market instrument for sustainable economic and environmental development. *Environmental Monitoring and Assessment* 86:203-209.

Scott, P.A., R.I.C. Hansell. 2003. Arctic ecotone, Churchill, Manitoba. *Arctic* 21 pages. (In press.)

Fenech, A., B. Taylor, R. Hansell and G. Whitelaw. 2002. Major road changes in southern Ontario 1935-1995: implications for protected areas. In Bondrop-Nielsen et al., *Managing Protected Areas in a Changing World*, Science and Management of Protected Areas Association, Acadia University, Wolfville, Nova Scotia, pages 365-383.

Fenech, A., R. Hansell, A. Isla and S. Thompson (eds.). 2000. *Natural Capital: Views from Many Perspectives*. *Report of an April 23, 1999 Workshop.* Environmental Monograph No. 16. Institute for Environmental Studies, University of Toronto, Toronto. 22 pages.

Ken Howard

Department of Physical and Environmental Sciences, U of T at Scarborough; tel: 416-287-7233; fax: 416-287-7279; gwater@utsc.utoronto.ca; www.scar.utoronto.ca/~gwater/

B.Sc. Hons.(Physics & Geography), Exeter; M.Sc. & Ph.D. (Hydrogeology), Birmingham. Professor, Physical and Environmental Sciences Division, U of T at Scarborough (Groundwater Research Group). Full Member, IES Graduate Faculty. Instructor of joint Geology and IES course JGN 2607H *Advanced Techniques in Hydrogeology*.

Research Interests:

All aspects of hydrogeological research related to groundwater resources in Canada, U.S., U.K., Mexico, the Caribbean, Australia and Africa. Major ion, minor ion, and environmental isotope hydrochemistry; contaminant migration; borehole and surface geophysics; recharge assessment; groundwater flow modelling; impacts of urbanisation on groundwater resources and approaches to the management and protection of aquifers.

Recent Publications:

Howard, K.W.F. and R. Israfilov (eds.). 2002. *Current Problems of Hydrogeology in Urban Areas, Urban Agglomerates and Industrial Centres*. NATO Science Series: IV Earth and Environmental Sciences, Volume 8. Kluwer, Dordrecht, The Netherlands. 504 pages. ***(See page 18.)***

Gerber, R.E. and K.W.F. Howard. 2002. Hydrogeology of the Oak Ridges Moraine aquifer system: implications for protection and management from the Duffins Creek watershed. *Canadian Journal of Earth Sciences* 39: 1333-1348.

Charles Jia

Department of Chemical Engineering and Applied Chemistry, Room WB329, 200 College Street, tel: 416-946-3097; fax: 416-978-8605; cqjia@chem-eng.utoronto.ca; www.chem-eng.utoronto.ca/~cqjia/

B. Eng., M.Eng. (Material), Chongqing, China; Ph.D. (Material Sci. and Eng.), McMaster. Associate Professor, Chemical Engineering and Applied Chemistry. Full Member, IES Graduate Faculty. Instructor of joint Chemical Engineering and IES course JNC2503H *Environmental Pathways*.

Research Interests:

Environmental applications of inorganic sulphur chemistry, sulphate-reducing bacteria (SRB), treatment and utilization of industrial wastes, fate and transport of pollutants in multimedia environments, chemical kinetics and thermodynamics of multi-phase systems.

Recent Publications:

Bejarano, C., C.Q. Jia, K.H.Chung. 2003. A mechanistic study on kinetics of carbothermal reduction of SO2(g) by oil sand fluid coke. *Industrial and Engineering Chemistry Research*. (In press.)

Ahmed, I. B., P.K. Gbor, and C.Q. Jia. 2002. Effects of O2 on aqueous SO2 leaching of Co, Cu and Ni from discard smelter slag, *Canadian Journal of Chemical Engineering* 80(3): 410-420.

Gbor, P.K., I.B. Ahmed and C.Q. Jia. 2002. Evaluation of contribution of acid and ligand to Ni, Co and Fe dissolution from non-ferrous smelter slags in aqueous sulphur dioxide. *Industrial and Engineering Chemistry Research* 41(7): 1861-1867.

Andy Kenney

Faculty of Forestry, Room 1019, Earth Sciences Centre, 33 Willcocks St., tel: 416-978-0474; fax: 416-978-3834; a.kenney@utoronto.ca; www.forestry.utoronto.ca/ac_staff/current/kenney.htm

B.Sc.F. (Forestry), Lakehead; M.Sc. (Environmental Biology), Guelph; Ph.D. (Forestry), Toronto.
Senior Lecturer, Forestry. ***IES Graduate Coordinator, Environmental Studies Graduate Program***. Associate Member, IES Graduate Faculty.

Research Interests:
Impacts of urban development on woodland ecosystems and relationship between urban design and extent of urban forest canopies; strategic planning in urban forestry and the involvement of stakeholder groups in its management; computerized urban forest inventory system used by community groups to assess structure and condition of their urban forest.

Recent Publications:

Tsarouhas, V., W.A. Kenney, and L. Zsuffa. 2001. Variation in freezing resistance during different phonological stages in some Populus and Salix clones: implications for clonal selection. *Silvae Genetica* 50(2):54-63.

Kenney, W.A. 2000. Leaf area density as an urban forestry planning and management tool. *Forestry Chronicle* 76(2): 235-239.

Kenney, W.A. and C. Idziak. 2000. The state of Canada's municipal forests - 1996 to 1998. *Forestry Chronicle* 76(2): 231-234.

Puric-Mladenovic, D., W.A. Kenney and F. Csillag. 2000. Land development pressure on peri-urban forests: a case study in the Regional Munic. of York. *Forestry Chronicle* 76(2): 247-250.

Scott Mabury

Department of Chemistry, 80 St. George St., tel: 416-978-1780; fax: 416-978-3596; smabury@chem.utoronto.ca; www.chem.toronto.edu/people/academic/maburys.html

B.S. (Chemistry), Northland College, Wisconsin; Ph.D. (Agricultural and Environmental Chemistry), California, Davis.
Associate Professor and Chair, Department of Chemistry.
Full Member, IES Graduate Faculty.
Instructor of IES 1410H *Analytical Environmental Chemistry.*

Research Interests:
Environmental photochemistry; aqueous oxidants, their reactivity towards pesticides and concentrations under realistic environmental conditions; role of fluorine in environmental fate of fluorinated pesticides, pharmaceuticals, and industrial chemicals; analytical environmental chemistry and development of new methods of trace analysis.

Recent Publications:

Lam, M., K. Tantuco and S.A. Mabury. 2003. PhotoFate: a new approach in the measurement of direct and indirect photolysis. *Environmental Science and Technology* 37:899-907.

Martin, J., S.A. Mabury, K.S. Solomon, D.C.G. Muir. 2003 Bioconcentration and tissue distribution of perfluorinated acids in Rainbow Trout (Oncorhynchus *mykiss*). *Environmental Toxicology and Chemistry* 22:196-204.

Ellis, D.A., J.W. Martin, D.C.G. Muir, and S.A. Mabury. 2003. The use of 19F NMR and mass spectrometry for the elucidation of novel fluorinated acid and atmospheric fluoroacid precursors evolved in the thermolysis of fluoropolymers. *Analyst* 128:756 -764.

Virginia Maclaren

Department of Geography, 100 St. George St.; tel: 416-978-1594; fax: 416-946-3886; maclaren@geog.utoronto.ca; http://www.geog.utoronto.ca/info/faculty/Maclaren.htm

B.A. (Geography), Bishop's; M.Pl. (Regional Planning), Ottawa; M.S., Ph.D. (Regional Science), Cornell.
Associate Professor, Department of Geography. ***IES Associate Director, Research.*** Full Member, IES Graduate Faculty. Instructor of joint Geography/IES course JGE 1420H *Urban Waste Managment: An International Perspective*.

Research Interests:
Urban waste management; environmental reporting and indicators; environmental impact assessment; environmental management in developing countries (Southeast Asia). Principal Investigator of IES project *Waste-Econ in Vietnam, Laos and Cambodia* ***(see pages 20-21)***.
Member of research team of project on *China's capacity for carbon sequestration* ***(see pages 22-23)***.

Recent Publications:

Maclaren, V.W. and A.T.T. Nguyen (eds.). 2003. *Gender and Waste Management: Vietnamese and International Experiences*. National Political Publisher, Hanoi, Vietnam. 140 pages. ***(See page 18.)***

Maclaren, V.W. 2002. Blighted or booming? An evaluation of community indicators and their creation. *Canadian Journal of Urban Research* 10(2): 275-291.

Maclaren, V.W. 2002. Concern for the environmental effects of trade in Canadian communities: evidence from local indicator reports. In J.J. Kirton and V.W. Maclaren (eds.) *Linking Trade, Environment and Social Cohesion: North American Experiences, Global Challenges.* Ashgate Publishing, Aldershot, pages 265-275.

Paul Muldoon

Canadian Environmental Law Association, 517 College St., Suite 401, Toronto, Ontario, M6G 4A2, tel: 416-960-2284 x219; fax: 416-960-9392; muldoonp@lao.on.ca; www.cela.ca
B.A. Hons. (Political Sci.), Wilfrid Laurier; LL.B., Ottawa; M.A. (Political Sci.), McMaster; LL.M., McGill.
Executive Director, Canadian Environmental Law Association, Toronto. Associate Member, IES Graduate Faculty. Instructor of IES 1701H *Environmental Law.*

Research Interests:
Environmental law and policy; regulation of toxic chemicals; public participation in environmental decision-making, environmental rights both federally and provincially.

Recent Publications:
Muldoon, P. 2003. Bilateral and multilateral dimensions of international environmental law. In E. Hughes, A. Lucas, W. Tilleman (eds.) *Environmental Law and Policy.* Emond Montgomery Publications, Toronto. (In press.)

Muldoon, P. and R. Nadarajah. 1999. A sober second look - the regulatory approach looks better when the context and consequences of voluntary initiatives are taken into account. In R.B. Gibson (ed.) *Voluntary Initiatives - The New Politics of Corporate Greening,* Broadview Press, Peterborough, pages 51-65.

Billups, S. T. Eder, J. Jackson, P. Muldoon and M. Murray. 1998. Treading water: a review of government progress under the Great Lakes Water Quality Agreement, Part I; and Part II. *Toledo Journal of Great Lakes' Law, Science and Policy* 91: 245.

Robert (Ted) Munn

Institute for Environmental Studies, 1048B Earth Sciences Centre; tel: 416-484-6551; ted.munn@utoronto.ca; www.utoronto.ca/env/munn/munn.htm; mailing address and fax on inner cover.
B.A., McMaster; M.A., Toronto; Ph.D., Michigan.
Professor Emeritus, IES.

Research Interests:
Global environmental change; air pollution; environmental policy; environmental impact assessment.

Recent Publications:
Munn, R.E. and A. Maarouf. 2004. Bioclimatology. In J. Oliver (volume ed.) *Encyclopaedia of World Climates.* Kluwer, Dordrecht, The Netherlands. (In press.)

Maarouf, A. and R.E. Munn. 2004. Global environmental change impacts on humans and the biosphere. In J. Oliver (volume ed.) *Encyclopaedia of World Climates.* Kluwer, Dordrecht, The Netherlands. (In press.)

Munn, R.E. (Editor in Chief) 2001. *Encyclopaedia of Global Environmental Change*, 5 volumes, 650 pages each. John Wiley and Sons, United Kingdom.

David Powell

Innis College, 2 Sussex Avenue; tel: 416-971-5141 or 416-946-8100; fax: 416-271-2078; david.powell@utoronto.ca; http://www.utoronto.ca/envstudy/
B.Sc and M.B.A., Toronto.
Program Counsellor and Placement Coordinator, Environmental Studies Program, Innis College. Associate Member, IES Graduate Faculty; Instructor of IES 1705H *Corporate Perspectives on the Environment*.

Research Interests:
Environmental management systems and voluntary industry initiatives.
Environmental management consultant who provides strategic planning advice, program assessment, management education, and research services to organizations that want to become more environmentally responsible. For the past ten years, he has worked on contract to the Canadian Chemical Producers' Association (CCPA) to assist it with the initial development, implementation, and ongoing updating of a protocol to verify that its member companies have successfully implemented the codes of practice under the CCPA's Responsible Care Program for environment, health and safety. He is currently working as a verifier of CCPA member companies under this program, and periodically assists in the development and delivery of training workshops for other verifiers and for member-company representatives. He is a member of the Canadian Advisory Committee to ISO TC207/SC1, Environmental Management Systems, which provides Canada's official input to the Organization of International Standards on ISO 14001 and 14004.

W. Scott Prudham

Department of Geography, Room 5028, 100 St. George Street; tel: 416-978-4975; fax: 416-946-3886; scott.prudham@utoronto.ca; www.geog.utoronto.ca/info/faculty/Prudham.htm

B.A.&Sc., McMaster; M.A. (Geography), Victoria; Ph.D. (Energy and Resources), California, Berkeley.
Assistant Professor, Department of Geography and IES.
Co-Instructor of IES 1002H *Environmental Decision-Making*. ***(See article on page 4.)***
On leave January - June, 2004.

Research Interests:
Political economy; social theory and the environment; human aspects of environmental change; environmental justice; environmental policy and regulation; biotechnology politics and regulation; globalisation and environment; politics of natural resource use and management.

Recent Publications:
Prudham,W.S. 2004. *The Nature of Capital: Political Ecology on the Pacific Slope.* Routledge Press, New York, New York. (In press.)
Prudham, W.S. 2003. Taming trees: capital, science, and nature in Pacific Slope tree improvement. *Annals of the Association of American Geographers.* (In press.)
Prudham, W.S. 2002. Regional science, political economy, and the environment. *Canadian Journal of Regional Science* 25(2): 171-206.
Prudham, W.S. 2002. Downsizing nature: managing risk and knowledge economies through production subcontracting in the Oregon logging sector. *Environment and Planning A* 34: 145-166.

Pamela Robinson

Innis College, 2 Sussex Avenue, tel: 416-978-3032; fax: 416-971-2078; pjr.hlrplan@sympatico.ca

B.A. (Hons. Political Studies), M.Pl. (Community and Environmental Planning), Queen's; Ph.D. (Geography), Toronto.
Lecturer, Urban and Environmental Studies Program, Innis College; Associate Member, IES Graduate Faculty; Instructor of IES 2001H *Environmental Governance in the New City of Toronto*, 2002/03.
On leave until December, 2003.

Research Interests:
Public engagement; organizational change for sustainability; governance; land use and environmental planning; environmental design; use of integrated assessment models in public engagement processes; community and individual response to climate change; growth management and long range planning policy development.
As an active contributor to the City of Toronto's Sustainability Roundtable through membership in the Governance working group and as instructor of IES 2000, she is currently involved in the development of a new series of sustainability indicators and working with City staff to develop more meaningful public engagement activities. She is also teaching a new Urban Sustainability course at Innis College. She also continues to be involved in the GTA-QUEST (Community Dialogues toward Creating a Sustainable Greater Toronto Region) project. The goal of this project is to engage stakeholders in the Greater Toronto Area in discussions about defining and sharing their vision(s) of a sustainable future, how this vision could be implemented and to help connect citizens with others in the GTA who are taking action toward similar sustainable futures.

Stefan Salbach

tel & fax: 416-491-2192; steve.salbach@utoronto.ca

B.A.Sc. (Civil Engineering), Toronto; M.A.Sc. (Sanitary Engineering), Toronto.
Environmental Consultant.
Associate Member, IES Graduate Faculty; Instructor of IES 2501H *Pollution Prevention and Control.*

Research Interests:
With Ontario government, many years of experience in environmental management with special interests in pollution control and water resources management; currently consultant.

Consulting Experience:
As an independent consultant he provides services in the environmental field, specializing in water resources management, water supply and pollution control. For example, he has provided advice on the policies and technical procedures used for the rehabilitation of soil contamination. Technical critiques were prepared for the International joint Commission on Remedial Action Plans. He prepared a strategic plan on water quality/water supply/waste treatment problems of several municipalities around Lake Sapanca, and area 139 km east of Istanbul, Turkey, including an analysis of the jurisdictional complexities governing environmental management. In China, he provided advice for pollution control options for a pulp and paper mill. In Romania, he provided advice to several municipalities about their municipal waste treatment and the development of a municipal sewer use by-law.

Beth Savan

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B.Sc. Hons., Toronto; Ph.D., London,U.K.
Director, Environmental Programs and Senior Lecturer, Innis College; Assistant Professor, Department of Geography.
Associate Faculty Member, IES.
Instructor of IES 2002H *Community Based Environmental Research,* Spring 2004.

Research Interests:
Sustainability planning, climate change, environmental education; Co-Chair of the Sustainability Round Table and Member of the Board of Directors of the Toronto Atmospheric Fund of the City of Toronto; President of Citizens Environment Watch, a student and citizen-run environmental monitoring project. Principal investigator of IES project *Capacity Building for Climate Change in Cuba* ***(see page 19)***.

Recent Publications:
Savan, B.I. and D. Sider, D. 2003. Contrasting approaches to community based research and a case study of community sustainability in Toronto, Canada. *Local Environment*. (In press.)
Savan, B.I., A.J. Morgan, and C. Gore. 2003. Environmental monitoring and the role of the universities: the case of Citizens' Environment Watch. *Environmental Management*. (In press.)
Savan, B.I. 2003. Community-university partnerships: linking research and action for sustainable community Development. *Community Development Journal.* (In press.)
Savan, B.I. and D. Bell. 2002. Curriculum development for community sustainability. In W. Filho (ed.) *Teaching Sustainability at Universities: Towards Curriculum Greening*. Peter Lang, Frankfurt, pages 303-321.

Frances Silverman

Gage Occupational & Environmental Health Unit, University of Toronto, 223 College St., Toronto, Ontario, M5T 1R4; tel: 416-978-5883; fax: 416-978-2608; frances.silverman@utoronto.ca
B.Sc., M.Sc. (Physiology) and Ph.D. (Respiratory Physiology), McGill.
IES Associate Director - Environment & Health; Director of IES' Collaborative Graduate Program in Environment and Health; Associate Professor, Department of Medicine, Dept. of Public Health Sciences, Inst. of Medical Science, Faculty of Physical Education and Health.
Full Member, IES Graduate Faculty.
Co-Coordinator of joint Medical Science and IES course MSC 4000H *Seminars in Environment and Health* and its Ph.D. equivalent IES 4001H.

Research Interests:
Adverse respiratory and systemic health effects of inhaled irritant environmental contaminants; inhalation toxicology (controlled environmental facility); studies directed at the understanding, diagnosis, treatment and potential prevention of adverse health effects of inhaled irritants and role they play in development of disease.

Recent Publications:
Brook, R., J. Brook, B. Urch, R. Vincent, S. Rajagopalan, and F. Silverman. 2002. Inhalation of fine particulate air pollution and ozone causes acute arterial vasoconstriction health adults. *Circulation* 105(13):1534-1536.
Alexis, N. B. Urch, S. Tarlo, P. Corey, D. Pengelly, P. O'Byrne P, and F. Silverman. 2000. Cycloozygenase-1 metabolites play a different role in ozone-induced pulmonary function decline in asthmatics compared to normals. *Inhalation Toxicology* 12 (12): 1205-1224.

Lesbia Smith

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B.Sc., City College of New York; M.D., State University of New York, Buffalo.
Assistant Professor, Department of Public Health Sciences and Gage Occupational and Environmental Health Unit;
Associate Member, IES Graduate Faculty.
Co-Coordinator of joint Medical Science and IES course MSC 4000H *Seminars in Environment and Health* and its Ph.D. equivalent IES 4001H.

Research Interests:
Medical and technical consultant with numerous projects in environmental and occupational health and public health to industry, government and public health agencies. Former Head of Environmental Health and Toxicology Unit of the Public Health Branch, Ontario Ministry of Health, managing issues in consultative and technical capacities in environmental health, environmental medicine, occupational health, and public health programs. Consultant to the study of the East Side Residents of Port Colborne (2001) for the Niagara Health Unit; lead and arsenic biological marker population screening in various communities in Canada; and currently working with the Sudbury Soils Study consulting consortium on human health risk assessment from metal in the environment of the Sudbury Region.

Recent Publications:
Smith, L. and H. Phillips (for SENES Consultants) 2002. *Arsenic in Drinking Water of Chapels Cove: Analysis, Risk Assessment and Public Health Response.*
Lesbia F. Smith, L.F., H. Phillips, and M.T. Do (for SENES Consultants) 2002. *Critical Review of the Epidemiology Literature on non-bladder cancer and THMs.*

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B.A., M.A. and Ph.D (Philosophy), Toronto.
Associate Professor, Department of Philosophy; From July 1, 2003: Director, Division of the Environment;
Full Member, IES Graduate Faculty.
Co-Instructor of IES 1001H *Environmental Decision-Making* and Instructor of joint Philosophy and IES course JVP 2147H *Environmental Philosophy*.

Research Interests:
Environmental philosophy, environmental and architectural phenomenology, philosophical foundations of sustainable development policies.

Recent Publications:
Stefanovic, I. 2003. The contribution of philosophy to hazards assessment and decision making. *Natural Hazards* 28: 229-247.
Stefanovic, I. 2002. Remembering the mystical in dwelling. In J. Goering and F. Guardiani (eds.) *Mystics, Visions and Miracles*. Legas, Ottawa, pages 51-60.
Stefanovic, I. 2001. Environmental philosophy: phenomenological ecology. In R.E. Munn (ed. in chief) *Encyclopedia of Global Environmental Change*, Volume 5. John Wiley & Sons Ltd., London, pages 253-257.
Stefanovic, I. 2000. *Safeguarding Our Common Future: Rethinking Sustainable Development*, State University of New York Press, New York. 272 pages.

Richard Stren

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B.A. (Political economy), Toronto;
M.A. and Ph.D. (Political science), California, Berkeley.
Professor, Political Science.
Instructor of joint Political Science and IES course, JPV1201H *Politics, Bureaucracy and the Environment*.
On leave Fall 2002.

Research interests:
Urban politics; comparative public administration and organization theory; urbanization and urban planning in developing countries; current teaching and research on African and Latin American urbanization and sustainable urban development.

Recent publications:
McCarney, P.L. and R.E. Stren (eds.) *Governance on the Ground: Innovations and Discontinuities in Cities of the Developing World.* Woodrow Wilson Center Press, Washington and Johns Hopkins University Press, Baltimore. (In press: October 2003.)
Montgomery, M., R.E. Stren, B. Cohen and H. Reed. 2003. (authors and editors). *Cities Transformed. Demographic Change and its Implications in the Developing World.* National Academies Press, Washington. (In press: Oct 2003.)
Gross Stein, J., R. Stren, J. Fitzgibbon and M. MacLean. 2001. *Networks of Knowledge: Collaborative Innovation in International Learning*. University of Toronto Press, Toronto. 176 pages.
Freire, M. and R.E. Stren. 2001. T*he Challenge of Urban Government.* The World Bank, Washington, D.C. 442 pages.

Peter Timmerman

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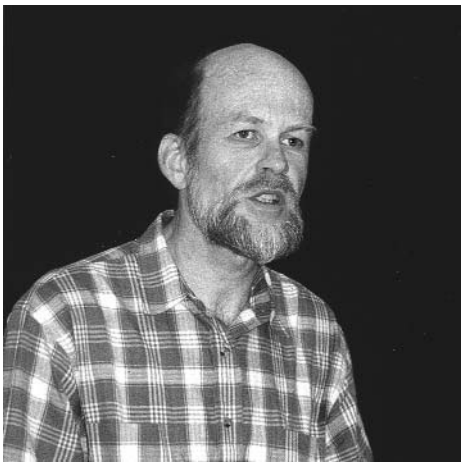
B.A., M.A., Toronto.
Assistant Professor and MES Co-ordinator, Faculty of Environmental Studies, York University.
Associate Faculty Member, IES.
Co-Instructor of IES 1002H *Environmental Management Case Studies*. ***(See article on page 4.)***

Research Interests:
International scientific research collaboration on global environmental change issues; social and economic dimensions of climate change; management of coastal cities; resolution of very long-term issues, e.g. high-level nuclear fuel waste management and emerging concerns of the 21st century.

Recent Publications:
Timmerman, P. (ed.) 2002. *Social and Economic Dimensions of Global Environmental Change*, Volume 5 and selected articles in *Encyclopaedia of Global Environmental Change.* John Wiley and Sons, United Kingdom.
Munn, R.E., P. Timmerman, and A. Whyte (eds.) 2000. Emerging Environmental Issues for the 21st Century: A Study for GEO-2000. UNEP, Nairobi, Kenya.
Timmerman, P., P. Harries-Jones and A. Rotstein. 1999. A signal failure: ecology and economy after the Earth Summit. In M.G. Schechter (ed.), *Future Multilateralism* United Nations University Press, Toyko.



Willem Vanderburg

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B.A.Sc., M.A.Sc., Ph.D (Mechanical Eng.), Waterloo.
Associate Professor, Department of Mechanical and Industrial Engineering (MIE) and IES; Director, Centre for Technology and Social Development. Instructor of joint MIE and IES course JEI 1901H *Technology, Society and the Environment.*

Research Interests:
Ecology of technology: how technology fits into, depends on and interacts with human life, society and the biosphere; preventive engineering and management: adjusting theory and practice to help create cleaner and greener technologies; areas of application (life cycle design of materials, processes and products, preventive energy end-use strategies, healthy workplaces and cities); relationship between culture of society and "cultures" of science and technology, with emphasis on embedded values, beliefs and world-views.

Recent Publications:

Vanderburg, W.H. 2002. Preventive approaches for the engineering and management of technology: bridging the gap between intellectual cultures. In Jim Downey and Lois Claxton (eds.), *What We Need to Know: Essays by Leading Canadian Researchers*, Canadian Foundation for Innovation/Key Porter Books, Toronto, pages 194-201.

Vanderburg, W.H. 2001. Is a second negawatt revolution within reach? *Bulletin of Science, Technology and Society* 21(6): 431-442.

Vanderburg, W.H. 2001. Comments on the empire of non-sense: art in a technique-dominated society. *Bulletin of Science, Technology and Society* 21(1): 38-54.

Rodney White

Institute for Environmental Studies, Room 1021 Earth Sciences Centre; tel: 416-978-6526; rodney.white@utoronto.ca; www.utoronto.ca/env/white.htm; mailing address and fax on inner cover.

B.A. Oxford; M.Sc., Pennsylvania State; Ph.D. (Geography), Bristol.
Professor, Geography and IES; ***IES Director***. Co-Instructor of IES 1704H *Risk Analysis and Management* and Co-Coordinator of joint Medical Science and IES course MSC 4000H *Seminars in Environment and Health* and its Ph.D. equivalent IES 4001H.

Research Interests:
Environmental implications of urbanization; environmental change and urban design; infrastructure planning (rural roads and water supply); the implications of environmental change for the financial services sector. Principal Investigator of IES project *Water Resources Management Policies for the Beijing-Tianjin-Tangshan Region* ***(see page 23)***. Member of research teams of IES projects *Waste-Econ in Vietnam, Laos and Cambodia* ***(see pages 20-21)*** and *China's capacity for carbon sequestration* ***(see pages 22-23)***.

Recent Publications:

Labatt, S. and R.R. White. 2002. *Environmental Finance: A Guide to Environmental Risk Assessment and Financial Products.* John Wiley and Sons, U.S. 366 pages. ***(See page 18.)***

Zetter, R and R.R. White (eds.) 2002. *Planning in Cities: Sustainability and Growth in the Developing World.* Urban Management Series, ITDG Publishing, London. 247 pages. ***(See page 18.)***

White, R.R. 2002. *Building the Ecological City.* Woodhead Publishing Ltd. 238 pages.

Martin Whittaker

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B.Sc. (Hons) and M.Sc. (Analytical Chemistry), McGill; Ph.D. (Environmental Risk Assessment & Management), Edinburgh; M.B.A. (International Finance), London.
Managing Director, Innovest Strategic Value Advisors. Associate Member, IES Graduate Faculty. Instructor of IES 1707H *Environmental Finance: Risk Management and Business Opportunities.* ***(See article on page 5.)***

Research Interests:
Leads Innovest's research in the energy and mining sectors, and spearheads the carbon finance and private equity activities; former environmental consultant and oil industry professional with Elf Aquitaine, the French oil multinational; has authored numerous articles and studies on sustainability and finance, and contributes regular analysis and commentary on these issues for private clients, at public fora and in the national and international media.

Recent Publications:

Whittaker, M. 2003. *Carbon Finance and the Global Equity Markets*. London: Carbon Disclosure Project Secretariat. 72 pages. (www.cdproject.net)

Whittaker, M. 2003. Specter of HIV Aids: a growing concern for emerging market investors. *Investor's Digest of Canada*, February 2003.

Whittaker M., Sustainability and Finance in the Global Mining Industry. Invited presentation and client report, World Bank, Washington, D.C. January 2002.

The following are recently published books written by some members of IES' graduate faculty.

Sue Horton, Shashi Kant and Lino Grima

S. Horton, S. Kant, A.P. Grima and A. Fenech (eds.) 2003. ***Natural Capital, Poverty and Development,*** **special issue of** ***Environment, Development and Sustainability*****. Kluwer, The Netherlands (In press.)** This book includes papers from the Conference on *Natural Capital, Poverty and Development* held September 5-8, 2001. The concept of Natural Capital seems to hold a lot of promise to reconcile the often conflicting views of environmentalists and economists. It opens a middle ground for constructive discussion of policies which could enable progress towards goals of both sustainable development (sustainable in environmental terms) and poverty alleviation. Can development occur without running down natural resources in an unsustainable way? Four aspects are examined: 1. the role of institutions in facilitating sustainable development; 2. examples of (eco)tourism that illustrate the potential and limits of the concept's applicability; 3. measurement issues for natural capital; and 4. the concept applied to agricultural strategy in fragile lands. (For info on the conference, see http://ies.utoronto.ca/ncpd/focus.htm.)
Sue Horton*, Interim Vice-Principal (Academic) and Dean, UT Scarborough;* ***Shashi Kant****, Associate Professor, Forestry;* ***A.P. Lino Grima****, Associate Faculty Member, IES;* ***Adam Fenech****, Meteorological Service of Canada and Ph.D. candidate, IES.*

Ken Howard

Howard, K.W.F. & Israfilov, R. (eds.). 2002. ***Current Problems of Hydrogeology in Urban Areas, Urban Agglomerates and Industrial Centres.*** **NATO Science Series: IV Earth and Environmental Sciences 8, 504 pages. Kluwer, The Netherlands.**
In May 2001, a NATO Advanced Research Workshop on *Current Problems of Hydrogeology in Urban Areas, Urban Agglomerates and Industrial Centres* was held in Baku, Azerbaijan on the understanding that many urban groundwater problems are not unique to any one region and there is much to be gained by scientific co-operation on an international scale. The products of that workshop are presented in this volume. Some of the case studies have never before been described in the English language. Overall, the papers represent the work and experiences of researchers and groundwater professionals who have worked on urban groundwater issues in developed and lesser-developed nations around the world. They reveal the magnitude and scope of the problem; but they also identify future challenges, potential courses of action, and emerging technologies that give hope for the future.
Ken Howard*, Professor, Physical Sciences, UT Scarborough*

Virginia Maclaren

Maclaren, V.W. and Nguyen Anh Thu eds. 2003. ***Gender and the Waste Economy - Vietnamese and International Experiences.*** **National Political Publishers, Hanoi, Vietnam, 140 pages.**
This publication was produced by the Waste-Econ Program (*Making Waste for the Economy (Waste-Econ) in Vietnam, Cambodia and Laos),* a 5-year project at IES and the Department of Geography. The publication is based on papers presented at a workshop held in Danang, Vietnam on February 21, 2002. Gender and waste researchers from Vietnam, India, the Netherlands and Canada presented different perspectives on gender and waste management. It is available in .pdf format on the Waste-Econ Program's website: http://ots.utoronto.ca/users/WasteEcon/
Virginia Maclaren*, Associate Professor, Geography.*

Sonia Labatt and Rodney White

Sonia Labatt and Rodney R. White. 2002. ***Environmental Finance: A Guide to Environmental Risk Assessment and Financial Products.*** **John Wiley & Sons. 366 pages.**
This book opens with a discussion of the concepts and tools used by financial institutions to develop environmental policies and products, and then details how recent changes in the financial services sector have affected the capacity of companies to respond to the environmental challenge. It introduces innovative new products such as tradable pollution permits, weather derivatives, catastrophe bonds, and many other market-based solutions that are being created in response to every type of environmental problem - from hurricanes to asbestos.
(See articles on IES' iniative on Environmental Finance and the new IES course on pages 5 and 27.)
Sonia Labatt*, Associate Faculty Member, IES;* ***Rodney White****, Professor, Geography and Director, IES.*

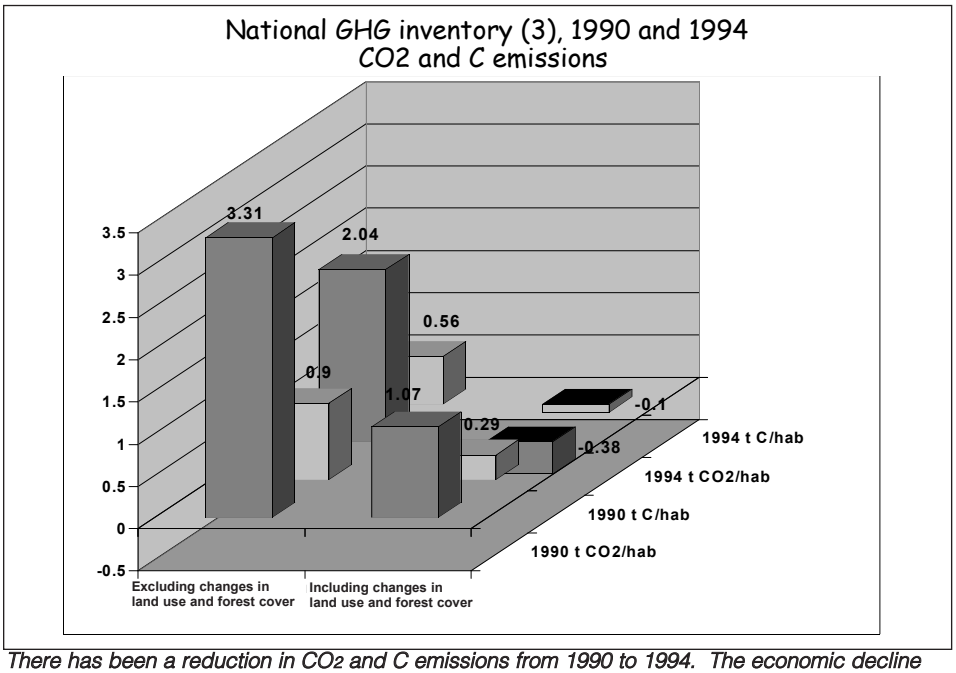
Monirul Mirza

M. Monirul Q. Mirza, Ajaya Dixit and Ainun Nishat (eds.) 2003. ***Flood Problem and Management in South Asia.*** **Kluwer Academic Publishers, the Netherlands, 210 pages.** http://www.kluweronline.com/)
The 10 articles in this edited book (reprinted from ***Natural Hazards***, 28(1)) focus on both the hazard and the vulnerability aspects of floods in South Asia from a multidisciplinary approach, examining the characteristics and nature of the flood problem and its management aspects. It suggests that flood control and management focused on structural solutions are insufficient and that effective solutions require major restructuring of both legal systems and institutions responsible for management. For those people living in the vast flood plains of South Asia to be able to overcome social, economic and environmental vulnerabilities, an adaptive approach to management of flood risks that identifies specific strategies is needed.
Monirul Mirza*, Researcher, Adaptation and Impacts Research Group at IES;* ***Ajaya Dixit****, Water Conservation Foundation (NWCF), Kathmandu, Nepal;* ***Ainun Nishat****, IUCN, The World Conservation Union, Dhaka, Bangladesh.*

Rodney White

Roger Zetter and Rodney R. White (eds.) 2002. ***Planning in Cities: Sustainability and Growth in the Developing World. Urban Management Series*****, ITDG Publishing, London. 247 pages.** (http://www.itdgpublishing.org.uk/)
Globalization and the neo-liberal economic development paradigm are the driving forces of urbanization in the developing world in the 21st century. These processes question the extent to which the increasingly rapid scale and speed of city growth is sustainable. It is an innovative study which bridges theory and practice to explore these conflicting challenges. Part I explores the changing paradigms of development and environmentalism and their impacts on urbanization and the emerging debates on the sustainability of cities. Part II focusses on case studies from different countries and different urban policy sectors and investigates the design and implementation of planning policies and ways of improving urban governance to support sustainable urban growth.
Roger Zetter*, Professor and Deputy Head, School of Planning, Oxford Brookes University, United Kingdom;* ***Rodney White****, Professor, Geography and Director, IES.*

New CIDA-funded project to develop climate action plan for Cuba



There has been a reduction in CO_2 and C emissions from 1990 to 1994. The economic decline due to the US blocade was reflected in reduced emission of greenhouse gases which have since increased, although an intensive reforestation program (reflected on right side) has also resulted in minimal net emissions. (Courtesy of Abel Centella, Cuban Ministry of the Environment.)

By Beth Savan

Cuba is an archipelago composed of two major islands (Cuba and Isla de la Juventud) and 1600 keys, with a total area of 110,860 km^2. Cuba enjoys high literacy, low infant mortality, and high life expectancy rates. The Cuban economy depends on tourism, manufacturing and the agricultural sector. A dramatic drop of about 35% in gross domestic product followed the collapse of the soviet bloc, with an accompanying reduction in trade of 80%. The continued US blocade has slowed economic recovery, but since 1995 the economy has nonetheless turned around, fuelled largely by intense investment in tourism. The economic decline was reflected in reduced emission of greenhouse gases which have since increased, although an intensive reforestation program has resulted in minimal net emissions (see figure above).

Like other small island states, the consequences of a rise in the Earth's mean temperature is a complicated and alarming issue for Cuba. Among the most important consequences of global warming are severe weather events. Tropical storms and hurricanes routinely pass near or make landfall in Cuba, and concern over the increased number or increased severity of storms due to climate change raises the potential for human harm and property damage and could prove detrimental to Cuba's vibrant tourist industry. Likewise, an increase in ocean levels in concert with extreme weather events reinforces the need for the tourist industry and coastline populations to take measures to adapt to these likely shifts. While uncertainty and complexity therefore dominate the issue of severe weather events, planning for and establishing the institutional and policy capacity to manage and adapt to these potential changes remains a priority.

A great deal of technical information on these subjects has been and continues to be collected by the Cuban Ministry of the Environment. For this reason, the new CIDA-funded project ***Capacity Building for Climate Change in Cuba***, administered at the Institute for Environmental Studies, aims to facilitate the Cuban government's efforts to integrate and translate this specific information into a broader national climate change plan, while focusing specifically on the development of sector specific action, awareness, and adaptation strategies through the development and implementation of strategic planning exercises and training modules.

The project activities involve the preparation and delivery of two multimedia modules for use in sector-specific workshops throughout Cuba. Together with Cuban colleagues, **Dr. Abel Centella** and **Dr. Luis Paz Castro** of the Instituto de Meteorologia, **Dr. Juan Llanes Regueiro o**f the Universidad de la Habana, and **Dr. Julio Torres Martinez** of the Ministerio de Ciencia Technologia y Medio Ambiente, as well as **David Heeney**, **Judy Simon** and **Raegan Bunker** of IndEco Strategic Consulting in Toronto, the first module on the science and policy of climate change has been designed. Interactive sessions, such as the inaugural workshop in September 2003, will explore the implications of climate change for the Ministry of Basic Industry (MINBAS), which manages electricity generation and distribution, mining and manufacturing. Following a period during which senior managers and policy advisors in the MINBAS complete work on climate change impacts and opportunities, the team will reconvene for a second workshop, in December 2003, aimed at interactively developing a sectoral strategic plan for prevention, mitigation and adaptation to climate change.

The goal is to develop flexible engaging modules, which can be used throughout Cuba and even in other countries, to assess and address the impacts of climate change on particular economic sectors in interactive workshops. It is hoped, also, to explore the broader goal of contributing to a national climate change strategy through an investigation of the potential for Canadian originated Clean Development Mechanisms to contribute to Cuba's energy efficiency and sequestration efforts.

This project is off to a great start, following the initial mission to Cuba in February 2003. In June 2003, the project's Cuban colleagues visited Toronto where they presented a seminar at U of T and met Canadian experts on climate change modeling, potential clean development mechanisms, and the meteorology of climate change.

Beth Savan is the Director of Environmental Programs at Innis College and the Director of this project. For more information, please contact her at b.savan@utoronto.ca or 416-978-7458.

'Waste-Econ' Program launches pilot project research, training and seminars

Community members participate in clean up of Vietnam's tourist area of Halong Bay (Photo: Tran Hieu Nhue.)

*By **Virginia Maclaren**, Project Director and **Cheryl Gonsalves**, Communications Officer.*

The CIDA-funded Waste-Econ Program (*Making Waste for the Economy in Vietnam, Cambodia and Laos*), led by **Virginia Maclaren** of Geography, is a 5-year project at IES and the Department of Geography. It has completed its third year of operation with a successful expansion of the program from Vietnam to Cambodia and Laos. Program activities included pilot project research and training in Vietnam, Canadian student field studies in Vietnam, Laos and Cambodia, 2-week training courses in Vietnam, 6-week training courses in Cambodia and Laos, and a seminar series at Toronto.

Pilot Project Activities

New projects will begin in Laos and Cambodia in 2003 on ***Waste Separation and Composting of Market Waste in Vientiane, Laos*** and ***Community-based Waste Management in Siem Reap, Cambodia***.

Most of the pilot projects in Vietnam have completed their first phase and are now concentrating on publishing and outreach. The following are highlights of three of the Vietnamese pilot projects.

1. **Solid Waste Landfill Siting and Best Management Practices in Danang**
   Led by **Bui Van Ga** (Danang University) and **Phil Byer** (Civil Engineering/IES, U of T), this project has explored opportunities for improving landfill-siting procedures. The success of a 2-day workshop on Landfill Siting led by Phil Byer in February 2003 has generated interest for future workshops of this nature. Graduate students **Laura McNally** and **Luu Duc Cuong** from Civil Engineering assisted in the delivery of the workshop, applying some of the results from their summer research projects in Vietnam.

2. **Micro-Finance Initiatives for Female Entrepreneurs in Haiphong**
   C.H. Van (Vietnam Women's Union), **Katharine Rankin** (Geography at U of T, **Lynne Milgram** (an Associate at the Asian Institute), and **Bella Lam** (Gems of Hope) continue to be involved in the micro-credit program for female plastics waste processors in Haiphong. Through this program, over 100 women have received loans of up to $150 US to purchase equipment and/or storage space for recyclables, which allows them to collect a greater volume of recyclables and helps them to obtain a better resale price from dealers. Katharine Rankin and Geography Ph.D. candidate **Yogendra Shakya** are conducting comparative research on microfinance programs in Vietnam and Nepal. The Waste-Econ Haiphong microfinance program is one of twelve cases included in their research.

3. **Managing Organic Waste in a Tourism Destination, Bai Chay Beach, Halong Bay**
   Tran Hieu Nhue (Hanoi University of Civil Engineering) and **Murray Haight** (University of Waterloo) have implemented significant improvements in managing tourism waste in Halong Bay, which is one of the most important eco-tourism destinations in Vietnam and also a World Heritage Reserve. Their project identified the amount of waste generated through tourism in the area (both on- and off-shore) and opportunities for reduction of that waste through recycling and composting. Community participation in the project has added to the success and sustainability of this work. This strong community support is prompting the Waste-Econ Program to develop a full scale Integrated Waste Management plan for the site.

The other pilot projects in Vietnam and their leaders are:

1. **Industrial Eco-Efficiency in Ho Chi Minh City:**
   Lam Minh Triet (National University of Ho Chi Minh City), **Murray Haight** (University of Waterloo), **Virginia Maclaren**, (Geography, U of T), and **Viive Wark** (Ontario Centre for Environmental Technology Advancement, OCETA).
2. **Improving Hazard Awareness and Educational Opportunities for Child Waste Pickers in Hanoi:**
   Pham Bang (Vietnamese Youth Research Institute) and **Catherine Chalin Clark** (Public Health Sciences, U of T), and **Susan Ruddick** (Geography, U of T)

Student Research in Vietnam

During the past year, the following eight U of T students travelled to Vietnam, Cambodia and Laos to conduct field research:

- **Carrie Mitchell** (recent Master's graduate in Program in Planning): *Cleaner Production in Ho Chi Minh City*; supervised by Virginia Maclaren;
- **David Richardson** (recent Master's graduate in Forestry): *Community-based Solid Waste Management Systems in Hanoi*; supervised by Shashi Kant;
- **Laura McNally** (recent Master's graduate in Civil Engineering): *Protection of Water Resources in Landfill Siting in Vietnam*; supervised by Philip Byer;
- **Curtis Puncher** and **Esther Rootham** are entering the final year of undergraduate degree in International Development Studies and are working in Cambodia and Laos respectively; supervised by Virginia Maclaren.

The Waste-Econ program also sponsored the following three Vietnamese students:

- **Nguyen Quang Tuan** (Ph.D. program in Geography): *Local Community Concerns about Landfills in Hanoi*; supervised by Virginia Maclaren;
- **Nguyen Van Ha** (Ph.D. program in Forestry): *Social Capital and Paper Making Craft Villages in Vietnam*; supervised by Shashi Kant; and
- **Luu Duc Cuong** (recent Masters graduate in Civil Engineering): *Institutional Issues for Landfill Siting in Vietnam*; supervised by Philip Byer.

Training Workshops and Courses in Vietnam

In the first year of the project, Canadian faculty offered a six-week training course on *Waste Economy and Integrated Waste Management* to help establish a solid understanding of waste management issues and their connections to the economy. This course was presented in Hanoi in the summer of 2000. The Vietnamese faculty and researchers who had assisted with this training have condensed the course material to create a shorter, two-week version of the training, tailored to local regions. To date they have offered this training in five provinces across Vietnam to over 150 participants from government and non-governmental agencies associated with waste management.

Waste-Econ then extended training to Cambodia and Laos using a similar protocol. In the summer of 2002, the 6-week training courses were offered to 30 participants in each of Cambodia and Laos. Two Vietnamese faculty members also assisted with the lectures for these countries. Canadian instructors included: **Phil Byer** (Civil Engineering/IES), **Sue Horton** (Economics), **Shashi Kant** (Forestry), **Amrita Daniere** (Geography and Planning), **Jim Dooley** (IES), **Hy Van Luong** (Anthropology), **Murray Haight** (University of Waterloo), **Catherine Chalin Clark** (Public Health Sciences), **Donald Cole** (Public Health Sciences), and **Virginia Maclaren** (Geography).

U of T Seminar Series

The Waste-Econ Program held a series of five public seminars during the past year with presentations by students Nguyen Quan Tuan, David Richardson, Laura McNally, Nguyen Van Ha and Carrie Mitchell (see above section on Student Research for topics). Carrie Mitchell's research on *Cleaner Production in Vietnam* was also accepted as a paper for presentation at the Canadian Pollution Prevention Roundtable held in Calgary in June 2003.

The Waste-Econ Program will resume its presentation of seminars by returning students and faculty involved in the program in the fall of 2003. Details of the upcoming series will be available on its web site: http://ots.utoronto.ca/users/WasteEcon.

Curriculum Development

Through the first three years of the project, our Vietnamese partners have been working on developing a new undergraduate-level waste management curriculum. The new curriculum will be integrated into environmental curricula at all universities in Vietnam and focus on the technical, economic, environmental and social aspects of waste management.

The proposed curriculum must now be submitted to the Ministry of Education and Training for approval and may then be adopted by the various educational institutions. Work will begin this year on developing the specific courses and materials needed to actually teach the programme.

In Cambodia and Laos, discussions have just started about how best to develop waste management curricula in those countries. As a start, both countries are translating and editing materials developed for the 6-week training courses held in the summer of 2002. In Laos, the partner institution expects to carry out a survey of environmental courses currently offered in the country before deciding how to proceed.

A Vietnamese waste collector and his bicylce, used for collecting old plastic and metal oil containers (photo: Joey Herrington)

Publication of Gender Workshop Papers

The following new publication is based on papers presented at a workshop held in Danang, Vietnam on February 21, 2002.

Maclaren, V.W. and **A.T. Nguyen** (eds.). 2003. *Gender and the Waste Economy - Vietnamese and International Experiences.* National Political Publishers, Hanoi, Vietnam, 140 pages.

Gender and waste researchers from Vietnam, India, the Netherlands and Canada had presented different perspectives on gender and waste management. One of the speakers was **Catherine Chalin Clark** who discussed issues related to the health of women and child waste pickers in Vietnam. It is available on the program's web site below.

For more information on the Waste-Econ Program, its partners, publications and seminars, visit its web site at: http://ots.utoronto.ca/users/WasteEcon or contact Virginia Maclaren at maclaren@geog.utoronto.ca

Enhancing China's capacity for carbon sequestration: Year One update

LEFT: Sean Thomas of the Faculty of Forestry (kneeling in centre) leads forest fieldwork in Jiangsu, China. (Photo by Julia Pan.)
RIGHT: The red soil county Xingguo in southeast China, one of the sites for carbon modelling. (Photo by Prof. Shi Xuezheng.)

*By **Julia Pan**, Project Manager*

The CIDA-funded project *Confronting Global Warming: Enhancing China's Capacity for Carbon Sequestration* has just finished its first year. It is a project in partnership with the Institute for Environmental Studies, the Department of Geography and the Faculty of Forestry, it applies Canadian modelling and remote sensing technology to understanding the role of land-use change in China's carbon cycle. The goal of the project is to contribute to the global effort of reducing net greenhouse gas emissions by enhancing China's capacity to sequester carbon in natural sinks, thereby supporting environmentally sustainable development in China. The three main components of the proejct include: 1)remote sensing and GIS/carbon cycle modelling, 2) forest assessment and ground-truthing, and 3) integrated assessment. It is hoped that China will possess enhanced ability to increase ecosystem carbon stocks through the development of technical and human resources and more effective land-use and afforestration planning and policies.

University of Toronto project team members include: Principal Investigator **Jing Chen** of the Department of Geography; **Rorke Bryan**, **Sean Thomas** and **John Caspersen** of the Faculty of Forestry; **Danny Harvey** and **Virginia Maclaren** of Geography, and **Rodney White** of Geography and IES. Other partners in Canada include the Adaptation and Impacts Research Group of Environment Canada, the Canadian Centre for Remote Sensing, and the Canadian Forestry Service. The Chinese network, led by the Institute of Geography and Natural Resources Research of the Chinese Academy of Sciences (CAS), includes Beijing Normal University and five research groups in Nanjing (southeast China) and Lanzhou (northwest China).

Planning and Training Workshops

The project has made considerable progress in Year 1, and has met nearly all the planned targets. Three successful planning and training workshops were held each relating to one of the three major project components mentione above. Thorough data have already been collected for one core site in Liping of Southwest China, and an auxiliary site Baoying in East China. Regretfully, with the occurrence of the SARS outbreak in the spring of 2003, the project's training workshop schedule in China was postponed until the summer of 2003. Instead, the Institute for Environmental Studies received four Chinese scholars from March to August 2003: **Dr. Wang Shaoqiang** and **Ms. Feng Xianfeng** from Institute for Geographical Sciences and Natural Resource Research, **Professor Tian Qingjiu** from Nanjing University, and **Dr. Sun Rui** from the Centre of Remote Sensing of Beijing Normal University, who performed carbon modeling work with **Jing Chen** and Canadian team members. All visitors achieved steady progresses in BEPS and INTEC carbon cycle modelling with the interface of Chinese data from the designated research forest areas.

Progress Reports, Workplans Approved

A Joint Project Steering Committee (JPSC) meeting was held in Beijing in April 2003. Both Canadian and Chinese project directors made project progress reports to the committee composed of members from CIDA, Chinese Ministry of Commerce, Bureau of Science and Technology of Natural Resource and Environment of the Chinese Academy of Sciences, and the Chinese National Development and Reform Commission. Presentations by Professors **Jing Chen** of U of T and **Liu Jiyuan** of China's CAS were well received with many positive comments on the significance of the project, the sound "results-based management" strategy and the progress to date. In terms of future direction, the JPSC committee would like to see increasing attention paid to the integration between scientific research and national policy. Specifically, the project outputs and contents should serve for national policy for land use and land reform. The JPSC committee accepted and approved the Year 1 Project Report and the Project Year 2 Annual Workplan.

Field Studies to be Conducted

With the project's excellent start in Year 1, preparing the groundwork for the tasks will be continued this year. Because of the interactive nature of the project, there are strong linkages among each of its three major components mentioned above. Progress in any component is dependent on advances made in the others. The major objective of work in Year 2 is to ensure that progress in each component is commensurate with the requirements of the others to produce a seamless integration process.

To achieve this objective, the work of the second component of Forest Assessment and Ground Truthing, will complete the field studies in the remaining two core areas, Changbaishan and Heihe. These studies will provide data for ground truthing that will enable calibration and completion of the remote sensing/GIS, vegetation canopy and carbon cycle modelling and mapping.

By the same logic, field work to be conducted by the Integrated Assessment (IA) component at the three core sites will provide information at the household level on gender and minority peoples' sensitivity to potential tree species and forest practices that might be adopted for carbon sequestration maximization. This information will be shared with both of the other three components (Remote Sensing/Carbon Cycling and the Forest Assessment and Ground Truthing), respectively so that the outcome of their work will be informed by socio-economic as well as by purely scientific considerations. The IA group will also deliver policy workshops on the impact of carbon sequestration.

Project Web site launched

The project launched its web site early in 2003. It includes general information of project purposes and objectives, five research sites in China (with image and narrative captions), information of working reports, news and events and upcoming research papers. Please see: **http://www.utoronto.ca/cccs2002/**

Canada joins International Carbon Sequestration Agreement

On a very positive note, the Government of Canada, signed an International Carbon Sequestration Agreement in June 2003, thereby joining a group of countries and the European Commission in cooperating in the development and deployment of carbon sequestration and related technologies. The Honourable **Herb Dhaliwal**, Minister of Natural Resources Canada, signed the Charter for the Carbon Sequestration Leadership Forum (CSLF) while attending the first meeting of this initiative, which is led by the United States. Other signatories include Australia, Brazil, China, Colombia, India, Italy, Mexico, Russia and the United Kingdom.

Julia Pan is the Project Manager of the carbon sequestration project. For more information, please contact her at jpan@oise.utoronto.ca, 416-946-8686 or see the project's web site: http://www.utoronto.ca/cccs2002/

Sustainable water management in Northern China: extended due to SARS

*By **Rodney White**, Project Director*

The University of Toronto is a member of a research consortium of seven Canadian and Chinese universities that are cooperating on a CIDA-funded project developing models for sustainable water management in the Beijing-Tianjin Region of Northern China. The various project tasks have been allocated to teams that include one Canadian and one Chinese university. The University of Toronto is paired with Tsinghua University to work on water supply and treatment and water pricing. The other components of the study include: demand estimation and forecasting (McGill University and Nankai University), institutional analysis (University of British Columbia and Peking University), environmental impact assessment (Université de Montréal and Nankai University), and GIS (Montréal and Peking). Each of the topics will become a chapter in a book which will summarise the main research findings.

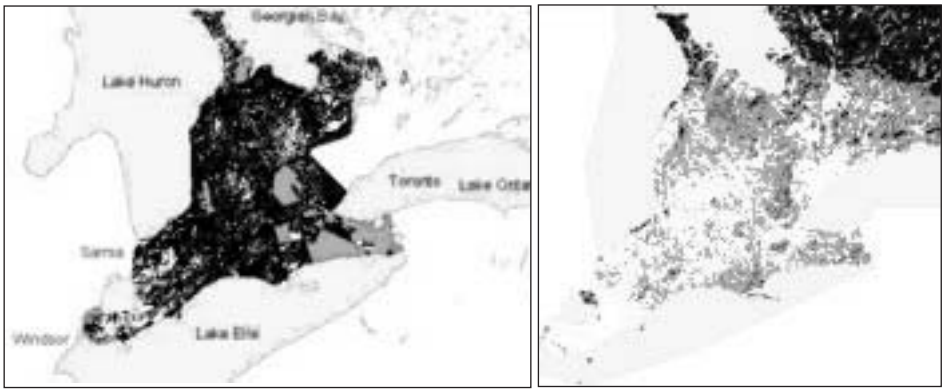
The University of Toronto team is comprised of faculty and students from Geography, IES, and Civil Engineering, including **Barry Adams** (Chair, Civil Engineering), **Lino Grima** and **Rodney White** (Geography and IES), **Alana Boland** (Geography) and **Chris Kennedy** (Civil Engineering). **Elisa Tseng** (Ph.D. candidate in Geography) had already completed a Masters degree on the project while at UBC (1997) and is now pursuing a Ph.D. on *Institutional Capacity and the Management of Groundwater Resources in the Beijing-Tianjin Region.*

Plans for a final workshop in Beijing in May 2003 were cancelled because of the travel ban due to the SARS outbreak which affected both China and Canada. The project timeline has been extended and we hope to complete all activities in the 2003-04 academic year.

Feeding one of the two major natural water reservoirs that supply the Beijing -Tianjin region, the Miyun Canal is a strategic waterway marked for improvements and capacity upgrade in 2004. (Photo by Eve Hou)

For more information on this project, please see its web site: http://www.chs.ubc.ca/china/index.html

Integrated Mapping Assessment Project Update



A comparison of southern Ontario land cover between pre-European settlement (left) and modern day (right) reveals a decrease in forested area from 80 to 20 percent. The map on the left is a first approximation of cover in 1795-1850: black areas represent forest and white areas are wetlands; grey areas have no data. In the present day map on the right, the black areas represent forest and white areas, developed land. (Maps created by Sadia Butt.)

*By **Adam Fenech**, **Don MacIver** and **Heather Auld**, Co-Directors of IMAP*

The Integrated Mapping Assessment Project (IMAP) Lab is involved in three main activities: 1. collecting published maps; 2. mapping components of the natural environment, or the human impacts on the natural environment; and 3. functionally linking and integrating these map surfaces together on specific issues. The maps are then made available on the IMAP web site: **www.utoronto.ca/imap**. Projects conducted during the last year are described as follows.

West Nile Virus in Ontario

This study traced the spread of the West Nile virus over the summers of 2000 to 2002, applied a risk analysis framework to the virus, and associated climate variables to the spread and severity of the virus across Ontario. This virus is a member of the Japanese encephalitis virus that can be spread to humans from birds through mosquito transmission. There have been infrequent human outbreaks, but more recently including the first outbreak in North America in New York City in 1999.

Using Health Canada maps and a Geographic Information System (GIS), **Adam Fenech** hypothesized that the virus would be exacerbated by warmer winters allowing infected mosquitoes to survive the winter or migrating birds to winter in Ontario; by spring or early summer warmth to support bird migrations from virus infected areas of North America; and by summer heat to allow for virus incubation and transmission. The study concludes that climate is one of many variables affecting the spread and severity of the virus. As the virus has been shown to propagate in temperatures above 30°C, a climate indicator such as a "West Nile Virus Infection Threshold Alert" is recommended to provide early warnings to the public.

Linking Excessive Rainfall to the Walkerton Tragedy

This study focused on the occurrence of excessive rainfall over a five-day period between May 8-12, 2000 that resulted in one of Canada's worst waterborne disease outbreaks, killing seven people with thousands becoming ill in Walkerton, Ontario. The five-day cumulative rainfall was unusually high and would, on average, be expected only once every 60 years or more. Drinking water from groundwater wells that are under the influence of surface water can be particularly vulnerable during excessive rainfall events.

A study across the United States by Curriero et al. in the *American Journal of Public Health*, identified that in more than 51% of cases, there was a direct relationship between the upper 10th percentile threshold for extreme precipitation events and waterborne diseases. Using a similar approach, the IMAP study revealed that the five-day cumulative rainfall exceeded the 90th percentile of the 30-year rainfall mean for Walkerton. In the future, it may be possible to develop a WellHead Protection Alert System that could provide advisories in advance of the risk of excessive rainfall.

The study was conducted by **Anthony Liu**, a Ph.D. student in Physics and IES, in collaboration with **Heather Auld**, **Adam Fenech**, **Joan Klassen**, **Don MacIver** of the Meteorological Service of Canada, **Dominique Charron** of the Centre for Infectious Disease Prevention and Control, and **Roger Hansell** of Zoology and IES.

Changing Landscape of Southern Ontario since European Settlement

As European settlement in southern Ontario occurred, land was prepared for agriculture by draining wetlands and removing trees, leading to altered and continually stressed ecosystems. To illustrate the changing landscape, **Sadia Butt** (a recent Masters graduate in Forestry and IES), **Preeti Ramprasad** (a Ph.D. student in Forestry and IES) and **Adam Fenech** used GIS to create a first approximation map of the pre-European landscapes of southern Ontario. These were derived from paper survey maps by **Peter Finlay**, a former University of Waterloo student, using the notes of the original land surveys of European settlement completed from 1798-1850. When compared to a modern day map of landscape coverage, results show a decrease in forested land from more than 80 percent to less than 20 percent. The implications are decreasing forest diversity and loss of forest cores to support sensitive wildlife species resulting in significant changes in the overall forest ecology.

Future Studies

Further development of the Lifestyle Meteorology project will be undertaken by **Don MacIver**, **Heather Auld** and **Adam Fenech**. This project is developing leading-edge software and an internet tool allowing users to identify environmental risks and find areas that are compatible with their lifestyle criteria and decide where to work, live, play or recreate.

Anthony Liu is working with Don MacIver, Heather Auld and Adam Fenech and the University of Regina on a climate change and electricity demand model for Ontario using MARICAL models and climate change scenarios.

For more information, please see the IMAP web site www.utoronto.ca/imap or contact Adam Fenech, 416-946-5335 or 416-739-4267, adam.fenech@ec.gc.ca

Adaptation & Impacts Research Group Update

*By **Brad Bass**, **David Etkin**, **Grace Koshida**, **Monirul Mirza**, **Marie Sanderson** and **Roger Street**.*

Research efforts of Environment Canada's Adaptation and Impacts Research (AIR) Group are directed towards understanding the impacts of weather, climate, air quality and related environmental impacts on human health and safety, economic prosperity and environmental quality and adaptation thereto. A key element of the research agenda continues to be carried out through partnerships and collaborations, such as the formal arrangements with specific universities: University of British Columbia, University of Waterloo, York University and the University of Toronto, where the group has a co-operative research relationship with IES. The AIR Group's agreement with U of T and IES has served as a jumping-off point for many collaborative research projects and initiatives. The IES-AIR Group collaborative research focusses on impacts and adaptations in the context of hazardous and anomalous weather in urban environments: defining hazardous and anomalous weather and climate, identifying the value of weather information, identifying vulnerabilities and changing vulnerabilities under climate change, assessing the impacts of hazardous and anomalous weather and climate in urban areas, and assessing adaptive strategies. **For more information, please see http://www.msc-smc.ec.gc.ca/airg. The current Acting Director of the AIR Group is Don MacIver (don.maciver@ec.gc.ca).**

Ongoing Research Projects

The following ongoing research projects involve AIR Group staff at IES. ***(See pages 26-27 for contact information and profiles.)***

1. **Complexity and Nonlinearities *(Brad Bass)*:** This research program uses the simulation platform, COBWEB (Complexity and Organized Behaviour Within Environmental Bounds) to explore the adaptation in complex systems and the emergence of nonlinearities during adaptation. New applications have focused on invasive species, transportation, sprawl and climate change.

2. **The Impact of Climate Change on Regional Energy Systems *(Brad Bass)*:** The impact of climate change on regional energy systems in Saskatchewan and the Toronto-Niagara Region has been evaluated with the Canadian Regional Energy Model, developed in conjunction with **Dr. Guohe Huang** and students in Environmental Engineering at the University of Regina.

3. **Adapting Urban Environments *(Brad Bass)*:** This study looks at the role of green walls and roofs in mitigating the urban heat island effect, improving air quality, and storm water retention. The next phase will explore the use of urban forestry in conjunction with green roofs and vertical gardens and its integration in a neighbourhood to reduce the use of air conditioning.

4. **Assessment of Natural Hazards and Disasters in Canada *(David Etkin)*:** The aim is to assess our existing understanding of the causes and consequences of natural hazards and disasters, and to identify gaps in both knowledge and action, with the hope of illustrating ways to develop resilient communities and good policies to reduce the impact of natural disasters in Canada. A set of background papers will be developed to serve as the basis for a publication aimed at a general audience. Most of the technical background papers have been published in *Natural Hazards* Vol. 28, No. 2-3.

5. **Quick Response Assessments after Weather Disasters in Canada *(Grace Koshida)*:** Other countries such as the U.S. have the capacity to enable researchers to go to the site of a disaster immediately after the event in order to assess impacts, response and recovery. The objective of this project is to develop methodologies to enable a similar assessment capacity in Canada with special emphasis on assessing the value of Environment Canada's weather products and services in reducing disaster impacts, mortality and morbidity rates.

6. **Canadian Droughts of 2001 and 2002: Causes, Impacts and Adaptations *(Grace Koshida)*:** Supported by the Saskatchewan Research Council and Agriculture and Agri-Food Canada, this research summarizes the climatology of the 2001-02 drought in Eastern Canada. Detailed analyses of the impacts and adaptations of the drought on crop production, livestock production, pastureland and water resources were conducted. This information may aid in the development of regional and provincial drought risk management plans to reduce vulnerability to future droughts.

7. **Historical and Future Climates for the Assessment of Energy Sector Impacts in Canada *(Monirul Mirza)*:** Funded by the Program on Energy Research and Development, the major objectives of this project are to develop, make available, and provide guidance to impact researchers/users, a nationally-consistent set of energy sector scenarios of historical and future climate for the energy sector impact researchers.

8. **Climate Change and Water Resources in South Asia *(Monirul Mirza)*:** South Asia is a water scarce region especially in the dry season. In future, increased water supply will be needed for agriculture, industry, rural and urban sectors mainly driven by increases in population and economic growth. Climate change and water resources problems in this vulnerable region are being addressed in this book project. Swets and Zeitlinger publishers in the Netherlands will publish this edited book in early in 2004.

9. **Millennium Ecosystem Assessment Project *(Monirul Mirza)*:** This is the most extensive study of the linkages between the world's ecosystems and human well-being. The assessment was launched by UN Secretary General Kofi Annan in 2001. Monirul Mirza is contributing as a lead author of a chapter on Flood and Storm Protection in a UN Report.

10. **Weather and Climate in Southern Ontario *(Marie Sanderson)*:** This two-year project has now been completed. A book *Weather and Climate in Southern Ontario* is to be published as part of the Geography Publication Series of the Department of Geography, University of Waterloo, late in 2003, and is aimed at the general public, comprehensively describing the climate of Southern Ontario and updating the work done by Putnam and Chapman (1937) and Chapman and Brown (1965). The book includes data on temperature, precipitation, wind and sunshine, as well as information on extreme events such as tornadoes, ice storms and floods.

Brad Bass

Current contact information during leave: Smart Growth Secretariat, Ministry of Municipal Affairs and Housing, 777 Bay Street, 16th Floor, Toronto, Ont, M5G 2E6; tel: 416-585-6130; fax: 416-585-7639; brad.bass@mah.gov.on.ca
http://www.smartgrowth.gov.on.ca
B.A. (Geography), Toronto; M.Sc. and Ph.D. (Geography), Penn State.
Associate Member, IES Graduate Faculty.
From January 2003 (on leave from AIR Group): Manager, Trends and Innovations, Smart Growth Secretariat, Ontario Ministry of Municipal Affairs and Housing.

Research Interests:
Smart Growth (policy innovations, policy assessment, analysis of trends); simulating adaptation with to environmental change with artificial intelligence and anticipatory computing; simulating the performance of regional energy system; ecological engineering including vertical gardens, green roofs and living machines. ***(Also see page 25.)***

Recent Publications:
Bass, B. 2003. Understanding surprise. *Environmental Peace.* (In press.)
Bass, B., V. Economou, C. Lee, T. Perks, S. Smith and Q. Yip. 2003. The interaction between social-psychological factors in indoor environmental health. *Journal of Environmental Monitoring and Assessment* 85: 199-219.
Bass, B., J. Hill and N. Suh. 2003. Simulating adaptation to environmental change with COBWEB. *Journal of Computing Anticipatory Systems.* (In press.)
Bass, B. 2001. Addressing urban environmental problems with green roofs. *Encyclopaedia of Global Environmental Change,* Vol.3. John Wiley & Sons, Chichester, U.K.

David Etkin

Institute for Environmental Studies, Room 3040 Earth Sciences Centre, tel: 416-978-6310; d.etkin@utoronto.ca; mailing address and fax on inner cover.
B.Sc. and M.Sc., York; B.Ed., Toronto.
Natural Hazards and Risk Analyst, Adaptation and Impacts Research Group.
Associate Member, IES Graduate Faculty.
Co-Instructor of IES 1706H *Natural Hazards and Natural Disasters.*

Research Interests:
Natural hazards and natural disasters, dealing with risk and how we adapt to it; focussing on Canada, research ranges from the spatial distribution of hazards, to mitigation; currently leading a national assessment of natural hazards. ***(Also see page 25.)***

Recent Publications:
Dore, M., I. Burton, and D. Etkin. 2003. Natural disasters, adaptive capacity and development in the 21st Century. In M. Pelling (ed.) *Natural Disasters and Development in a Globalizing World.* Routledge, London, Chapter 5, pages 75-92. (In press.)
Etkin, D., Haque, E. and Brooks, G. (eds.). 2003. *An Assessment of Natural Hazards and Disasters in Canada.* Special issue of *Natural Hazards*. Kluwer, The Netherlands. 28(2-3) ***(See page 25.)***
Etkin, D., Haque, C.E. and Brooks, G.R. (2003) Editorial: Towards a better understanding of natural hazards and Disasters in Canada. In *An Assessment of Natural Hazards and Disasters in Canada* (see above reference).
Etkin, D., S.E. Brun, S. Chrom, and P. Dogra. 2002. *A Tornado Scenario for Barrie, Ontario.* Institute for Catastrophic Loss Reduction Research Paper, ICLR Research Paper Series #20. 13 pages.

Grace Koshida

Institute for Environmental Studies, Room 3046 Earth Sciences Centre, tel: 416-978-0309, grace.koshida@ec.gc.ca; mailing address and fax on inner cover.
B.E.S. (Geography), Waterloo;
Researcher, Adaptation and Impacts Research Group at IES.

Research Interests:
Drought/heat wave hazards in Canada; high-impact weather events; climate change impact indicators; disaster mitigation; climate change impacts on Canadian water resources; historical analogues. ***(Also see page 25.)***

Recent Publications:
Koshida, G. 2003. Series of Saskatchewan Research Council (SRC) reports in: Wheaton, E., V. Wittrock, and S. Kulshreshtha (eds.) *Canadian Droughts of 2001 and 2002: Climatology, Impacts and Adaptations*:
- Climatology of the 2001-2002 Droughts in Ontario and Quebec. SRC Publication No. 11602-25E03. 21 pages.
- Comparison of the 2001-2002 Droughts in Ontario and Quebec with Past Droughts. SRC Publication No. 11602-26E03. 6 pages.
- Crop Production Impacts and Adaptations in Ontario and Quebec. SRC Publication No. 11602-30E03. 28 pp.
- Print Media Survey of Impacts and Adaptations to the 2001-02 Drought, Eastern Canada. SRC Publication No. 11602-27E03. 12 pages.
- Water Resource Impacts and Adaptations in Ontario and Quebec. SRC Publication No. 11602-28E03. 19 pages.

Koshida, G. 2002. *Literature Review and Evaluation of Existing Quick Response Models.* Office of Critical Infrastructure and Emergency Preparedness, Ottawa. 59 pages.

Monirul Mirza

Institute for Environmental Studies, Room 3041 Earth Sciences Centre, tel: 416-978-6201; monirul.mirza@utoronto.ca; mailing address and fax on inner cover.
B.Sc.Eng., M.Sc.Eng., Bangladesh U. of Engineering & Technology; Ph.D. (Global Change) Waikato, New Zealand.
Researcher, Adaptation and Impacts Research Group.
Associate Member, IES Graduate Faculty.
Co-Instructor of IES 1706H *Natural Hazards and Natural Disasters.*

Research Interests:
Water resources modelling and assessment, hydro-meteorological analyses, analyses of extremes and natural hazards, river engineering and sediment transport, environmental management, environmental impacts assessment, climate change scenario construction, climate change and sea-level rise impacts and adaptation, greenhouse gas emissions assessment, development of statistical and management application tools and application of GIS.
(Also see page 25.)

Recent Publications:
Mirza, M.M.Q. 2003. Climate change and extreme weather events: can developing countries adapt? *Climate Policy.* (In press.)
Mirza, M.M.Q., A. Dixit and A. Nishat (eds.). 2003. *Flood Problem and Management in South Asia.* Kluwer Academic Publishers, the Netherlands, 210 pages.
Mirza, M.M.Q., R.A. Warrick and N.J. Ericksen. 2003. The implications of climate change on floods of the Ganges, Brahmaputra and Meghna rivers in Bangladesh. *Climatic Change* 57: 287-318.
Mirza, M.M.Q. 2003. The three recent extreme floods in Bangladesh: a hydro-meteorological analysis. *Natural Hazards* 28(1): 35-64.

Marie Sanderson

Institute for Environmental Studies, Room 1049 Earth Sciences Centre, tel: 416-978-5665; marie.sanderson@utoronto.ca; mailing address and fax on inner cover.
B.A. (Hons.), Toronto; M.A. (Geography) Maryland; Ph.D. (Geography), Michigan.
Guest scientist/researcher, Adaptation and Impacts Research Group.
Associate Member, IES Graduate Faculty.

Research Interests:
Climate change and water; geographic biographies. She has served as Editor of the *Canadian Water Resources Journal* for 9 years (until December 2003); it is a refereed quarterly publication of the Canadian Water Resources Association.

Recent Publications:
Sanderson, M. 2003. *Weather and Climate in Southern Ontario.* Geography Publication Series. Department of Geography, University of Waterloo. (In press.) ***(See page 25.)***
Sanderson, M. 2001. North America's sweetwater seas, in T. McKnight (ed.) *Regional Geography of the United States and Canada*. Prentice-Hall, pages 14-15.
Sanderson, M. 2001. Donald Fulton Putnam 1903-1977 in P. Armstrong and G. Martin (eds.) *Geographers Biobibliographical Studies, Volume 18.* Mansell, London and Washington, pages 72-84.
Sanderson, M. 2001. Charles Warren Thornthwaite. In R.E. Munn (ed.) *The Encyclopaedia of Global Environmental Change Volume 2.* John Wiley & Sons, U.K., pages 581-582.
Sanderson, M. and R.G. Putnam. 2000. *Down to Earth: A Biography of Geographer Donald Fulton Putnam.* The Department of Geography, University of Toronto. 144 pages.

Roger Street

Current contact information during leave: Room 2N114, Meteorlogical Service of Canada, 4905 Dufferin St., Downsview, Ontario M3H 5T4; tel: 416-739-4536; fax: 416-739-4721; roger.street@ec.gc.ca
B.Sc. (Physics & Mathematics), Guelph; M.Sc. (Physics), Toronto.
On leave as Director of AIR Group.
Current position: Acting Regional Director, Meteorological Service of Canada - Ontario Region.
Associate Member, IES Graduate Faculty.

Research Interests:
Socio-economic impacts of climate change and variability and adaptations to these impacts, with particular emphasis on natural ecosystems and the associated resource sectors; adaptation as a response towards achieving sustainable development; and impacts and adaptation methodologies and tools (e.g. climate scenarios).

Publication:
Smit, B, I. Burton, R. Klein and R. Street. 1999. The science of adaptation: a framework for assessment. *Mitigation and Adaptation Strategies for Global Change* 4: 199-213.

MEETINGS

Lessons learned from Walkerton:

Justice O'Connor meets with U of T researchers

Justice Dennis O'Connor (middle), Commissioner of the Walkerton Enquiry, is joined by Doug Macdonald of Innis College (left) and Rodney White of IES (right) at a meeting with U of T researchers.

*By **Rodney White**, Meeting Rapporteur*

University of Toronto environmental researchers met with **Justice Dennis O'Connor**, Commissioner of the Walkerton Enquiry, on October 17 2002 for a meeting entitled ***Water and Drinking Water Teaching and Research at the University of Toronto: Lessons from the Walkerton Enquiry***. It was sponsored by the Department of Geography, Division of the Environment (DOE), Division of Environmental Engineering, Innis College's Environmental Studies Program, and IES.

The meeting began with an address by Justice O'Connor in which he stressed that the purpose of the provincial public enquiry was to address the lack of public confidence in the province's water supply following the contamination event at Walkerton in the summer of 2000, which led to 1,300 confirmed cases of illness and seven deaths, mostly associated with a virulent strain of E. Coli. The enquiry was held to establish the facts of the case and to offer recommendations for water policy in the province, with the following principle recommendations: 1) planning should be done by the Ministry of the Environment on a watershed basis, 2) plans would be binding, 3) water managers must have the requisite level of management competence with mandatory accreditation, and 4) there should be provincial oversight from "source to tap".

Justice O'Connor's presentation was followed by questions from the researchers concerning the interdisciplinary nature of the enquiry, involvement of the university, public access to the process, budget provisions and so on. It became clear that the situation within the university with regard to expertise in water management mirrored that of society at large. There are many types of expertise but we lack the means to integrate them effectively.

It was widely felt that Walkerton had exposed the fact that our society's failure is not due to a lack of science and technology but is due to a lack of connection between knowledge and application. Over the last 20 years, conditions in the province have deteriorated through cutbacks and downloading of responsibilities. Perhaps ironically, the situation in the university may be similar in that the water governance issue does not appear to be a salient interest.

The university and the province (potentially) would benefit if we could improve communication within the water community at the university and with colleagues at all levels of government. The least we can do is to improve the interdisciplinary linkages related to water and to advertise those that already exist. We could begin to do this by setting up a post-Walkerton working group to assess the success with which the recommendations of the enquiry are implemented.

For more information, please contact Doug Macdonald, Innis College, douglas.macdonald@utoronto.ca

Environmental Finance 2004:

conference to invite CFOs of resource-based companies

*By **Rodney White***

Following the launch of the book ***Environmental Finance: a Guide to Environmental Risk Assessment and Financial Products*** written by **Sonia Labatt** and **Rodney White** (John Wiley & Sons, 2002) and the offering of a new IES course, IES 1707H ***Environmental Finance: Risk Management and Business Opportunities***, we were encouraged to take the Environmental Finance "message" to the broader community in business and government.

With the help of an advisory committee drawn from the environmental finance community in Toronto, we began planning for a conference that would bring together representatives of all the players that are creating this new field - both the users and the providers of environmental financial products. These products include tradable credits for emissions reduction for SO_x, NO_x and CO_2, weather derivatives, catastrophe bonds, environmental impairment insurance, credits for producing electricity from renewable energy, venture capital for environmentally friendly projects under the Kyoto Protocol, and many more.

Speakers will be drawn from companies that have gained experience in the development of these products, most of which has happened in the last five or six years. Many have been prepared for markets that are still nascent in the sense that the regulatory framework that provided the need for them has not yet been completed - mostly notably the enforcement of the Kyoto Protocol. The target audience is Chief Financial Officers of the large resource-based companies that have the most impact on the environment, including the emissions of greenhouse gases, such as companies from oil and gas, utilities, iron and steel, pulp and paper, chemicals, cement, smelters and mining.

The conference, ***Environmental Finance 2004: Emerging Environmental Risks, Strategies and Opportunities*** will be held on April 21-22, 2004, at U of T under the auspices of the university's newly established Risk Management Institute and IES.

Further details are available at: www.environmental-finance.utoronto.ca

See www.utoronto.ca/env/seminars.htm for schedules of IES seminars and other U of T environmental seminars.
To receive email notification or more information, please contact Mona El-Haddad, m.elhaddad@utoronto.ca

2002-03 Environmental Studies Seminar Series

Jonathan Abbatt, Professor, Chemistry, U of T. *The chemistry of atmospheric aerosols: impact on climate and air quality.*

David Bell, Professor, Environmental Studies; Director, Centre for Applied Sustainability, York U. *Governance for sustainability.*

Bernard Fleet, Senior Advisor - Technology, Electrovaya Inc. *The role of information technology & GIS in environmental management.*

Richard Gilbert, Urban issues consultant. *Hong Kong: the most sustainable affluent city.*

Stanley Griffin, President and CEO, Insurance Bureau of Canada. *Natural disasters: what are insurers doing?*

Charles Hall, Professor, Environmental and Forest Biology, SUNY ESF, Syracuse. 1. *The myth of sustainable development. (*Joint with Depts of Botany and Zoology); and 2. *Predicting future oil supplies.* (Joint with the Dept. of Zoology)

Andy Kenney, Assistant Professor, Forestry, U of T. *The role of Toronto's urban forest in carbon sequestration and air pollution mitigation.*

Kent Moore, Associate Professor, Physics, U of T. *Trends and variability in the climate of the North Pacific as expressed in a 300 year long ice core from Mount Logan, Yukon.*

Jane Rigby, Associate Vice-President, CO2e.com, Toronto. *The carbon market: what is it and how does it work?*

Barbara Sherwood Lollar, Professor, Geology, U of T. *New tools for tracking groundwater contamination.*

Kimberly Strong, Associate Professor, Physics, U of T. *Stratospheric ozone loss in the Arctic as measured by ground-based remote sounding*.

2002-03 Environment and Health Seminar Series

Joint with the Gage Occupational and Environmental Health Unit

Gail Eyssen, Professor, Public Health Sciences, U of T. *Environmental sensitivity: an approach to research from environment to physiologic mechanisms.*

David Gannon, Head, AstraZeneca Environmental Laboratory, Mississauga. *Pharmaceuticals in the environment: the issues and the search for solutions.*

Patricia Harper, Scientist, Hospital for Sick Children, Toronto. *Individual variation and the response to environmental contaminants.*

Eric Holowaty, Head of Surveillance, Cancer Care Ontario. *Spatial surveillance of cancer in Ontario.*

Michael Jerrett, Assistant Professor, School of Geography and Geology, McMaster U. *Spatial analysis of the air pollution-mortality association in the context of ecologic confounders.*

Pam Kaufman, Lecturer, Public Health Sciences, U of T. *Exploring physical and social factors that influence smoking behaviour in outdoor public place.*

Gary Liss, Assistant Professor, Public Health Sciences, U of T. *Comparison of medically unexplained symptoms between radiographers and physiotherapists.*

Loraine Marrett, Scientist, Preventive Oncology, Cancer Care Ontario; and **Cheryl Rosen**, Head of Dermatology, Toronto Western Hospital. *Ultraviolet radiation and skin cancer: mechanisms, epidemiology and prevention.*

Mark Raizenne, Science Manager, Air Health Effects Division, Health Canada. *Air pollution and children's health.*

Stephen Bede Scharper, Assistant Professor, Dept. & Centre for Study of Religion, U of T. *The role of values and worldviews in environment and health.*

Sarah Wakefield, Assistant Professor, Geography, U of T. *Individual and community responses to environmental health threats: coping in a risk society.*

Special Research Seminars

Joint IES and Sustainable Toronto Seminars

IES is pleased to co-host seminars with the *Sustainable Toronto* Project, directed by **Beth Savan** of Innis College. These seminars are held as part of IES' Environmental Studies series (see above). This past year, two seminars were presented:

- *Shifting organizational culture toward sustainability:* Panel discussion with **Anne Mitchell**, Canadian Institute for Environmental Law and Policy (CIELAP); **Lisa King**, Toronto and Region Conservation Authority; **Pamela Robinson**, Innis College, University of Toronto; and **Meg Shields**, City of Toronto; and
- *Monitoring for sustainability: engaging citizens in collecting, mapping and taking action on ecological data:* presented by **Jeff Borisko**, formerly of Citizens Environment Watch, and **John Sorrell**, Centre for Applied Sustainability, York University.

For more information on *Sustainable Toronto*, please see www.sustainabletoronto.ca or contact Beth Savan at b.savan@utoronto.ca

Capacity Building for Climate Change in Cuba

As part of IES' new CIDA-funded project on Climate Change in Cuba led by **Beth Savan** of Innis College, project team members from Cuba were invited to U of T to give a seminar on *Adaptation and Mitigation of Climate Change-Prospects and Opportunities: The Case of Cuba.* Presenters were: **Abel Centella** of the Instituto de Meteorologia, **Juan Llanes Regueiro** of the Universidad de la Habana; and **Julio Torres Martinez** of CITMA Ministerio De Ciencia Technologia y Medio Ambiente, Cuba. **For more information on this project, please see page 19 or contact Beth Savan at b.savan@utoronto.ca**

IES Research Day

Held annually in early May, IES Research Day is a small sampling of the variety of research conducted by IES faculty and students. This half-day event features presentations by faculty and graduate students as well as a graduate students' award presentations and poster exhibit. **See pages 32-36 for abstracts of student presentations and posters; see page 37 for awards and recipients. For more information, please contact Mona El-Haddad, m.elhaddad@utoronto.ca**

Waste-Econ Program Seminar Series

Making Waste for the Economy (Waste-Econ) in Vietnam, Cambodia and Laos is a 5-year project at IES and the Department of Geography. The Program held a series of seminars in 2002/03:

- *Local Community Concerns about Landfills: a case study in Hanoi, Vietnam* by **Nguyen Tuan Quang** (Ph.D Candidate, Geography)
- *Community-Based Solid Waste Management Systems in Hanoi, Vietnam* by **David Richardson** (Master's Candidate, Forestry)
- *Protection of Water Resources in Landfill Siting in Vietnam* by **Laura McNally** (Master's Candidate, Civil Engineering)
- *Social Capital and Paper Making Craft Villages in Vietnam* by **Nguyen Van Ha** (Ph.D Candidate, Forestry)
- *Promoting Cleaner Production in Vietnam: The Role of Training and Education in Strengthening Industry's Environmental Behaviour* by **Carrie Mitchell** (Master's Candidate, Planning)

Seminars will resume in the fall of 2003.

For information on the program, see pages 20-21, http://ots.utoronto.ca/users/WasteEcon, or contact Virginia Maclaren at maclaren@geog.utoronto.ca

Graduate Environmental Students' Association: a year of new initiatives

*By **Heather Jones-Otazo**, GESA President*

The Graduate Environmental Students' Association (GESA) has had a school year jam-packed with fun and exciting events! This year, GESA negotiated for and secured funding from the Institute for Environmental Studies (IES) and the Division of Environmental Engineering, which gave GESA the ability to plan for many stimulating activities and events throughout the school year. It was the GESA executive's initiative to include both IES and Environmental Engineering students in its activities, in order to strengthen U of T's environmental graduate student community.

Students at the 2002 Fall Retreat at Hart House Farm. TOP L-R: Forrest (guest of GESA), Tarek Ayesh (Environmental Engineering), Luke Garnham (Geography/IES), Stuart Storey (guest of GESA); BOTTOM L-R: Lisa Lachuta and Helen Zhang (both Environmental Engineering); Josephine Archbold, Heather Jones-Otazo, Tanya Labencki (all Geography/IES). Absent: David Sandomierski (Political Science/IES), Joaquin Otazo. (Photo: Heather Jones-Otazo.)

2002-03 Events

Online Elections

Elections for the GESA Executive occurred online in September 2002 on the GESA website: www.utoronto.ca/env/ies/gesa/, offering students a more accessible way of voting. The GESA 2002-03 Executive was:

- *President and Treasurer*: **Heather Jones-Otazo**, M.Sc. student, Geography/IES Environment & Health;
- *Vice-President and Environmental Engineering Representative*: **Nilima Gandhi**, M.A.Sc. student, Chemical Engineering/Environmental Engineering;
- *Secretary and Environmental Studies Representative*: **Tanya Labencki**, M.Sc., student, Geography/IES Environmental Studies;
- *Communications Director*: **Anthony Liu**, Ph.D. student, Physics/IES Environmental Studies;
- *Social Director*: **Tarek Ayash**, M.A.Sc. student, Chemical Engineering/Environmental Engineering;
- *GSU Representative*: **Satyendra Bhavsar**, M.A.Sc. student, Chemical Engineering/Environmental Engineering;
- *GESA Representative on UTERN*: **Amanda Mongeon**, M.A. student, OISE/IES Environmental Studies.

GESA Presence on UTERN Board of Directors

Amanda Mongeon represented GESA as a board member of the U of T Environmental Resource Network (UTERN) working on the environmental levy and designing the new UTERN structure. The funds generated through the levy will be put towards university greening initiatives on all three campuses. ***(For more details, see http://utern.sa.utoronto.ca)***

IES Orientation and BBQ

The 2002-03 school year got off to a good start at the IES Orientation and BBQ in early September 2002. The orientation session offered new and returning IES students the opportunity to meet and greet other students, staff and faculty while enjoying a sumptuous BBQ. A similar event will be held in September 2003.

Library Information Sessions

Library orientation sessions that focused on library skills necessary for environmental students took place in the fall of 2002. One session was geared towards library skills for IES students, while another was adapted towards environmental engineering students.

Hart House Farm Retreats

GESA organized two weekend retreats to Hart House Farm in October 2002 and January 2003. In the fall, activities that were part of the retreat included casual sports, hiking near the Niagara Escarpment and exploring the region's caves. At night, students partook in a delicious group meal of lasagnas, enjoyed various games and libations, and fun was had by all around a group campfire. The crisp autumn breeze and cloudless skies allowed for a clear view of the stars, and beautiful fall colours dominated the forests.

The winter retreat began in true environmental style with a stroll along the Bruce Trail, fully blanketed in dazzling white snow. Students revisited the Finnish sauna and twig teepee from their last retreat in October, made snow angels and those brave (or crazy) enough had their try at Frisbee tobogganing! Back at the farm, they warmed up with hot chocolate and a delicious pot-luck dinner. After dinner they played many rounds of a murder mystery game, showcasing GESA's best and upcoming actors and detectives! The following morning, **Paul Aird**, Professor Emeritus of Forestry, gave a very informative talk on the natural features, wildlife and history of the area. They then explored the limestone caves of the Niagara Escarpment.

Winter Holiday Party

The Winter Holiday Party, held in January 2003, was organized by Satyendra, Nilima and Heather. It was a fun and relaxing opportunity to enjoy tasty niblets and get together with the IES and environmental


LEFT: The environmental exposition of Environmental Career Day 2003 provided an opportunity for students to network with potential employers. (Photo: Donna Workman.) RIGHT: Students enjoy the BBQ following the September 2002 IES/GESA orientation session. (Photo: Heather Jones-Otazo.)

engineering community in the Galbraith building.

Environmental Career Day

U of T's second annual Environmental Career Day was an overwhelming success. Over 300 students and over 30 potential employers braved the snowstorm and attended the event on March 5th, 2003 at Hart House. To organize it, IES and GESA worked closely for over six months with the Division of Environmental Engineering, Division of the Environment, Environmental Students Union (ENSU), Toronto Undergraduate Geography Society (TUGS), Department of Geography, Innis College's Environmental Studies Program, the Faculty of Forestry, Students' Administrative Council, School of Graduate Studies, and the Scarborough Campus' Science Co-op Program.

This year's event built on last year's success of inviting all environmental graduate and undergraduate students, from all three campuses, to attend the morning speakers session, the afternoon environmental exposition, and a reception. An invitation-only lunch was also held.

This event provided students with the chance to explore opportunities and make contacts in the environmental sector. It also highlighted U of T's first-rate environmental graduates and strengthened its environmental network.

The speakers session was characterized by advice from a wide variety of environmental professionals who provided students with guidance on ways to achieve different environmental career goals. Speakers and their topics included: **David Balsillie** of U of T's Faculty of Forestry: careers in academia; **Ray Clement** of the Ontario Ministry of the Environment: careers in government; **Anne Mitchell**, Director of Canadian Institute for Environmental Law & Policy: careers in environmental law and ENGOs; **Martin Whittaker** of Innovest Strategic Value Advisors: careers in environmental finance; **Loren Vanderlinden** of Toronto Public Health: careers in environment & health; and **Joy Williams** of ICF Consulting Canada: careers in environmental engineering.

Over 30 environmental groups participated in the afternoon's environmental exposition, filling the Hart House Great Hall to capacity. These groups, which included representatives from municipal, provincial and federal government bodies, environmental consulting groups, ENGOs and industry, set up displays and shared information about current and future opportunities within their organization. The exposition provided both students and group representatives with one-on-one networking opportunities.

Environmental Career Day 2003 not only gave students an opportunity to network with potential employers, but also contributed to environmental community building at U of T.

GESA would like to thank everyone who participated in organizing the event for their hard work and dedication. We look forward to an even more successful Environmental Career Day in 2004!

For more information on Environmental Career Day 2003, see: www.ies.utoronto.ca/careerday2003

End-of-Year Party

GESA's End-of-Year Party, held in May 2003, was planned by Nilima, Tanya and Heather and brought us together for socializing and feasting. Many environmentally-friendly products were given off as raffle prizes to those in attendance.

Algonquin Park Trip

Geography student **Sarah Gewurtz** and Forestry/IES student **Levi Waldron** teamed up with GESA to organize this escape-the-big-city foray into the bush in June 2003. The weather was beautiful, the campsite on Mew Lake was scenic, and the hike near the Highland trail led them into close contact with a spruce grouse and a white-tailed deer. However, the black flies were the worst some have ever experienced (i.e. Benadryl and zillions of bites were had by all). Next time GESA will plan camping trips for later on during the summer!

Upcoming Events in 2003-04

GESA would like to thank all students, staff and faculty in IES and Environmental Engineering for their active participation in all of our events this year. We look forward to an exciting and fun-filled new school year and hope to see all new and returning students, staff and faculty at upcoming events, which will include:

Fall:	IES Orientation and BBQ
	Executive online elections
	Hart House Retreat
	Library info sessions
Dec/January:	Winter Holiday Party
March:	Environmental Career Day
May:	End-of-Year Party

Heather Jones-Otazo was GESA President in 2002-03 and a M.Sc. student in Geography and IES' Environment and Health Program.
For more information on GESA, please email gesa.ies@utoronto.ca or visit www.utoronto.ca/env/ies/gesa

The following is a list of graduates, as well as new and continuing students enrolled in IES' Environmental Studies collaborative graduate program in 2002/03. For more information, please see www.utoronto.ca/env/ies, or contact Donna Workman, d.workman@utoronto.ca, 416-978-7077.

2002-03 GRADUATES

Yang Ching Au, M.A., Geography/IES; supervisor: Rodney White, Geography/IES. *Social isolation and environmental vulnerability: Toronto's hot weather response plan.*

Todd Barr, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES; supervisor: Ed O'Sullivan, Adult Education. *Course work only program.* ***(Winner of a Gordon Cressy Award for Student Leadership; see page 37.)***

Adrianna Beemans, M.A., Political Science/IES; supervisors: H. Donald Forbes/Richard Stren, Political Science. *Participation, criteria and bears, Oh my! Evaluating public participation mechanism in regards to the Canadian Biotechnology Advisory Council.*

Judith BenDavid, M.A., Geography/IES; supervisor: Danny Harvey, Geography. *Corporate epistemic communities affecting global environmental change: a case study of the partnership for climate action.*

Craig Butt, M.Sc., Geography/IES; supervisor: Miriam Diamond, Geography. *Chemical and physical characterization of organic films on an impervious surface.* ***(Winner of a Labatt fellowship; see page 37.)***

Kabita Chakraborty, M.A., South Asian Studies/IES; supervisor: Sashi Kant, Forestry. *Voices: street children's thoughts and perceptions of the environment.*

Luke Garnham, M.A., Geography/IES; supervisor: Rodney White, Geography/IES. *Reclaiming the roof: an assessment of green roofs, agriculture and the ecological city in Toronto.*

Angela Morris, M.A., Geography/IES; supervisor: Scott Prudham, Geography/IES. *Public participation in the Canadian Biotechnology debate: the response of NGOs.*

David Preszler, M.A., Political Science/IES; supervisor: Richard Stren, Political Science. *A proposal for confidence building in the Middle East: the water crisis and the need for an infrastructure based solution.*

Lucie Sliva, M.Sc., Zoology/IES; supervisor: Dudley Williams, Zoology. *Exploration of riffle scale influences of biotic and abiotic variables on microbial communities of the hyporheic zone.*

2002-03 NEW & CONTINUING STUDENTS

Sarah Ann Augustine, M.Ed., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning. *Education and the environment.*

Robert Aurich, M.Ed., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning. *Environmental effects on student learning.*

Martha Barriga, M.A., OISE/UT (Adult Education, Community Development and Counselling Psychology); supervisor: Daniel Schugurensky, Adult Education. *Immigration from the perspective of adult environmental education: sense of community and place, environmental action at the personal and social level, and environmental knowledge.*

Chris Gore studies policy of Ugandan electricity

Electricity in Uganda: the politics of policy implementation

*By **Chris Gore**, Ph.D. Candidate, Dept. of Political Science/IES Environmental Studies Program. (Supervisor: Richard Stren, Political Science.)*

Abstract of presentation at IES Research Day on May 1, 2003:
In the East African country of Uganda, recent figures show that less than 3% of the total population of 24.7 million people has access to electricity – one of the lowest levels in the world – and close to 95% of the population relies on biomass. Moreover, at times, total electricity system losses have exceeded 30%. It comes as no surprise then that in recent years the Government of Uganda, at the encouragement of international donors, has attempted to reform this sector. This reform process has included the unbundling of the state utility, privatizing the distribution and generation components, introducing new law and policy, improving distribution networks, and investing in new generation sources.

The presentation focussed on one component of the overall reform process in Uganda – the deliberation over the construction of a new 200 megawatt hydroelectric dam near the headwaters of the Nile. Specifically, it examined the character of the dam's environmental assessment process to reveal a unique outcome: the key debate and criticism of the project was not centered on the environmental or social impacts, but the failure of the process to formalize debate over the economic dimensions of the project. The presentation also considered explanations for this outcome, particularly focusing on the relationship between access to information, participation in the process, and the structure of the process itself.

For more information, please contact Chris at chris.gore@utoronto.ca

Chris Gore presenting his research at IES Research Day.

Robert Barwell, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES. *Course work only program.*

Hafeeza Bassirulah, E.D.D., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning.

Jamie Bradburn, M.Sc., Geology/IES. *Course work only program.*

Teri Burgess, M.A., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning. *Development of an intermediate level global education program within the public education system.*

Leon Chartrand, Ph.D., Theology, St. Michael's College/IES; supervisor: Stephen Dunn, Theology, St. Michael's College. *Sacredness of Grizzly Bear encounters: a phenomenological path to Grizzly Bear recovery and reintroduction efforts in the Bitterroot and Greater Yellowstone Ecosystems (Wyoming-Montana-Idaho).*

Anna Chase, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning. *Outdoor environmental education, qualitative research methods (especially phenomenology).*

Richard Christie, M.A., OISE/UT (Curriculum, Teaching & Learning)/IES.

Arden Court, M.Ed., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning.

Patrick Darkhor, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning.

Eric Dunbar, M.Sc., Botany/IES; supervisor: James Eckenwalder, Botany. *Ulmus pumila, an alien in Toronto.*

José Etcheverry, Ph.D., Geography/IES; supervisor: Danny Harvey, Geography. *Renewable energy for productive uses: strategies to enhance environmental protection and the quality of rural life.* ***(Winner of a Gordon Cressy Award for Student Leadership; see page 37.)***

Adam Fenech, Ph.D., Geography/IES; supervisor: Rodney White, Geography. *Integrated assessment modelling to assist municipalities in reducing greenhouse gas emissions.*

Chris Gore, Ph.D., Political Science/IES; supervisor: Richard Stren, Political Science. *Energy sector reform in Uganda.* ***(See abstract of his research on page 32.)***

Stephanie Graham, M.A., OISE/UT (Sociology & Equity Studies in Education)/IES.

James Gray-Donald, Ph.D., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES; supervisor: David Selby, Curriculum, Teaching & Learning. *Stories of transformation: experiences of facilitation and change within a novel environmental education program in El Agustino (Lima, Peru).* ***(See abstract of his research poster presented at IES Research Day below.)***

Sarah Hartley, Ph.D., Political Science/IES; supervisor: Grace Skogstad, Political Science. *A comparison of policy responses to environmental risk: the case of agricultural biotechnology in Canada and the UK.* ***(Winner of a Labatt fellowship; see page 375.)***

Munya Kabba, Ph.D., OISE/UT (Sociology & Equity Studies in Education)/IES.

Jennifer Kalnins, L.L.B., Law/IES; supervisor: Donald Dewees, Economics. *Course work only program.*

Mary Kearney, M.Sc., Geology/IES. *Course work only program.*

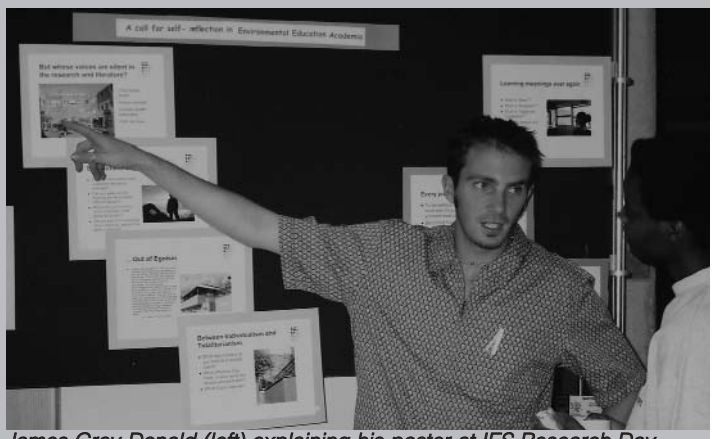
Continued on page 34 ...

James Gray-Donald: Peru's environmental citizenship

Experiences of environmental citizenship in El Agustino, Peru: a call for self-reflection in environmental education academia

*By **James Gray-Donald**, Ph.D. Candidate, Department of Adult Education, Community Development and Counselling Psychology (OISE)/IES Environmental Studies Program. (Supervisor: David Selby, Department of Curriculum, Teaching and Learning.)*

Abstract of poster at IES Research Day on May 1, 2003:
This poster aimed to represent an aspect of my development as an environmental educator. I argue that there are deep structural parallels between my development and that of environmental education academia. My recent move to Lima, Peru and work in the marginalized inner urban municipality of El Agustino has affirmed recent evolutions in my environmentalism. While environmentalism emerged in North America from the conservation and preservation movements, it has consistently broadened its scope to include urban areas, health issues, and recently environmental justice, racism and the interwoven dimensions of inner and outer peace. Throughout this development, environmentalists and environmental educators have had a highly mixed image, sometimes selfless saints and more often misguided and misinformed social depressants. I understand these labels and identify useful pathways to move beyond them. My grounding methodology focuses on self-reflection as a tool to understand one's place: ecological place, historical place, political place and spiritual place. I use semi-structured workshops with community members to inspire dialogue around self-hood and place. This discussion naturally leads to notions of citizenship, responsibility, inter-generational equity, and to avenues of action that community members feel are appropriate.



James Gray-Donald (left) explaining his poster at IES Research Day.

For more information, please contact James at jgraydonald@oise.utoronto.ca

... continued from page 33.

Martin Kijazi, Ph.D., Forestry/IES; supervisor: Sean Thomas, Forestry
A comparative analysis of the characteristics of endemic vs. widespread tree flora in the Eastern Arc Biodiversity hotspot, Africa. ***(See abstract of his research below.)***

Sarah King, Ph.D., Religion/IES; supervisor: Ingrid Stefanovic, Philosophy.
A qualitative investigation into the religious dynamics involved in Canadian environmental conflict.

Kristen Knoepfli, M.Sc., Zoology/IES; supervisor: Mark Engstrom, Zoology.
Biogeography and systematics status of the Chiapan deer mouse, Peromyscus gymnotis.

Tanya Labencki M.Sc., Geography/IES; supervisor: Miriam Diamond, Geography.
Characterization of washoff from urban impervious surfaces.

Kara Lefevre, Ph.D., Zoology/IES; supervisor: Helen Rodd, Zoology.
Ecological impacts of habitat disturbance.

Leslyn Lewis, Ph..D., Sociology/IES.

Anthony Liu, Ph.D., Physics/IES; supervisor: Kent Moore, Physics.
Severe winter weather over southern Ontario.

Angela Loder, M.A., Political Science/IES; supervisor: Richard Stren, Political Science.
Course work only program.

Elizabeth Lundy, M.A., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning.
Establishing a connection to nature.

Amy Mader, M.A., Economics/IES; supervisor: Don Dewees, Economics.
Economic issues with renewable portfolio standards in electricity markets.

Silvia Mancini, Ph.D., Geology/IES; supervisor: Barbara Sherwood Lollar, Geology. *Monitoring biodegradation of benzene in groundwater systems using carbon and hydrogen compound specific isotope analysis.*

Jennifer McDonald, M.Sc., Geology/IES; supervisor: Ken Howard, Physical and Environmental Sciences, Scarborough.
Hydrogeology of Nova Scotia.

Jennifer McKelvie, Ph.D., Geology/IES; supervisor: Barbara Sherwood Lollar, Geology. *Stable isotope fractionation as an indicator of fuel oxygenate biodegradation at gasoline release sites.* ***(Winner of Labatt fellowship; see p. 37.)***

James McKenzie, Ph.D., OISE/UT (Adult Education, Community Development and Counselling Psychology)/IES; supervisor: Roxana Ng, Adult Education.

Leah McMullin, M.Ed., OISE/UT (Adult Education, Community Development and Counselling Psychology)/IES.
Course work only program.

Brian Milani, Ph.D., OISE/UT (Adult Education, Community Development and Counselling Psychology)/IES; supervisor: Edmund O'Sullivan, Adult Education.
Building materials in a green economy: community-based strategies for dematerialization.

Amanda Mongeon, M.Ed., OISE/UT (Adult Education, Community Development and Counselling Psychology)/IES; supervisor: Roxana Ng, Adult Education.
Course work only program.

Melanie Murphy, M.A., Geography/IES; supervisors: Philip Byer, Civil Engineering/IES; Scott Prudham, Geography/IES.
The uncertainties of climate change in environmental impact assessment.

Ernest Opoku-Boateng, Ph.D., Geography/IES; supervisor: Rodney White, Geography/IES.

Martin Kijazi studies African endemic tree species

Martin Kijazi (right) and Professor Emeritus Paul Aird at IES Research Day.

A comparative analysis of the characteristics of endemic vs. widespread tree flora in the Eastern Arc biodiversity hotspot, Africa

*By **Martin Kijazi**, Ph.D. Candidate, Faculty of Forestry/IES Environmental Studies Program. (Supervisor: Sean Thomas, Faculty of Forestry.)*

Abstract of poster at IES Research Day on May 1, 2003:
The "Eastern Arc" region of Tanzania and Kenya has been identified as one of the world's leading "global biodiversity hotspots", as an area of high conservation priority, with high concentration of endemic species and a high threat of human disturbance. A thorough understanding of characteristics of species of conservation interest is important for appropriate formulation of biodiversity conservation plans. Patterns of co-variation were analyzed among morphological and life history traits for 393 woody taxa in the East Usambara portion of the Eastern Arc. Compared to widespread taxa, narrow endemic taxa (i.e. restricted to Usambara Mountains) showed higher than expected frequencies of self-dehiscent (not animal dependent) seed-dispersal, habitat preference for primary forest, and were preferentially distributed in the sub-montane habitat zone. The frequency of dioecious mating systems among narrow endemic taxa was lower than expected, while that of hermaphrodite mating systems higher than expected. Near-endemic taxa (taxa restricted to Eastern Arc and East African coastal forests) showed traits intermediate to those of endemic and widespread taxa. The frequency of treelets and shrubs among endemic taxa was higher than expected. These findings suggest that long-term selection pressure for persistence in a naturally fragmented system has resulted in the suite of traits that now characterize narrow endemic taxa. Within-patch disturbance and patch clearing may presently be more critical threats to woody species than forest fragmentation per se and protection of forest remnants in the E. Usambara may be an effective long-term conservation strategy.
For more information, please contact Martin at tini.herbert@utoronto.ca

Urban environmental financing: facing the challenges of the future.

Albert Osei, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: David Selby, Curriculum, Teaching & Learning. *A comparative study of the role of education in aboriginal/ indigenous fisheries management in Canada (Antigonish) and Ghana (Moree).*

Kathryn Palmer, M.A., Geography/IES; supervisor: Scott Prudham, Geography/ IES. *The role of ENGOs in the land use planning process in Ontario, case study: the Oak Ridges Moraine.*

David Partlow, M.A., Geography/IES; supervisor: Scott Prudham, Geography/ IES. *Community issues related to BC forest policy.*

Preeti Ramprasad, Ph.D., Forestry/IES; supervisor: D.N. Roy, Forestry; Rodney White, Geography/IES. *Exploring the impacts of transport infrastructure development on local forest ecosystems in the Niagara Escarpment Ontario.*

Carolyn Richardson, Ph.D., Philosophy/IES; supervisor: Ingrid Stefanovic, Philosophy. *Nature writing and philosophical thinking.*

David Sandomierski, M.A., Political Science/IES; supervisor: Richard Stren, Political Science. *Course work only program.*

Marli Santos, M.A., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: Ed O'Sullivan, Adult Education.

Saeed Sheshehgar, M.S.W., Social Work/IES.

David Sider, Ph.D., Geography/IES; supervisor: Virginia Maclaren, Geography. *Community based environmental management in India.*

Nicki Simms, M.A., Geography/IES; supervisor: Scott Prudham, Geography/IES. *First Nations' indigenous knowledge and community forestry.*

Luciana Sivertson, Ph.D., Anthropology/ IES; supervisor: Krystyna Sieciechowicz, Anthropology, Scarborough. *Watershed ecology management: the Sibun Bio-Region, Belize, Central America.*

Kymberley Snarr, Ph.D., Anthropology/ IES; supervisor: Frances Burton, Anthropology. *The howling monkeys of Cuero y Salado: life in fragmentation on the north-coast of Honduras.* ***(Winner of a Gordon Cressy Award for Student Leadership; see page 37.)***

Kevin Tuohy, L.L.B., Law/IES. *The international obligation to conduct international environmental impact assessment.*

Amar Wahab, Ph.D., OISE/UT (Sociology & Equity Studies in Education)/IES; supervisor: Margrit Eichler and Alissa Trotz, Sociology & Equity Studies. *Gender and environmental activism: the role of women in environmental NGOs in the Caribbean.*

Levi Waldron, Ph.D., Forestry/IES; supervisor: Paul Cooper, Forestry. *Modeling the leaching of inorganic wood preservative components from pressure-treated wood.* ***(See abstract of his research below.)***

Adam Watson, M.A., Geography/IES; supervisor: Alana Boland, Geography *An evaluation of Vietnam's urban waste management sector, with a specific focus on the role for capacity building in improving the efficacy of Vietnam's waste management policy initiatives.*

Bob Willard, Ph.D., OISE/UT (Adult Education, Community Development and Counselling Psychology)//IES; supervisor: J. Gary Knowles, Adult Education. *Why some companies embrace sustainability, why others do not, and how to convince the second group.*

Levi Waldron studies leaching of wood preservatives

Prediction of wood preservative leaching from pressure-treated wood

*By **Levi Waldron**, Ph.D. Candidate, Faculty of Forestry/IES Environmental Studies Program. (Supervisor: Paul Cooper, Faculty of Forestry.)*

Abstract of presentation at IES Research Day on May 1, 2003: Chromated copper arsenate (CCA) is the most widely used industrial wood preservative in the world. The greenish tinge it imparts to wood is a familiar sight in decks, fences, utility poles, playground equipment, and many other applications. The recent controversy surrounding the safety of CCA pressure-treated wood and its planned replacement with alternative preservatives comes amidst a general lack of understanding or agreement on how any of these preservatives are lost from wood or how to assess the potential hazards. This paper presents a brief background on wood preservation, its advantages and problems, and a physical model which provides better understanding of the leaching process and improved methods for assessing leaching hazards of new and present wood preservatives. When wood is treated with CCA, a fixation reaction occurs which is critical to the efficacy and safety of the finished product. Variations of the model are applied to the reagent Cr-VI during the fixation stage, to the products Cr-III, As-V, and Cu-II in the final post-fixation stage, and to some of the potential alternatives to CCA: Boron, Copper Azole, and Ammoniacal Copper Quat (ACQ). The model is useful for predicting approximate leaching rates and for understanding how factors such as temperature, sample size, and duration affect leaching.

Levi Waldron presenting his research at IES Research Day.

For more information, please contact Levi at levi.waldron@utoronto.ca

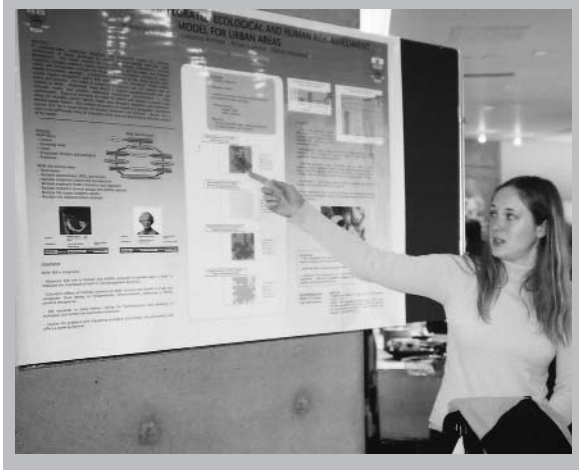
Heather Jones develops a model to assess health risks from contaminants

Development of a screening-level environmental risk assessment model for urban areas

*By **Heather Jones**, M.Sc. Student, Department of Geography/IES Environment and Health Program. (Supervisor: Miriam Diamond, Geography.)*

Abstract of poster at IES Research Day on May 1, 2003:
A generic, screening-level and predictive risk assessment model for chemical contaminants is being developed to support decision-making regarding urban development. The model accounts for risks from multiple contaminants, multiple endpoints, multiple exposure routes, multiple receptors and life stages, and temporal trends, and incorporates multiple risk characterization techniques summed up using a weight-of-evidence approach. Contaminants considered by the model include semi-volatile organic compounds (SOCs). Receptors considered include humans at different life stages and with different lifestyles. The model is comprised of exposure and risk modules that are coupled to MUM – Multimedia Urban Model, a fugacity-based fate and transport model that predicts multimedia contaminant concentrations in urban environments. Exposure estimates are made for humans using, for example, population-specific intake rates and empirically-derived uptake factors. Case studies are being performed for the Greater Toronto Area (GTA) and for Kampala, Uganda.

Heather Jones explaining her poster at IES Research Day.



The following is a list of graduates, as well as new and continuing students enrolled in IES' Environment and Health collaborative graduate program in 2002/03.

For more information, please consult the IES web site, www.utoronto.ca/env/ies, or contact Donna Workman, 416-978-7077, d.workman@utoronto.ca

2002-03 GRADUATES

Nadia Abu Zahra
M.A., Geography/IES; supervisor: Amrita Daniere, Geography.
To HGIS or not to HGIS? What are the potential and actual applications in low- to middle-income countries of health-based geographic information systems (HGIS)?

James Doherty
M.Sc., Community Health/IES; supervisor: Susan Tarlo, Public Health Sciences.
Evaluation of work-related symptoms, asthma, sensitization and exposures among x-ray technologists.

Marcy Erskine
Ph.D., Anthropology/IES; supervisor: Larry Sawchuk, Anthropology.
Adoption of preventative health technology in rural Malawi, Africa.

David Wasserstein
M.Sc., Medical Science/IES; supervisor: Frances Silverman, Medicine/Gage Occupational and Environmental Health Unit.
The effect of controlled ambient air pollutant exposure on inflammatory mediator release in humans. ***(Winner of a Labatt fellowship; see page 37.)***

Tammy Wong
M.H.Sc., Public Health Sciences/IES; supervisor: Andrea Sass-Kortsak, Public Health Sciences.
Professional degree in Occupational and Environmental Health (Occupational Hygiene).

2002-03 NEW & CONTINUING STUDENTS

Nita Chaudhuri
Ph.D., OISE/UT (Adult Education, Community Development and Counselling Psychology)/IES.
Environmental health in the community context.

Heather Jones-Otazo
M.Sc., Geography/IES; supervisor: Miriam Diamond, Geography.
Development of a screening-level environmental risk assessment model for urban areas. (***See abstract on this page. Winner of the Langford Prize, Brown Prize, Labatt fellowship and Gordon Cressy Award; see page 37.)***

Larissa Lisnevskaia
M.Sc., Medical Science/IES; supervisor: Frances Silverman, Medicine/Gage Occupational and Environmental Health.
Effects of air pollution on cardiorespiratory health.

Shehrina Tabassum
M.Sc., Medical Science/IES; supervisor: Frances Silverman, Medicine/Gage Occupational and Environmental Health.
Symptoms related to exposure to air pollutants.

*By **Mona El-Haddad***

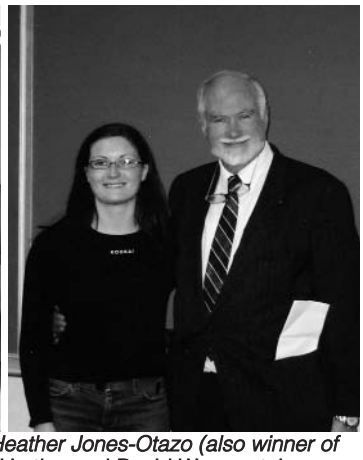
Congratulations to the recipients of the following graduate environmental awards presented at IES Research Day on May 1, 2003. For more information on awards, please contact Donna Workman, 416-978-7077, d.workman@utoronto.ca or see http://www.utoronto.ca/env/ies

George Burwash Langford Prize

This annual prize provides support and encouragement for student service and research at IES. This year, $350 was awarded to **Heather Jones-Otazo**, an M.Sc. student in Geography and IES' Environment & Health Program and President of the Graduate Environmental Students Association. For her research, she is developing an integrated ecological and human risk assessment model for urban areas ***(see page 36 for an abstract)***.

John Brown Prize

This prize is awarded for the best applied research project dedicated to the analysis and improvement of occupational or environmental health to students in the Gage Occupational and Environmental Health Unit (Community Health), the Department of Chemical Engineering and Applied Chemistry, the Department of Public Health Sciences, and/or IES. This year, $1000 was awarded to **Heather Jones-Otazo** of Geography and IES' Environment and Health Program (see above).



LEFT: Labatt Fellowship recipients left to right: Anthony Liu, Heather Jones-Otazo (also winner of George Langford and John Brown Prizes), Craig Butt, Sarah Hartley and David Wasserstein, joined by IES Director and award presenter Rodney White. Absent: Jennfier McKelvie. RIGHT: Sperrin Chant Toxicology Award winner Josephine Archbold with award presenter Roger Hansell.

Sperrin Chant Masonic Award in Toxicology

Members of IES and the university, with members of the University Lodge A.F. and A.M., initiated this new award, given to students doing research in toxicology who demonstrate academic excellence, strength of character, and financial need. This year, **Josephine Archbold**, an M.Sc. student in Geography and IES' former Toxicology Program, was awarded $1500. She was developing a decision-support tool to conduct a screening-level ecological risk assessment of contaminants in an urban environment.

Arthur and Sonia Labatt Graduate Fellowships

Through a generous donation of **Arthur** and **Sonia Labatt**, these fellowships are awarded annually to support IES students who demonstrate academic excellence and financial need. Applicants wrote a paper exploring practical based solutions to environmental issues and/or examining the marketplace for solutions to environmental issues. Six recipients were awarded $4150 each:

Craig Butt, M.Sc. student, Geography/IES Environmental Studies;
Sarah Hartley, Ph.D. student, Political Science/IES Environmental Studies;
Heather Jones-Otazo, M.Sc. student, Geography/IES Environment and Health;
Anthony Liu, Ph.D. student, Physics/IES Environmental Studies;
Jennifer McKelvie, Ph.D. student, Geology/IES Environmental Studies; and
David Wasserstein, M.Sc. graduate (November 2002), Medical Science/IES Environment and Health.

IES students receive Cressy leadership awards

*By **Mona El-Haddad***

We are pleased to congratulate four IES graduate students who were amongst the recipients of the 2003 Gordon Cressy Student Leadership Award: **Todd Barr, José Etcheverry**, **Heather Jones-Otazo**, and **Kymberley Snarr**. The awards, presented during a ceremony on April 2 2003 at Hart House, recognize students for their outstanding contributions to the university through extra-curricular involvement.

Todd Barr (M.Ed. student, OISE/IES) has been an active member of the Graduate Environmental Students' Association (GESA) and the U of T Environmental Resource Network (UTERN). José Etcheverry (Ph.D. student, Geography/IES) was a founder of the Sustainable Energy Group and past president of GESA. Heather Jones-Otazo (M.Sc. student, Geography/IES) is GESA's current president and an active member of UTERN. Kym Snarr (Ph.D student., Anthropology/IES) has helped coordinate environmental conferences and is developing distance education courses at IES.

Gordon Cressy joins IES recipients of the student leadership award named in his honour. Left to right: Kymberley Snarr, José Etcheverry, Gordon Cressy, Heather Jones-Otazo. Absent: Todd Barr. (Photo: Donna Workman.)