Institute for Environmental Studies
University of Toronto

2003-04 ANNUAL REPORT

ON THE COVER

A typical view of traffic congestion on the Gardiner Expressway in Toronto during rush hour. A sign warns of heavy traffic along the way while a GO Transit train passes by. Cars are a major source of air pollution in Toronto. Although improved technology is making cars less-polluting, the growing number of cars on roads offsets these pollution reducing benefits. (CP PHOTO - Steve White)

FOR IES UPDATES:

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

Environews newsletter

Available on the IES website and in hardcopy, this newsletter highlights news of IES and the University of Toronto environmental community.

Institute for Environmental Studies

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2003-04 IES Annual Report
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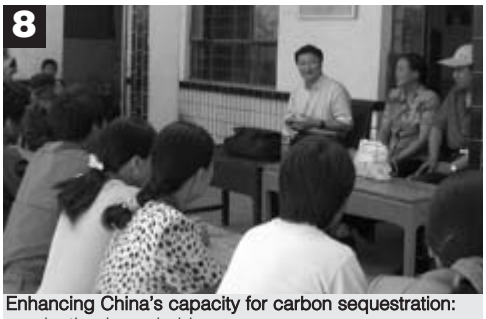
IES' first online Certificate in Environmental Management: certificates of first graduates are signed

Waste-Econ Program: creating waste management training programs for Vietnam, Cambodia and Laos



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DIRECTOR'S FOREWORD

Our ecological niche

By Rodney White, IES Director

We are still waiting for a consensus to emerge as to what extent the modern consumer society is subject to the laws of nature. Does endless suburban sprawl carry a significant environmental price? Might water become a scarce commodity? Is the reduction (near elimination) of greenhouse gases our most urgent environmental priority? Does the attack on the World Trade Center make environmental issues less urgent (by comparison) or should it be interpreted as a symptom of a common, deeper problem?

On the world stage we see many actions that reflect a growing concern about our environmental security. President Putin has indicated that Russia will ratify the Kyoto Protocol, thereby bringing it into force. There is a great deal of climate change mitigation activity in the United States in State legislatures and through voluntary initiatives at the corporate and municipal level. Institutional investors responsible for the management of over $10 trillion of funds supported the second round of the Carbon Disclosure Project -- more than twice the amount of capital behind the first round. The response rate from the FT500 companies that were surveyed by the Project rose from 47% to 59%. Of the respondents 45% indicated that they considered climate change to be a serious problem and/or opportunity and stated that they were taking actions to reduce their corporate exposure to 'carbon risk' (Whittaker and Dickinson 2004).

All of these actions reflect a growing awareness of our environmental challenge -- at least among governments and corporations. At the personal and family level an increase in the degree of concern is less visible. Yes, there are committed individuals and organisations that strive to reduce our negative impacts on the planet. But they appear to be a fairly small minority. In Toronto we continue to ship our solid waste to Michigan, with more than a hundred trucks making a daily round trip of several hundred kilometres. Urban sprawl continues relentlessly as urban Canada continues its 20 year trend of declining residential density, supporting the related trend of a steady increase in the number of kilometres of automobile travel per person per year. Frequent flyer points are symbols of social hierarchy, much like the acquisition of a family car in the 1950's.

From time to time this complacency is jolted by a serious breakdown in the apparent normalcy of modern consumer society. The attack on the World Trade Center was certainly the most sudden and savage of those shocks. The outbreak of SARS likewise shook our assumptions about 'normal life'. For people living in cities struck by SARS the world was suddenly divided into 'us and them', only we had become 'them'. Last year also saw major power outages in the north-eastern United States, Ontario, Scandinavia, the UK and Italy. Ontario is still recovering from the contaminated water incident in Walkerton that left seven dead and 1,300 ill, some with long term implications.

Do these various incidents -- and others like them -- point to a common lesson? Has our increasingly urbanised lifestyle seriously divorced us from understanding our continued reliance on Nature, simply because that reliance becomes daily less visible? For almost all the inhabitants of a modern western city, water and power are available at very low cost and for no physical effort. Garbage is collected regularly and taken 'away'. Do the 15 tons of greenhouse gases we individually emit every year really weigh on our consciousness?

Perhaps a heightened sense of vulnerability -- from unexpected disease, power outages and terrorism -- will encourage people to look more critically at the way we conduct everyday life in the modern city. Is it reasonable to assume that a tonne of water will be delivered to your house every day (and the used water taken away and treated), for the price of a cup of coffee?

Reference cited: Whittaker, M. and P. Dickinson. 2004. *Carbon Disclosure Project: Climate Change and Shareholder Value in 2004*. Innovest Strategic Value Advisors, New York.

Administrative Staff

Mona El-Haddad
Communications and Director's Assistant

Mona manages all administration functions of the Office of the Director. She is also helps to increase IES' profile as Editor of the IES Annual Report and *Environews* newsletter, and Coordinator of IES' seminars and Research Day.

Imran Hasan
Manager, Environmental Information Office

New to IES in September 2004, Imran will be responsible for the Internet Information Systems at IES, including the design and maintenance of the IES website and its related teaching, research and conference pages.

Laurane Harding
Business Officer

Donna Workman

Laurane administers IES' income and expenditures. She is responsible for budget reports and financial statements, purchases and leasing of equipment, research contracts and grants, and payroll documentation for employees.

Donna Workman
Student Advisor; Distance Learning Coordinator

Donna Workman

Donna administers IES courses, graduate programs and certificate programs. She advises students on eligibility, programs, policies and procedures; liaises with academic and administrative staff on program and educational matters.

IES introduces new certificate programs and produces its first two sets of graduates

Since launching its first distance certificate program in Environmental Management in September 2003, IES has already produced two sets of graduates. Plans are underway for new certificate programs, such as the Certificate in GIS for Environmental Management starting in August 2004.

Certificate in Environmental Management

Instructor: Kymberley Snarr, Ph.D. candidate, Department of Anthropology and IES, kym.snarr@utoronto.ca

The Certificate in Environmental Management (CEM) program is offered in a completely online e-classroom environment, without the requirement to physically meet face-to-face. This distance program was originally launched as IES was approached many times over the last decade with requests to deliver programs that would help professionals move into environmental careers while accommodating busy lifestyles and being accessible to individuals outside of Toronto.

Within the two CEM cohorts since its launch in September 2003, students were located across Canada, in the U.S.A., Central America and the Middle East. Despite their geographical differences, students were able to communicate and engage in interactive partner and group projects. Upon completion of the certificate, the students 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.

The two courses required for the certificate, **CEM 400 Fundamentals in Environmental Management** and **CEM 401 Environmental Case Management**, use the courseware, WebCT, available through the University of Toronto. Each course takes ten weeks to complete. With the use of asynchronous discussion forums and synchronous live chats, the students are very much part of a dynamic and active classroom. Synchronous guest chats are employed to allow the students access to experts in specific areas of study. For the latest CEM 401, which employed the case study of the Kyoto Protocol, guest lecturers and topics included: **Doug Macdonald**, Director of Innis College's Environmental Studies Program, on *Canadian Response to the Kyoto Protocol*, and **Rodney White**, Director of IES, on *Business and the Kyoto Protocol.* The large final project in CEM 401 was a group assignment in which the students were asked to evaluate the Kyoto Protocol as an environmental management plan in the face of the environmental challenge of global climate change. This summary paper was published in the Summer 2004 issue of *Environews* (see www.utoronto.ca/env/ies).

Don Cormack

Rodney White, Director of IES, and Michael Marrus, then Dean of the School of Graduate Studies, sign the certificates of the first graduates of IES' completely online Certificate in Environmental Management.

New certificate programs starting in 2004-05

Plans are underway to offer three additional distance education certificate programs, the first of which is to start in late August 2004:
1. GIS for Environmental Management;
2. Emergency Management; and
3. Urban Environmental Finance.

GIS for Environmental Management Program

Instructor: Don Boyes, Lecturer, Department of Geography, boyes@geog.utoronto.ca

This program provides an introduction to geographic information systems (GIS) for environmental professionals with no prior GIS experience. Participants will develop practical skills through hands-on tutorials and exercises while also gaining a solid understanding of the underlying concepts. Topics will include geographic data input (digitizing and street address geocoding), data models (including Environmental Systems Research Institute's, ESRI, geodatabase), data availability, acquisition and management, map projections, and spatial query and map overlay analysis.

The Certificate consists of two courses: 1. an intensive full-week, in-class workshop, **Introduction to Geographic Information Systems for Environmental Management**; and 2. **GIS Applications for Environmental Management**, a case study offered by distance. An exciting feature of the introductory GIS workshop is the leading-edge industry data and case study provided by EcoLog Environmental Risk Information Services, ERIS. This allows participants to gain experience with real data and environmental applications while they master GIS concepts and skills using state-of-the-art software ArcGIS 9.

For more information about distance learning opportunities at IES, please visit www.utoronto.ca/env/ies or contact Donna Workman, d.workman@utoronto.ca.

New stand-alone Master's in Environmental Science to join IES' graduate programs

U of T at Scarborough and IES have been developing a new one-year Master's Professional Program in Environmental Science to start in September 2005. This stand-alone degree program, to be offered at the U of T at Scarborough, is ideal for newly graduated students or existing professionals working in industry or government agencies.

Master's Professional Program in Environmental Science

By Nick Eyles, Physical & Environmental Sciences, Scarborough

IES will offer a new one-year **Master's Professional Program in Environmental Science** (M.Env.Sc.) to be located in the Department of Physical and Environmental Sciences at U of T at Scarborough (UTSC). Pending final approval from the Ontario Council on Graduate Studies, the program will start in September 2005. The focus of this stand-alone Master's program relates to contaminants and their transport and fate in natural and degraded environments. The program is designed for both newly graduated students and existing professionals in industry and government agencies. It will consist of two options (an all-course option, and an intern option) both requiring completion of a total of five full course equivalents. Full time students will complete all instructional requirements in two terms (fall and winter) and then complete field and research-based courses during the early summer. The four-month internship may be completed concurrently or sequentially as a work placement internship. The program may also be completed on a part-time basis.

Collaborative Graduate Programs

IES' currently offers two graduate programs, offered at both the Master's and Ph.D. levels, which require students to enroll in a collaborating department. By special arrangement, students may be admitted from other departments than those listed below.

1. Environmental Studies

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.

2. Environment and Health

Collaborating departments include Community Health; Geography; Health Policy, Management and Evaluation; and the Institute of Medical Science. We currently have students from the Department of Anthropology and OISE/UT's Department of Adult Education, Community Development and Counselling Psychology.

Graduate Courses

(for Collaborative Programs)

Core Courses

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

IES 1002H Environmental Management Case Studies
*2003/04: **Peter Timmerman**, Faculty of Environmental Studies, York U. and **Mark Winfield**, Division of the Environment.*
*2004/05: **W. Scott Prudham**, Geography/IES and **Mark Winfield**.*

MSC 4000H Seminars in Environment and Health; IES 4001H Seminars in Environment and Health (for Ph.D. students))
***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 Member.*

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

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

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

IES 1707H Environmental Finance: Risk Management and Business Opportunities
*2003/04: **Martin Whittaker**, Innovest Strategic Value Advisors.*
*2004/05: **Jane Rigby**, CO2e.com, Toronto.*

IES 2000H/Y Independent Study

IES 2002HF Special Topics: Environmental Governance in the New City of Toronto
***Quentin Chiotti**, Pollution Probe.*

IES 2002HS Special Topics: Community Based Environmental Research
***Beth Savan**, Innis College.*
(Newly offered in 2003/2004.)

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

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 2003/04 and 2004/05.)

JEI 1901H Technology, Society & Environment
***Willem Vanderburg**, Civil Engineering/IES.*

For more information, please visit www.utoronto.ca/env/ies or contact Donna Workman, d.workman@utoronto.ca.

Climate change action plan delivered successfully to Cuban government

A CIDA-funded project wraps up, after successfully developing a climate action plan for Cuba in response to severe weather events.

By Beth Savan

IES' CIDA-funded project ***Capacity Building for Climate Change in Cuba***, has succeeded in meeting all its original objectives. In the summer of 2004, Project Director **Beth Savan** of Innis College and team colleagues will be completing a final report, documenting the project's accomplishments, as well as the lessons learned while carrying out this project over the past 18 months.

Last year, two modules on Mitigation and Adaptation to Climate Change were successfully delivered in Cuba by Cuban colleagues **Dr. Abel Centella** and **Dr. Luis Paz Castro** of the Instituto de Meteorologia, **Dr. Juan Llanes Regueiro** of the Universidad de la Habana, and **Dr. Julio Torres Martinez** of the Ministerio de Ciencia Technologia y Medio Ambiente, together with **David Heeney**, **Judy Simon**, **Shona Adamson** and **Raegan Bunker** of IndEco Strategic Consulting in Toronto. The first module, "Challenges and Opportunities", outlined the science and policy related to climate change and its general impacts in Cuba, and then walked participants through an interactive session identifying key impacts of climate change on their sector. The second module, "Actions and Strategies", built on this exercise by carrying out a strategic planning session that helps participants to figure out mitigation and adaptation activities they can pursue to address climate change impacts on their sector. The workshops were focused on the participation of the Ministry of Basic Industry (MINBAS), which manages electricity generation and distribution, mining and manufacturing in Cuba.

Both modules were very well received, and earned high praise from workshop participants. As a result of these sessions, MINBAS is incorporating climate change initiatives into its corporate strategic plan. Furthermore, the project's Cuban colleagues have already adapted the modules to different audiences, and have delivered them several more times to different groups in and outside of Havana.

David Heeney, IndEco Strategic Consulting

Old Havana's harbour, Cuba. Members of a CIDA-funded project successfully delivered two workshops to the Cuban government to develop mitigation and adaptation strategies for climate change impacts.

In the final weeks of the project, the modules already developed will be adapted to effectively deliver summary information to senior executives in the Cuban government. Further funding will be saught, so that the work can be applied more extensively to other sectors and provinces in Cuba, and to other countries in Central America and the Caribbean.

For more information, please contact Beth Savan at b.savan@utoronto.ca.

China sustainable water management project wraps up with CD-ROM

By Rodney White, IES Director

Completed in 2003-04, **Sustainable Water Resources Management in the Beijing-Tianjin Region of Northern China** was a CIDA-funded research consortium of seven Canadian and Chinese universities in which the University of Toronto was included. The various project tasks were allocated to teams that included one Canadian and one Chinese university: water supply and treatment and water pricing (U of T and Tsinghua University); 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 geographical information systems (Montréal and Peking).

The U of T team was comprised of faculty and students from Geography, and Civil Engineering, and IES including **Barry Adams** (Civil Engineering), **Lino Grima** and **Rodney White** (Geography/IES), **Alana Boland** (Geography) and **Chris Kennedy** (Civil Engineering) and **Elisa Tseng** (Ph.D. candidate, Geography).

David Brown

A CD-ROM containing the results of the project is available from Mona El-Haddad, m.elhaddad@utoronto.ca.
For more information on the project, please visit www.chs.ubc.ca/china/index.html

‘Waste-Econ’ Program: waste management outreach in Vietnam, Cambodia and Laos

In its fourth year, the Waste-Econ successfully started waste management projects and training programs in Cambodia and Laos while continuing similar activities in Vietnam.

By Virginia Maclaren, Project Director and Carrie Mitchell, Communications Officer.

The Waste-Econ Program (*Making Waste Work for the Economy in Vietnam, Cambodia and Laos)* has now completed its fourth year and has extended its program to six years. The purpose of this CIDA-funded IES and Geography project, led by **Virginia Maclaren** of Geography, is to build human and institutional capacity for implementing integrated waste management in Vietnam, Cambodia and Laos (or Lao PDR).

A number of key program activities took place in the last year including pilot project development; Canadian student field work; graduate-level training for Vietnamese students at the University of Toronto; two-week training courses held in Vietnam, Cambodia and Laos; curriculum development in Vietnam and Cambodia; and a U of T seminar series highlighting past research.

New Pilot Project Activities in Laos and Cambodia

In Laos a pilot project on market waste composting started in the summer of 2003 to examine the potential for composting the high volume of organic wastes generated at market sites throughout Vientiane. Over the last year, our Laos partners at the National Science Council hosted workshops on waste-auditing (taught by **Chuck Hostovsky**, Geography), waste economics (taught by **Phil Byer**, Civil Engineering) and composting, assisted three Canadian graduate students with their studies on compost feasibility (see below) and designed and built a temporary compost facility to test compost techniques.

In Siem Reap, Cambodia, where many neighbourhoods have no waste collection service at all, a pilot project on community-based waste management has started in the summer of 2004 to investigate the feasibility of having community members manage and finance a waste collection and source separation program. Our partners at the Royal University of Phnom Penh have developed a survey that will be used to assess household willingness to participate in the proposed community-based scheme.

Continuation of Pilot Projects in Vietnam

In Vietnam, most of the pilot projects are now entering an awareness-raising and dissemination phase. The latest activities of the five projects are as follows:

1. ***Microfinance for Female Waste Pickers in Hai Phong,*** led by **C.H. Van** (Vietnam Women’s Union) with the assistance of advisors from Gems of Hope, a Canadian non-governmental organization. This pilot project was created to set up a micro-credit program for female waste pickers in Hai Phong. As of April 2004, $47,000 CAD had been distributed to 440 participants to purchase equipment and/or storage space for recyclables, which allows them to collect a greater volume and obtain a better resale price from dealers. There has been a 100% repayment rate. Women in the program also receive training courses on reproductive health, environmental sanitation around the home and gender equality.

2. ***Tourism waste at Bai Chay Beach, Ha Long Bay,*** led by **T.H. Nhue** (Center for Environmental Engineering of Towns and Industrial Areas (CEETIA) and **Murray Haight** (University of Waterloo): the team has conducted a number of awareness workshops over the last two years and provided households with information on solid waste separation and household composting. During this past year, a community survey found that knowledge of these issues and of waste as an environmental problem had significantly increased since an initial survey in 2001. The project has begun to attract the attention of local authorities as well, which is leading towards a number of changes in waste management policy in Ha Long Bay.

3. ***The Cleaner Production and Industrial Waste project in Ho Chi Minh City***, led by **L.M. Triet** of the Institute for Environment and Resources (CEFINEA) at Vietnam National University, **Murray Haight** (University of Waterloo), **Virginia Maclaren** and **Viive Sawler** (Ontario Centre for Environmental Technology Advancement, OCETA). A workshop on cleaner production for industry and government officials was held in Ho Chi Minh City where CEFINEA staff presented the results of their research and demonstration activities.

One of the activities of Waste-Econ’s pilot project on market waste composting in Laos was to conduct a waste-audit of one of the city's main markets. Here, students from Canada and Laos work together to sort waste into appropriate categories and weigh it.

Carrie Mitchell

4. ***Solid Waste Landfill Siting and Best Management Practices in Da Nang***, led by **Bui Van Ga** (Da Nang University) and **Phil Byer** (Civil Engineering). A workshop on integrated waste management for local waste management professionals was held and introduced geographic information systems as a tool to assist in siting landfills.

5. ***Child Waste Pickers at Nam Son Landfill,*** led by **Pham Bang** (The Youth Research Institute, Vietnam). A survey of former child pickers was conducted to determine the impact of a recent ban on child pickers at the landfill.

Phil Byer

A moment of relaxation for a few child waste pickers in Vietnam. This reveals some of the health risks associated with children working in the waste sector, such as lack of proper protective gear and potential occupational hazards.

Canadian Student Research in Vietnam, Cambodia, and Laos

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

- **Adam Watson** (recent Master's graduate, Geography/IES, U of T): *An examination of Vietnam's urban waste management capacity*; supervised by Alana Boland and Virginia Maclaren.
- **Sangeeta Chopra** (recent Master's graduate, Civil Engineering, U of T): *Quantification and composition audit of waste generated at the early morning market in Vientiane, Lao PDR*; supervised by Phil Byer.
- **Laura Evangelista** (recent Master's graduate, Planning, Queen's University): *Source separation of market waste: attitudes and opinions of market vendors in Vientiane, Laos*.
- **Adrienne Best** (U of T International Health Scholarship Program): *'We teach them to know about their daily lives': exploring a child waste picker outreach team in Phnom Penh, Cambodia*; supervised by Catherine Chalin Clark, Public Health Sciences.
- **Genevieve Wong** (Master's candidate, Civil Engineering, U of T): *Separation, Transportation and collection options for market waste composting in Vientiane, Lao PDR*; supervisor: Phil Byer.
- **Zeralynn Tse** (Master's candidate, Planning, U. of Waterloo): *Empowering the informal Sector: a proactive approach to waste management in Bai Chay Beach in Halong Bay, Vietnam*; supervised by Murray Haight.
- **Curtis Puncher** (recent graduate, International Development Studies program): *Informal waste recycling systems in Phnom Penh, Cambodia*; supervised by V. Maclaren.
- **Esther Rootham** (recent graduate, International Development Studies program): *Recycling Banks in Vientiane, Laos*, supervised by Virginia Maclaren.

Sponsorship of Vietnamese Students

The Waste-Econ Program also sponsored Vietnamese students at U of T:

- **Nguyen Quang Tuan** (Ph.D. candidate, Geography): *Landfills and community-driven regulation in Vietnam*; supervised by Virginia Maclaren.
- **Nguyen Van Ha** (Ph.D. candidate, Forestry): *Social capital and papermaking craft villages in Vietnam*; supervised by Shashi Kant, Forestry.
- **Hoang Phuong Chi** (M.Eng. candidate): *Quality of compost produced in Ha Long Bay, Vietnam*; supervised by Phil Byer.
- **Nguyen Thi Thuc Thuy** (M.Eng. candidate): *Costs and benefits of implementing a source-separation program in Da Nang, Vietnam*; supervised by Phil Byer.

Training Courses and Workshops in Vietnam, Cambodia and Laos

This year the Waste-Econ Program continued to promote integrated waste management strategies and practices through two 2-week courses and one 2-week training course solely for female professionals, which were held in Vietnam. Similar short courses were also held for the first time in Laos (Champasack) and Cambodia (Siem Reap). In addition, a follow-up workshop was conducted with the trainees from four previous training courses in Vietnam to find out how and whether trainees were using the knowledge gained from the courses in their work.

In January 2004, OCETA led a two-day workshop in Vientiane, Laos for 30 private business managers and government officials, which examined environmental management systems and cleaner production with a specific focus on the woodworking sector.

Curriculum Development in Vietnam and Cambodia

The Waste-Econ program has achieved great success this year in Vietnam by receiving approval of the new Waste-Econ curriculum framework from the Vietnamese Ministry of Education and Training. Receiving approval for the curriculum means that any university in Vietnam will be able to implement the curriculum. Ten training institutions have already have expressed their intent to implement it as soon as possible.

In Cambodia, The Royal University of Phnom Penh is developing a full undergraduate course on Waste-Economy for their Environmental Science program. Many of the topics will be the same as those from the six-week training course offered there in 2002, but with expanded content.

Seminar Series at U of T

The Waste-Econ Program held eight public seminars this past year to disseminate student and faculty research results. **Christine Furedy**, **Pierre Desrochers** and **Phil Byer** made faculty presentations. **Adrienne Best**, **Laura Evangelista**, **Sangeeta Chopra**, **Adam Watson** and **Curtis Puncher** presented the findings of their research abroad. Curtis Puncher also returned to Cambodia in November of 2003 to present his work at the Social Research Congress in Phnom Penh.

The seminar series will continue in the fall of 2004. Please see the website below for more information.

New website

A new website has been launched in August 2004, with a new address: **http://www.utoronto.ca/waste-econ.**

For more information, please visit the Waste-Econ website above or contact Virginia Maclaren, maclaren@geog.utoronto.ca

Left: Dr. Tian Qingjiu; right: Dr. Yongyuan Yin

LEFT: Mr. Xia Xueqi of Nanjing University measuring Leaf Area Index in Xing-guo, one of the project sites in Jiangxi Province, China;
RIGHT: Dr. Yongyuan Yin leading the team conducting Integrated Assessment household surveys in Heihe region of Northwest China

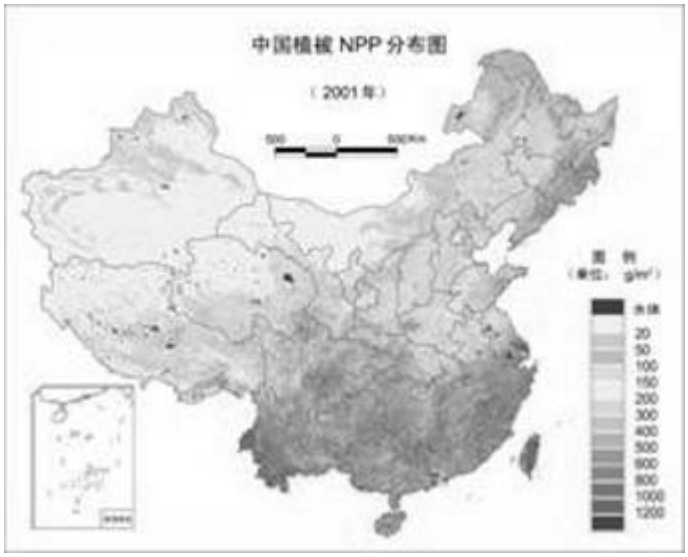
Enhancing China's capacity for carbon sequestration: year two update

Despite delays due to the SARS outbreak, field research and a household survey were conducted in the second year of this project.

By Julia Pan, Project Manager

The CIDA-funded project ***Confronting Global Warming: Enhancing China's Capacity for Carbon Sequestration*** got off to an excellent start in its first year but the SARS episode resulted in some delays its second year. A project in partnership with IES, 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.

A map of China indicating the net primary productivity (NPP), the net gain of carbon in living biomass each year. The dark areas are forests with high NPP values. These values are used in estimating the carbon source and sink distribution in China's forests.



Feng Xianfeng.

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 project components 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, Virginia Maclaren** and **Mingzhen Chen** of Geography, and **Rodney White** of Geography and IES. Other partners in Canada include the Adaptation and Impacts Research Group of Environment Canada, and the Canadian Centre for Remote Sensing. The Chinese network, led by the Institute of Geography and Natural Resources Research of the Chinese Academy of Sciences (CAS), includes seven research institutions in Beijing, Nanjing (southeast China) and Lanzhou (northwest China).

Remote Sensing and GIS/Carbon Cycle Modelling Component

The SARS outbreak in the summer of 2003 prevented Canadians from visiting China and limited fieldwork that the Chinese partners could undertake. However, some Chinese and Canadian colleagues were able to conduct work in China and in Toronto before and after the SARS travel bans. This was particularly true of the Remote Sensing and GIS/Carbon Cycle Modelling component of the project. Coarse resolution and some moderate resolution image processing was completed. Also, Leaf Area Index (LAI), Net Primary Productivity (NPP) and carbon source and sink maps were produced for one of the core sites. Chinese colleagues trained by the project

were able to conduct coarse resolution image processing on their own and have been able to adapt the principles of Canadian software GeoComp-n to their own software system to produce a preliminary all-China carbon sink and source map. During the year, the group was able to complete nearly 30% of the entire work related to this component of the project. The preliminary finding is that reforested areas in China are currently actively sequestering carbon.

Integrated Assessment

The Integrated Assessment (IA) group finalized the household survey questionnaire and conducted surveys in the three core site areas: Changbaishan (Dunhua), Heihe and Liping, in the northeast, northwest and southwest respectively. Since Changbaishan is a forest reserve without any significant population and forestry activities, it was decided to carry out the household survey in Dunhua, a populated area immediately adjacent to the reserve with similar forest ecosystems. The surveys covered various stakeholders, including women and minority groups. Various methods including economic and statistical models have been employed to study the economic and ecological impacts of land use changes. Despite the setback from SARS, the IA group was able to complete nearly 30% of the entire work related to integrated assessment. In addition to country-level IA, graduate students are conducting township-level IA based on geographical information systems. It is hoped that the surveys 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 the other two components so that the outcome of their work will be informed by socio-economic as well as by purely scientific considerations.

Forest Assessment and Ground Truthing

The Forest Assessment and Ground Truthing component of the project experienced the greatest impact from the SARS episode because the planned training and fieldwork were cancelled in 2003. Nevertheless, Chinese colleagues were able to collect relevant information on all tree species, especially native tree species with high potential for carbon sequestration utilization, found at the core sites. Some preliminary evaluations of "status quo" carbon sequestration scenarios have been conducted. The summer of 2004 will be an intensive season for this project component, with work jointly conducted by Chinese and Canadian team members. The research results will feed the other two project components towards building up an integrated carbon sequestration and assessment model. It is for this reason that CIDA has agreed to extend the project completion date to December 2005.

Changbaishan Conference

A major joint activity of this year's work is the Changbaishan conference re-scheduled to the summer of 2004, in Northeast forest in one of the Chinese Academy of Sciences' Flux Observation Tower Stations. After the conference, the key players from all the partner institutions are to conduct joint fieldwork studies at this core site and the auxiliary Dunhua area, and finalize methods for the integration of the three project components into a user-friendly model and decision support system for carbon sequestration in China.

Prior to and after the Changbaishan event, there will be a high level information sharing meeting in Beijing with the relevant government agencies, to ensure the results of the project will be widely disseminated and acted upon in the formulation of national environmental and land use policies in China.

For more information, please visit the project's website: www.utoronto.ca/cccs2002/ or contact Julia Pan, jpan@oise.utoronto.ca.

LOOKING FORWARD:

New project to facilitate best practices in community-based research in Canada

By Beth Savan

A new project funded by SSHRC Community-University Research Alliance (CURA) and administered at IES, ***Facilitating Best Practices in Community-Based Research in Canada*** has recently started. It is a partnership between **Beth Savan** of U of T's Innis College and **Robb Travers**, Director of Research at Wellesley Central Health Corporation (WCHC).

In order to facilitate a best practice framework (including substantial policy recommendations), this project will assess current barriers and facilitating factors for community-based research (CBR) in Canada. The project will culminate in a best practices manual, a set of policy recommendations specific to community groups, universities, and funders, and a strategy for knowledge exchange with stakeholder groups. As such, it will add to the existing body of Canadian CBR literature and at the same time, will fill an important gap by systematically identifying barriers and facilitators, while making policy recommendations. WCHC will contribute significant in-kind resources in addition to providing a grant for developmental and implementation activities.

This collaboration will build on a database, already developed, of persons interested in or participating in community-based research. The preliminary interviews that were already carried out will then be analysed, leading to the design, delivery (by email) and evaluation of a cross-Canada e-mail and web-based survey of the contacts gathered in the database. The project will be overseen by an Advisory Committee of senior people experienced in CBR and related policy and funding issues.

A preliminary outline of a manual for best practices in community-based research will be developed, based on the survey results, consultations and interviews, and on a comprehensive literature review that has already been completed. Researchers will draft the manual, report and policy recommendations near the end of the first year of this initiative.

The proposed primary research aims to better understand and facilitate CBR in communities across Canada, by identifying the conditions necessary for success, the barriers to effective CBR, and the best practices for funders, scholars, community partners and university administrators to ensure effective research partnerships.

Beth Savan, of Innis College, is the Director of this project. For more information, please contact her at b.savan@utoronto.ca.

Adaptation & Impacts Research Group update

By Brad Bass, David Etkin, Grace Koshida, Monirul Mirza, and Indra Fung-Fook.

Part of the Meteorological Service of Canada (Environment Canada), the Adaptation and Impacts Research Group's (AIRG) research efforts 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 IES-AIRG 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. The Acting Director is **Don MacIver**. **See pages 21-22 for profiles of AIRG staff at IES.**

For more information, please visit www.msc-smc.ec.gc.ca/airg or contact Indra Fung Fook, Administrative Officer, indra.fungfook@ec.gc.ca, 416-739-4436.

Update on research projects of AIRG at IES

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. The software utilizes genetic algorithms within a Java platform to simulate how a group of agents, with different strategies, cope with environmental variability and change. A paper will be published in the *Journal of Environmental Informatics* in 2004 **(see page 21 for citation)**.

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. The next phase of this work will extend the model to the Province of Ontario and the Region of Waterloo.

3. **Adapting Urban Environments to Atmospheric Change *(Brad Bass)*:** This study looks at the role of green walls and green roofs in mitigating the urban heat island effect, improving air quality, reducing energy consumption and increasing storm water retention. One component uses the UFORE urban forest model to assess how these technologies can best be used to reduce energy consumption and improve air quality on a community scale. A second component involves the simulation of a building's energy consumption with and without a green roof. A third component will assess the impact of green walls on mental well being. A paper has been published in the *Journal of Environmental Monitoring and Assessment* **(see page 21 for citation)**.

4. **Assessment of Natural Hazards and Disasters in Canada *(David Etkin)*:** The aim of this project 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 has been published, mostly in *Natural Hazards* (2003) Vol. 28, No. 2-3 **(see page 21 for citation)** but also in the research paper series published by the Institute for Catastrophic Loss Reduction. A summary report for decision makers and practitioners has also been completed. In progress is a report, intended for a general audience, which helps people assess their risks and better respond to them.

5. **Canadian Agricultural Adaptations to 21st Century Droughts: Preparing for Climate Change? *(Grace Koshida)*:** Funded by the Climate Change Action Fund, the purpose of this project is to improve our understanding of current adaptation processes and options in Canadian agriculture. This information will aid in the development of actions to enhance current adaptability and decrease future vulnerability to droughts, especially under climate change.

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 a nationally consistent set of energy sector scenarios of historical and future climate. A report titled *Climate Change and the Canadian Energy Sector: Report on Vulnerability, Impact and Adaptation* has recently been published (AIRG, Meteorological Service of Canada, Environment Canada, 2004, 52 pages).

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 are being addressed in this edited book project, to be published by Taylor and Francis (the Netherlands) by the end of 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. Launched by UN Secretary General Kofi Annan in 2001, this study is comprised of three working groups: Scenarios, Conditions and Trends, and Responses. Three volume reports will be published by Island Press, U.S. by September, 2005. Monirul Mirza is a coordinating lead author of the chapter on Flood and Storm Control of the Responses Working Group.

10. **Fourth Assessment Report of the Intergovernmental Panel on Climate Change *(Monirul Mirza)*:** The Intergovernmental Panel on Climate Change (IPCC) of the United Nations has recently launched its Fourth Assessment Report (FAR), expected to be completed and published in 2007. Monirul Mirza has been invited by IPCC Working Group II to act as a Coordinating Lead Author to lead Chapter 17: Assessment of Adaptation Practices, Options, Constraints and Capacity.

Graduate Faculty

The following are members of IES' Graduate Faculty; primary affiliations or departmental appointments are shown. Research profiles of faculty who held IES administrative appointments, were Instructors of IES courses and/or Principal Investigators of IES research grants and contracts in 2003-04 are on pages12-22.

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, *Social Sciences, Scarborough*
Frances Burton, *Social Sciences, Scarborough*
*Phil Byer, *Civil Engineering*
Terry Carleton, *Forestry/Botany*
Catherine Chalin Clark, *Public Health Sciences*
Jing Chen, *Geography*
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*
Nick Eyles, *Physical & Environmental Sciences, Scarborough*
Roberta Fulthorpe, *Physical & Environmental Sciences, Scarborough*
William Gough, *Physical & Environmental Sciences, Scarborough*
Brian Greenwood, *Physical & 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 & Environmental Sciences, Scarborough*
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)*
Ulrich Krull, *Chemistry, Mississauga*
Hy van Luong, *Anthropology*
Scott Mabury, *Chemistry*
Laurel MacDowell, *History, Mississauga*
Virginia Maclaren, *Geography*
(IES Associate Director, Research; Graduate Coordinator, Environmental Studies Program)
Heather MacLean, *Civil Engineering*
Jay Malcolm, *Forestry*
Loraine Marrett, *Public Health Sciences*
David Martell, *Forestry*
Patricia McCarney, *Political Science*
Andrew Miall, *Geology*
William Michelson, *Sociology*
G.W. Kent Moore, *Physics, Mississauga*
Glenn Morris, *Zoology, Mississauga*
D. Scott Munro, *Geography, Mississauga*
Edmund O'Sullivan, *Adult Education, Community Development & Counselling Psychology (OISE/UT)*
Anthony Price, *Physical & Environmental Sciences, Scarborough*
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*
Barbara Sherwood Lollar, *Geology*
Krystyna Sieciechowicz, *Anthropology*
Frances Silverman, *Medicine*
(IES Associate Director; Director, Environment & Health Grad Program)
Myrna Simpson, *Physical & Environmental Sciences, Scarborough*
Grace Skogstad, *Political Science*
Sandy Smith, *Forestry*
W. Gary Sprules, *Zoology, Mississauga*
Ingrid Stefanovic, *Philosophy*
Richard Stren, *Political Science*
Susan Tarlo, *Public Health Sciences*
Vic Timmer, *Forestry*
Carolyn Tuohy, *Political Science*
*Willem Vanderburg, *Civil Engineering*
Frank Wania, *Physical Sciences & Environmental Sciences, Scarborough*
*Rodney R. White, *Geography*
(IES Director)
Dudley Williams, *Physical & Environmental Sciences, Scarborough*
Ann Zimmerman, *Zoology*

Associate Members:

Brad Bass, *Environment Canada*
Alana Boland, *Geography*
Paul Bozek, *Gage Occupational & Environmental Health Unit*
Quentin Chiotti, *Pollution Probe*
Donald Cole, *Public Health Sciences*
James Dooley
David Etkin, *Environment Canada*
A.P. (Lino) Grima
H. Roland Hosein, *GE Canada Inc.*
Andy Kenney, *Forestry*
Sonia Labatt
Abdel Maarouf, *Environment Canada*
Douglas Macdonald, *Innis College*
Monirul Mirza, *Environment Canada*
Paul Muldoon, *Canadian Environmental Law Association*
Barbara Murck, *Environmental Sciences, Mississauga*
David Powell, *Innis College*
*Scott Prudham, *Geography*
Jane Rigby, *CO2e.com*
Pamela Robinson, *Innis College*
Stefan Salbach
Marie Sanderson, *Environment Canada*
Beth Savan, *Innis College*
Stephen Scharper, *Innis College*
M. Ronald Shimizu
Lesbia Smith, *Public Health Sciences*
Roger Street, *Environment Canada*
Peter Telford
Peter Timmerman, *York University*
Sarah Wakefield, *Geography*
Douglas Whelpdale, *Environment Canada*
Martin Whittaker, *Swiss Re*
Mark Winfield, *Pembina Institute*
Cindy Woodland, *Pharmacology*

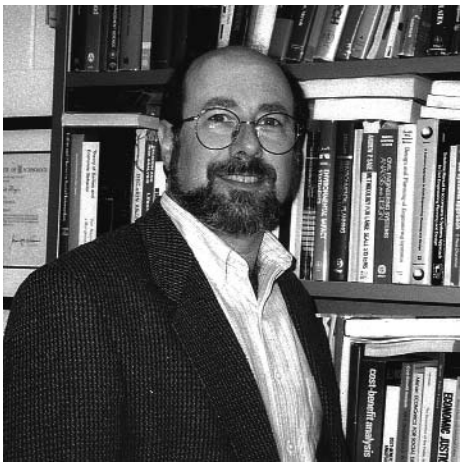
Members Emeriti:

Paul Aird, *Forestry*
Ian Burton, *Environment Canada*
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.

FACULTY

Profiled on pages 12-20 are faculty who held administrative appointments, instructed graduate courses and/or were Principal Investigators of research at IES in 2003-04.



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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; solid waste management; climate change.

Recent Publications:

Byer, P., J.S. Yeomans and M. Lalani. 2004. *Addressing Climate Change Uncertainties in Project Environmental Assessments*. Research report to the Canadian Environmental Assessment Agency. 108 pages.

Tam, E.K.L. and P.H. Byer. 2004. Estimating the liability of redeveloped contaminated lands. *Journal of Urban Planning and Development (ASCE)*. (In press.)

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. Pages 313-317.

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Office: Department of Geography, 100 St. George St., U of T, M5S 3G3; tel: 416-978-1586; fax: 416-946-3886; chenj@geog.utoronto.ca; 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.
Full member, IES Graduate Faculty.

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 8-9)**.

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.

Liu, J., J. M. Chen, and J. Cihlar. 2003. Mapping evapotranspiration based on remote sensing: an application to Canada's landmass. *Water Resources Research* 39:1189-1200.

Chen, B., J. M.Chen, J. Liu, D. Chan, K. Higutchi, and A. Shashkov. 2003. A vertical diffusion scheme to estimate the atmospheric rectifier effect. *Journal of Geophysical Research* 109 D04306, doi:10.1029/2003JD03925.

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Office: Pollution Probe, 625 Church Street, Suite 402, Toronto, M4Y 2G1; tel: 416-926-1907, ext 236; fax: 416-926-1601; qchiotti@pollutionprobe.org; www.pollutionprobe.org
B.A. Hons. (Geography-Urban Studies), York; M.A. (Historical Geography), Queen's; Ph. D. (Geography), Western Ontario. Air Programme Director and Senior Scientist, Pollution Probe.
Associate Member, IES Graduate Faculty.
Instructor of IES 2002H *Environmental Governance in the New City of Toronto.*
Research Interests:
Transportation, air issues and human health; atmospheric change in the Toronto-Niagara Region; human health impacts from, and adaptation to, global environmental change; atmospheric change and the energy sector; transportation demand management.
Recent Publications:

Chiotti, Q., Maarouf, A., Basiji, A. and R. Bain. 2004. *Climate Change and the Energy Sector in the Toronto-Niagara Region: A report on impacts and adaptation options.* Prepared for the Adaptation and Impacts Research Group, and the Meteorological Service of Canada - Ontario Region. (In press.)

Chiotti, Q. and B. Mills. 2004. The Toronto-Niagara Region Assessment Framework: the importance of integrated mapping for environment and health. In D. MacIver (ed.) *Decoding Canada's Environmental Past: Integrated Mapping Assessments of Changing Vulnerability and Variability in Climate, Biodiversity, Land-use and Built Environments.* Environment Canada, Downsview. (In press.)

Keating, M., Chiotti, Q., Ogilvie, K. and D. Bell. 2004. *Moving Together: Towards a Healthier and More Sustainable Future*, a report from the Transportation, Air Issues and Human Health Conference, co-sponsored by Pollution Probe and the York Centre for Applied Sustainability, Toronto, Canada, April 28 and 29, 2003.

Miriam Diamond

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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

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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 modern 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.

A.P. Lino Grima

Office: Institute for Environmental Studies, Room 1048B, 33 Willcocks St., U of T; tel: 416-978-3486; fax: 416-978-3884; lino.grima@utoronto.ca; http://myprofile.cos.com/grima; mailing address on inner cover.

B.A. Hons. (Geography), Manchester; Dip. Ed., London; M.A. and Ph.D. (Geography), Toronto.
Associate Member, Geography and 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 5)**.

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* 5(3): 1-18.

Grima, A.P. 2001. Chapters: 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

Office: Department of Zoology, 25 Harbord St., U of T, M5S 3G5; tel: 416-978-5031, fax: 416-978-8532, 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. and R.I.C. Hansell. 2002. Development of White Spruce Tree islands in the shrub zone of the forest-tundra. *Arctic* 55(3):238-246.

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.

Ken Howard

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B.Sc. Hons.(Physics & Geography), Exeter; M.Sc. & Ph.D. (Hydrogeology), Birmingham. Professor, Dept. of Physical and Environmental Sciences, 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. 2004. Approaches to the evaluation and protection of groundwater and surface water in situations with competing uses. In Teaf, C. et al., (eds.) *Risk Assessment as a Tool for Environmental Decision-Making in Central Asia.* NATO Science Series IV Earth and Environmental Sciences, Kluwer. (In press.)

Sheng, Z., K.W.F. Howard, C. Otto, V. Ritchie, O. Sililo, and S. Appleyard. 2003. Sources, types, characteristics and investigation of urban groundwater pollutants. *International Contributions to Hydrogeology (IAH)* 24: 53-107.

Charles Jia

Office: Department of Chemical Engineering and Applied Chemistry, Room WB329, 200 College Street, U of T, M5S 3E5; 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:

P.K. Gbor and C.Q. Jia. 2004. Critical evaluation of coupling particle size distribution with the shrinking core model. *Chemical Engineering Science.* (In press.)

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* 42(16): 3731-3739.

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.

Andy Kenney

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B.Sc.F. (Forestry), Lakehead; M.Sc. (Environmental Biology), Guelph; Ph.D. (Forestry), Toronto.
Senior Lecturer and Coordinator of the Master of Forest Conservation Program, Forestry. IES Graduate Coordinator, Environmental Studies Graduate Program, 2001 to June 30, 2004.
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.

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.

Scott Mabury

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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:
Ellis, D.A., J.W. Martin, A.O. DeSilva, S.A. Mabury, M.D. Hurley, M.P. Sulbaek Andersen, T.J. Wallington. 2004. Degradation of fluorotelomer alcohols: a likely atmospheric source of perfluorinated carboxylic acids. *Environmental Science and Technology* 38: 3316-3321.

Dinglasan, M.J., Y. Ye, E. Edwards, and S. Mabury. 2004. Fluorotelomer alcohol biodegradation yields a suite of poly and perfluorinated acids. *Environmental Science and Technology* 38:2857-2864.

Lam, M.W., C.J. Young, S.M. Richards, K.R. Solomon, and S.A. Mabury. 2004. The aquatic persistence of 8 pharmaceuticals in outdoor microcosms monitored by HPLC-UV and LC-MS-MS using electrospray ionization. *Environmental Toxicology and Chemistry* 23:1431-1440.

Virginia Maclaren

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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 and Graduate Coordinator, Environmental Studies Program.**
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/Geography project *Waste-Econ in Vietnam, Laos and Cambodia* **(see pages 6-7)**. Reseach team member of IES/Geography/Forestry project *China's capacity for carbon sequestration* **(see pages 8-9).**

Recent Publications:
Maclaren, V.W. 2004. Waste management: integrated approaches. In Bruce Mitchell (ed.) *Resource Management and Development in Canada,* 3rd ed. Oxford University Press. Pages 371-397.

Maclaren, V.W. 2004. Urban sustainability reporting. In S.M.Wheeler and T. Beatley (eds.) *The Sustainable Urban Development Reader.* Routledge, New York, pages 203-210.

Nguyen Van Ha, S. Kant, and V.W. Maclaren. 2004. The contribution of social capital to household welfare in a Vietnamese paper recycling craft village. *Journal of Environment and Development* 13(3): 1-29.

Paul Muldoon

Office: Canadian Environmental Law Association, 130 Spadina Avenue, Suite 301, Toronto, Ontario, M5V 2L4; 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.

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

Office: Institute for Environmental Studies, Room 1048B, 33 Willcocks St. U of T; tel: 416-484-6551; fax: 416-978-3884; ted.munn@utoronto.ca; www.utoronto.ca/env/munn/munn.htm; mailing address 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; frequent reviewer of submissions to scientific journals and monographs: for example, Munn and P. Timmerman were the principal reviewers of an 1800-page first draft arctic climate impact assessment, sponsored by the International Arctic Science Committee of the Arctic Council.

Recent Publications:
Munn, R.E. and A. Maarouf. 2005. Bioclimatology. In J. Oliver (volume ed.) *Encyclopaedia of World Climates.* Kluwer, Dordrecht, The Netherlands. (In press.)

Maarouf, A. and R.E. Munn. 2005. 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. (2005) Gabe Csanady: Reminiscences of his 12 years in Canada 1961-1973, *Journal of Oceanography.* (In press.)

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

David Powell

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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

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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*.
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. *Knock on Wood: Nature as Commodity in Douglas-fir Country.* Routledge Press, New York, New York. (In press; expected Fall 2004; **see page 23**.)
Prudham, W.S. 2004. Poisoning the well: neo-liberalism and the contamination of municipal water in Walkerton, Ontario. *Geoforum* 35(3): 343-359.
Prudham, W.S. 2003. Taming trees: capital, science, and nature in Pacific Slope tree improvement. *Annals of the Association of American Geographers.* 93(3): 636-656.
Prudham, W.S. 2002. Regional science, political economy, and the environment. *Canadian Journal of Regional Science* 25(2): 171-206.

Stefan Salbach

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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:
Environmental management with special interests in pollution control and water resources management.

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. Volunteering with the Canadian Executive Service Organization (CESO), expert advice was provided as follows: in China, advice for pollution control options for a pulp and paper mill was provided; in Romania, advice was provided to several municipalities about their municipal waste treatment and the development of a municipal sewer use by-law; in Honduras, a needs assessment for municipal drinking water supplies was made.

Beth Savan

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

Research Interests:
Sustainability planning, climate change, environmental education; member of the Board of Directors of the Toronto Atmospheric Fund of the City of Toronto; Chair 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 5)** and of the IES project *Facilitating Best Practices in Community Based Research in Canada.* **(see page 9).**

Recent Publications:

Savan, B.I., C. Gore, A. Morgan. 2004. Shifts in environmental governance in Canada. *Environment and Planning C.* 23 pages. (In press.)
Savan, B.I. 2004. Campus and Community, 14 pages in P. McCarney (Ed.), *Creating Knowledge, Strengthening Nations.* University of Toronto Press. (In press.)
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* 8(3): 303-316.
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* 31(5): 561-568.

Frances Silverman

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B.Sc., M.Sc. (Physiology) and Ph.D. (Respiratory Physiology), McGill.
Associate Professor, Department of Medicine, Dept. of Public Health Sciences, Inst. of Medical Science, Faculty of Physical Education and Health.
IES Associate Director - Environment & Health. Director of IES' Collaborative Graduate Program in Environment 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:

Urch B., J.R. Brook, D. Wasserstein, R.D. Brook, S. Rajagopalan, S., P. Corey, F. Silverman. 2004. Relative contributions of PM2.5 chemical constituents to acute arterial vasoconstriction in humans. *Inhalation Toxicology* 16: 345-352.

Urch, B., D.N. Wasserstein, K.Z. Lukic, R.D. Brook, P.N. Corey, F.S. Silverman. 2004. Blood pressure (BP) and heart rate (HR) changes during controlled human exposures to concentrated ambient fine particles (CAP) and ozone. (A883) *American Journal of Respiratory and Critical Care Medicine*. Abstracts issue, April 2004.

Lesbia Smith

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lesbia.smith@sympatico.ca

B.Sc., City College of New York; M.D., State University of New York, Buffalo School of Medicine.
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:
Metal toxicology and metal exposure measures (arsenic, lead, mercury, nickel, aluminum) in occupational and community settings; community health studies addressing health impacts and biological measures of lowlevel environmental exposures.

Recent Publications:

Smith, L. and H. Phillips. 2002. *Arsenic in Drinking Water of Chapels Cove: Analysis, Risk Assessment and Public Health Response.* Prepared for SENES Consultants.

Lesbia F. Smith, L.F., H. Phillips, and M.T. Do. 2002. *Critical Review of the Epidemiology Literature on non-bladder cancer and Trihalomethanes.* Prepared for SENES Consultants.

Ingrid Leman Stefanovic

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B.A., M.A. and Ph.D (Philosophy), Toronto.
Associate Professor, Department of Philosophy.
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.
Full Member, IES Graduate Faculty.
Instructor of joint Political Science and IES course, JPV1201H *Politics, Bureaucracy and the Environment*.

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.) 2003. *Governance on the Ground: Innovations and Discontinuities in Cities of the Developing World.* Woodrow Wilson Center Press, Washington and Johns Hopkins University Press, Baltimore. 304 pages. **(See page 23.)**

Montgomery, M., R.E. Stren, B. Cohen and H. Reed. 2003. (authors and editors). 2003. *Cities Transformed. Demographic Change and its Implications in the Developing World.* National Academies Press, Washington. 552 pages. **(See page 23.)**

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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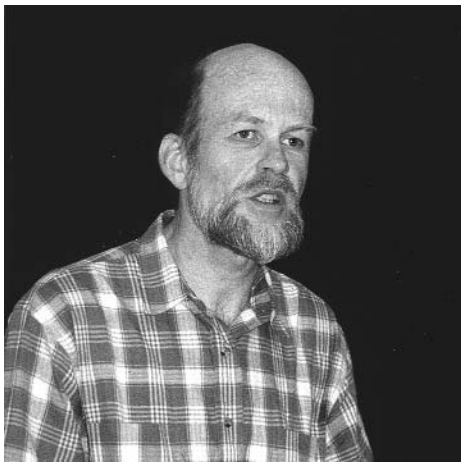
www.yorku.ca/fes
B.A., M.A., Toronto.
Assistant Professor and MES Co-ordinator, Faculty of Environmental Studies, York University.
Associate Member, IES Graduate Faculty.
Co-Instructor of IES 1002H *Environmental Management Case Studies*, 2003-04.

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. On the Steering Committee of a new interfaith environmental organization, the Canadian Forum on Religion and Ecology.

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.



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B.A.Sc., M.A.Sc., Ph.D (Mechanical Eng.), Waterloo.
From May 1, 2004: Associate Professor, Department of Civil Engineering and IES (formerly with Mechanical and Industrial Engineering); Director, Centre for Technology and Social Development.
Instructor of joint CIV and IES courses JEI 1901H *Technology, Society and the Environment I.*

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. 2005. *Living in the Labyrinth of Technology.* University of Toronto Press. (Forthcoming.)

Vanderburg, W.H. 2000. (2002, second printing). *The Labyrinth of Technology.* University of Toronto Press. 368 pages.

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.

Rodney White

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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 5)**. Research team member of IES projects *Waste-Econ in Vietnam, Laos and Cambodia* **(see pages 6-7)** and *China's Capacity for Carbon Sequestration* **(see pages 8-9)**.

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

Martin Whittaker

Office: Swiss Re Financial Services, 55 E. 52nd Street, New York, New York 10055, tel: 212-317-5106; fax: 212-317-5051; Martin_Whittaker@swissre.com www.swissre.com/emissions

B.Sc. (Hons) and M.Sc. (Analytical Chemistry), McGill; Ph.D. (Environmental Risk Assessment & Management), Edinburgh; M.B.A. (International Finance), London.
From June 1, 2004: Senior Vice President, Swiss Re Financial Services
Until May 31, 2004: Managing Director, Innovest Strategic Value Advisors, Toronto.
Associate Member, IES Graduate Faculty.
Instructor of IES 1707H *Environmental Finance: Risk Management and Business Opportunities*, 2003-04.

Research Interests:
Recently joined Swiss Re, working on fund development and risk management in the renewable energy and environmental commodity markets. Market trends and drivers in the energy, resource, clean technology and renewables sectors; carbon finance market; the sustainable and socially responsible investment community. Formerly led Innovest's research in the energy and mining sectors, and spearheaded the carbon finance and private equity activities.

Recent Publications:
Whittaker, M. 2003. *Carbon Finance and the Global Equity Markets*. Carbon Disclosure Project Secretariat, London. 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.

Mark Winfield

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B.A., M.A., Ph.D. (Political Sci.), Toronto.
Director, Pembina Institute's Environmental Governance Program.
Instructor, Division of the Environment.
Associate Member, IES Graduate Faculty.
Co-Instructor of IES 1002H *Environmental Management Case Studies*.

Research Interests:
Formerly Director of Research with the Canadian Institute for Environmental Law and Policy. Smart growth, urban sustainability and electricity policy in Ontario; environmental policy issues, including toxic substances and hazardous waste management, drinking water protection, biotechnology regulation, federalism and the environment, and the relationship between international trade and environmental agreements.

Recent Publications:
Winfield M. 2003. Pollutant release and transfer inventories in North America, in D. Markell and J. Knox, *The North American Commission for Environmental Co-operation: Progress to Date, Prospects for the Future, and Lessons for Regional Governance.* Stanford University Press. Pages 38-56.
Winfield, M., D. Whorley, and S. Kaufman. 2002. Public safety in private hands: a study of Ontario's technical standards and safety authority. *Canadian Public Administration*, 45(1): 24-51.
Winfield, M. 2001. Environmental policy and federalism, in H. Bakvis and G. Skogstad, eds., *Canadian Federalism: Performance, Effectiveness and Legitimacy.* Oxford University Press, Toronto. Pages 124-137.

The Adaptation and Impacts Research Group of the Meteorological Service of Canada have a collaborative agreement with IES. Profiled on pages 21-22 are the Director of AIRG, Don MacIver, and members of AIRG with offices at IES. See page 10 for further details.

AIRG

Brad Bass

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B.A. (Geography), Toronto; M.Sc. and Ph.D. (Geography), Penn State. Researcher, Adaptation and Impacts Research Group, Meteorological Service of Canada, Environment Canada **(page 10)**. Associate Member, IES Graduate Faculty. From January 2003 to January 2004, during leave from AIRG: Manager, Trends and Innovations, Smart Growth Secretariat, Ontario Ministry of Municipal Affairs and Housing.

Research Interests:
The role of complexity and non-linear processes in adaptation; simulating adaptation with anticipatory computing; ecological engineering adaptations to atmospheric change including vertical gardens, green roofs and living machines. **(Also see page 10.)**

Recent Publications:

Hu Z, B. Bass, C. Chang and G. Huang. 2004. An innovative approach for visualization of subsurface soil properties. *Canadian Journal of Soil Science* 84(1): 63-70.

Suh, N, B. Bass, E. Chan and N. Toller. 2004. Emergent computation and modelling: Complex Organization and Bifurcation Within Environmental Bounds (COBWEB). *Journal of Environmental Informatics*. (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.

David Etkin

Office: Institute for Environmental Studies, Room 3040, 33 Willcocks St., U of T; tel: 416-978-6310; fax: 416-978-3884; d.etkin@utoronto.ca; www.msc-smc.ec.gc.ca/airg; mailing address on inner cover.

B.Sc. and M.Sc., York; B.Ed., Toronto. Natural Hazards and Risk Analyst, Adaptation and Impacts Research Group, Meteorological Service of Canada, Environment Canada **(page 10)**. 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 10.)**

Recent Publications:

Etkin, D. and I.L. Stefanovic. 2004. Mitigating natural disasters: the role of eco-ethics. *Mitigation and Adaptation Strategies for Global Change.* (In press.)

Etkin, D., E. Haque, L. Bellisario, and I. Burton. 2004. An Assessment of Natural Hazards and Disasters in Canada - A Report for Decision-makers and Practitioners. The Canadian Natural Hazards Assessment Project (ISBN #0-9735436-4).

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, pages 75-92.

Etkin, D., Haque, E. and Brooks, G. (eds.). 2003. *An Assessment of Natural Hazards and Disasters in Canada.* Special issue of *Natural Hazards* 28 (2-3). Kluwer, The Netherlands.

Grace Koshida

Office: Institute for Environmental Studies, Room 3046, 33 Willcocks St., U of T; tel: 416-978-0309; fax: 416-978-3884; grace.koshida@ec.gc.ca; www.msc-smc.ec.gc.ca/airg; mailing address on inner cover.

B.E.S. (Geography), Waterloo; Researcher, Adaptation and Impacts Research Group, Meteorological Service of Canada, Environment Canada **(page 10)**.

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. **(Also see page 10.)**

Recent Publications:

Bonsal, B., G. Koshida, E.G. O'Brien and E. Wheaton. 2004. Droughts, pages 19-26 in *Threats to Water Availability in Canada.* National Water Research Institute, Burlington, Ontario. NWRI Scientific Assessment Report Series No. 3 and ACSD Science Assessment Series No. 1.

Koshida, G. 2003. *Climate, Nature, People: Indicators of Canada's Changing Climate.* Canadian Council of Ministers of the Environment (CCME), Winnipeg, Manitoba. 45 pages.

AIRG

The Adaptation and Impacts Research Group of the Meteorological Service of Canada have a collaborative agreement with IES. Profiled on pages 21-22 are the Director of AIRG, Don MacIver, and members of AIRG with offices at IES. See page 10 for further details.

Don MacIver

Office: Adaptation and Impacts Research Group, Meteorological Service of Canada, 4905 Dufferin St., Downsview, M3H 5T4; tel: 416-739-4436; fax: 416-739-4297; don.maciver@ec.gc.ca; www.msc-smc.ec.gc.ca/airg

B.Sc. (Physics and Geography), Western Ontario; M.Sc. (Meteorology), Alberta. Acting Director, Adaptation and Impacts Research Group, Meteorological Service of Canada, Environment Canada **(page 10)**.

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Research Interests:

Integrated air issues, biometeorology and biodiversity (a Canadian representative for the Convention on Biological Diversity), high impact weather and atmospheric hazards, coastal zones impacts and adaptation, climate change scenarios, forestry and agriculture, water resources, municipal decision making. **(Also see page 10.)**

Recent Publications:

MacIver, D.C. and E. Wheaton. 2003. Forest biodiversity: adapting to a changing climate. World Forestry Congress, Quebec City. (In press.)

Auld H., D.C. MacIver, N. Urquizo and A. Fenech. 2002. Biometeorology and adaptation guidelines for country studies. Proceedings of the International Society of Biometeorology(AMS), Kansas City, U.S.

MacIver D.C., N. Urquizo and H. Auld. 2002. Biometeorology and adaptation in the context of climate Change and biodiversity. Proceedings of the International Society of Biometeorology (AMS), Kansas City, U.S., plus (CD-ROM)

Auld H., D.C. MacIver and J. Klaassen. 2002. Heavy precipitation and waterborne disease outbreaks: the Walkerton example. Proceedings of the International Water and Health Conference, Ottawa, Canada.

Monirul Mirza

Office: Institute for Environmental Studies, Room 3041, 33 Willcocks St., U of T; tel: 416-978-6201; fax: 416-978-3884; monirul.mirza@utoronto.ca; www.msc-smc.ec.gc.ca/airg; mailing address on inner cover.

B.Sc.Eng., M.Sc.Eng., Bangladesh U. of Engineering & Technology; Ph.D., Waikato, New Zealand. Professional Engineer, Ontario.
Researcher, Adaptation and Impacts Research Group, Meteorological Service of Canada, Environment Canada **(page 10)**. 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 10.)**

Recent Publications:

Mirza, M.M.Q. (ed.) 2004. *The Ganges water diversion: environmental effects and implications.* Kluwer Academic Publishers, Dordrecht, the Netherlands. (In Press).

Mirza, M.M.Q. 2003. Climate change and extreme weather events: can developing countries adapt? *Climate Policy.* 3: 233-248.

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.

Marie Sanderson

Office: Institute for Environmental Studies, Room 1049, 33 Willcocks St., U of T; tel: 416-978-5665; marie.sanderson@utoronto.ca; mailing address on inner cover.

B.A. (Hons.), Toronto; M.A. (Geography) Maryland; Ph.D. (Geography), Michigan. Guest scientist/researcher, Adaptation and Impacts Research Group, Meteorological Service of Canada, Environment Canada **(page 10)**. Associate Member, IES Graduate Faculty.

Research Interests:

Climate change and water; geographic biographies. She served as Editor of the Canadian Water Resources Journal, a refereed quarterly publication of the Canadian Water Resources Association, for nine years (until December 2003).

Recent Publications:

Sanderson, M. 2004. *Weather and Climate in Southern Ontario.* Geography Publication Series. Department of Geography, University of Waterloo. 120 pages. (In press; expected Sept, 2004; **see page 23.)**

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.* Department of Geography, University of Toronto. 144 pages.

NEW BOOKS & CD-ROM

The following are recent books by some of IES' graduate faculty. Also included is a recent CD-ROM featuring results of the completed IES project on sustainable water management in China.

Montgomery, M. , R.E. STREN, B. Cohen, H. Reed (eds.). 2003. ***Cities Transformed: Demographic Change and Its Implications in the Developing World.*** **National Academies Press, Washington, D.C. 552 pages. (www.nap.edu)**
Virtually all of the growth in the world's population for the fore-seeable future will take place in the cities and towns of the developing world. The benefits from urbanization cannot be overlooked, but the speed and sheer scale of this transformation present many challenges. A new cast of policy makers is emerging to take up the many responsibilities of urban governance -- as many national governments decentralize and devolve their functions. Programs in poverty, health, education, and public services are increasingly being deposited in the laps of untested municipal regional governments. Drawing from a wide variety of data sources, including DHS surveys, censuses and other local studies, this book explores the implications of various urban contexts for marriage, fertility, health, schooling, and children's lives. It should be of interest to all involved in city-level research, policy, planning and investment decisions.
Mark Montgomery *is a Professor, Dept. of Economics, State University of New York, Stony Brook;* ***Richard Stren*** *is a Professor, Dept. of Political Science, University of Toronto* ***(see page 19)****;* ***Barney Cohen*** *and* ***Holly Reed*** *are Director and Program Officer, respectively, of the National Academies' Committee on Population.*

MCCARNEY, P.L. and R.E. STREN (eds.). 2003. ***Governance on the Ground: Innovations and Discontinuities in Cities of the Developing World.*** **Johns Hopkins University Press, Baltimore. 304 pages. (www.press.jhu.edu/)**
This book describes people at a local level working through municipal institutions to take more responsibility for their own lives and environment. This study reports what social scientists in eight local networks found when they chose their own subjects for a worldwide comparative study of institutional reform at the local level. The book is the culminating product of the Global Urban Research Initiative, a major 10-year research effort that created a worldwide network of some 400 social scientists. The topics covered include fiscal innovation, infrastructure projects, social development, housing, harbour development, and political party participation. Material comes from Chile, Colombia, Mexico, Brazil, Sudan, Zimbabwe, South Africa, Lebanon, Israel, Egypt, Bangladesh, India, Vietnam, Indonesia, Thailand, and the Philippines. All chapters present governance at a local level in a period characterized by decentralization and democratization, when many governments were improving local accountability and transparency and people were actively participating in public forums, especially through institutions of civil society. While cautiously optimistic for the future, authors show concern for potential traps and obstacles that lie in the way of demonstrably better living conditions for the majority of poor people living in many of the cities reported.
Patricia McCarney *and* ***Richard Stren*** *are Asscociate Professor and Professor, respectively, Dept. of Political Science, U of T.*

O'SULLIVAN, E. and M. Taylor (eds.) 2004. ***Learning Toward an Ecological Consciousness: Selected Transformative Practices.*** **Palgrave Macmillan. 272 pages.**
This book highlights the pedagogical practices that foster transformation from our current way of thinking about our place in the world to an underlying ecological way of seeing and acting. It offers a selection of transformative practices that demonstrate, in specific contexts, the complex journey and contextual conditions that move us towards a deeper realization that we are part of the world around us, holding a greater promise for deeper ecological awareness. Thirteen chapters offer a rich array of practices in diverse life settings -- educational environments, communities and workplaces and personal relationships, representing a range of cultures, work settings and professions.
Edmund O'Sullivan *is a Professor with the Transformative Learning Centre at the Ontario Institute for Studies on Education (OISE), U of T.;* ***Marilyn Taylor*** *is a Professor of Social Policy, University of Brighton.*

Leaf, M. and D. Yeung (eds.). 2003. ***Sustainable Water Resources Management in the Beijing-Tianjin Region*** **(CD-ROM). Centre for Human Settlements, University of British Columbia.** This CD-ROM contains the collective output of the CIDA-funded project *Sustainable Water Resources Management in the Beijing-Tianjin Region*, a research consortium of seven Canadian and Chinese universities, including the University of Toronto. Sub-projects included: water supply and treatment and water pricing; demand estimation and forecasting; institutional analysis; environmental impact assessment; and GIS. The U of T team was comprised of faculty and students from Geography, IES, and Civil Engineering, including **Barry Adams** (Civil Engineering), **Lino Grima** and **Rodney White** (Geography and IES), **Alana Boland** (Geography), **Chris Kennedy** (Civil Engineering) and **Elisa Tseng** (Geography Ph.D. candidate). **The project's website is: www.chs.ubc.ca/china/index.html**
For copies, please contact Karen Zeller, zeller@interchange.ubc.ca or Mona El-Haddad, m.elhaddad@utoronto.ca.
Michael Leaf *is the Project Director, Centre for Human Settlements, UBC.*

FORTHCOMING:

PRUDHAM, W.S. 2004. ***Knock on Wood: Nature as Commodity in Douglas-fir Country.*** **Routledge Press, New York, New York.**
(In press; expected Fall, 2004.)
The book examines the relationship between old-growth, temperate rain forests of the US Pacific Northwest on the one hand, and the human economic uses of this unique and compelling landscape on the other. It emphasises the ways that interactions between socio-economic and biophysical factors shape distinct historical and geographical patterns in wood commodity production, forest regulation, and forest politics. It explores the historical geography of capitalist wood commodity manufacture, propelling liquidation of the old-growth forests of the region and creating the conditions under which new ways of thinking about and regulating forests have emerged. The spotted owl controversy is examined as a highly significant and poignant example of conflict arising as a result of making commodities from nature.
W. Scott Prudham *is an Asst. Professor, Dept. of Geography and IES, U of T* ***(see page 17).***

SANDERSON, M. 2004. ***Weather and Climate in Southern Ontario.*** **Geography Publication Series. Department of Geography, University of Waterloo. 120 pages. (In press; expected Sept, 2004.)**
This book 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). It includes data on temperature, precipitation, wind and sunshine, as well as information on extreme events such as tornadoes, ice storms and floods. It includes 36 illustrations, plus a chapter on "Weather disasters" by **David Phillips**, Senior Climatologist at Environment Canada.
For copies, please contact: Kate Evans, Department of Geography, University of Waterloo; cost is $20 plus GST & postage/handling; (519) 888-4567 x 3278; bkevans@fes.uwaterloo.ca.
Marie Sanderson *is a Guest Researcher with the Adaptation and Impacts Research Group, Meteorological Service of Canada, at IES, U of T* ***(see page 22).***

Graduate Environmental Students' Association active on and off campus

By Tanya Labencki, GESA President

The online election of the new executive of the Graduate Environmental Students' Association (GESA) marked the start of a new academic year filled with new initiatives and activities. In September 2003, the new executive was selected with both returning and new students filling the roster:

- *President*: **Tanya Labencki**, M.Sc. student, Geography/IES Environmental Studies Program;
- *Vice-President & U of T Environmental Resource Network (UTERN) Rep*: **Satyendra Bhavsar**, Ph.D. student, Chemical Engineering/Environmental Engineering
- *Communications Director and Environmental Protection Advisory Committee Rep*: **Anthony Liu**, Ph.D. student, Physics/IES Environmental Studies Program;
- *Social Director & Environment & Health Rep*: **Shelby Yamamoto**, M.Sc. student, Public Health Sciences/IES Environment and Health Program;
- *Treasurer*: **Nadia Hernandez Martinez**, M.A.Sc. student, Chemical Engineering/Environmental Engineering;
- *Environmental Engineering Rep*: **Harshan Radhakrishnan**, M.A.Sc. student, Chemical Engineering/Environmental Engineering; and
- *Members-at-large*: **Robert Aurich**, **Tarek Ayash**, **Kim Beazley**, **Nilima Gandhi**, **Sarah Gewurtz**.

Orientation Sessions

To start off the year, GESA began by taking an active part at IES' orientation session on September 5, 2003. **Tanya Labencki** and former President **Heather Jones-Otazo** gave a presentation on GESA to incoming students, followed by great food which was enjoyed by all. Many thanks to **Robert Aurich** for barbequing some great burgers. As well, **Satyendra Bhavsar** and **Nilima Gandhi** presented information on GESA to incoming students at the environmental engineering orientation session.

Two library information sessions were also organized by GESA: one for IES students, organized by **Tanya Labencki** and another for environmental engineering students, organized by **Satyendra Bhavsar** and **Harshan Radhakrishnan**.

U of T Environmental Events

GESA currently acts as a liaison body improving communication between environmental students, staff and faculty here at the University of Toronto. This year, in addition, GESA aimed to build on previous years' events by becoming more active in addressing environmental issues both on and off campus. For example, GESA now has representatives on the Environmental Protection Advisory Committee (EPAC) and the U of T Environmental Resource Network (UTERN): **Anthony Liu** and **Satyendra Bhavsar**, respectively.

In the spring of 2004, GESA endorsed EPAC's Greenhouse Gas Reduction Plan, and will help bring this plan to the University of Toronto community at large in the future.

GESA was also involved in U of T's Environment Week held in March 2004. **Sarah Gewurtz** (GESA member-at-large), sat on the Student Administrative Council's (SAC) Environment Week committee. Also, **Tanya Labencki**, **Nadia Hernandez**, **Shelby Yamamoto** and **Sarah Gewurtz** all participated in running a GESA information booth on Activism Day in the Bahen Centre on March 12, 2004. Environment Week was preceeded by GESA's largest annual event on March 3, 2004: Environmental Career Day **(please see article on page 25).**

Parties

On October 31, 2003, GESA hosted a Halloween Party complete with a scary movie and pumpkin carving. The event was organized by **Shelby Yamamoto** and **Satyendra Bhavsar** to introduce GESA members to their executive.

On January 8 and May 14, 2004, the GESA executive held their annual Winter Holiday Party and Spring Party, respectively. Both

Social gatherings were only some of the activities organized by the GESA executive, as they aimed to be more active with regards to environmental issues on campus.
LEFT: Members of GESA celebrate Halloween in October 2003 party. Left to right: Harshan Radhakrishnan, Vishnu Radhakrishnan, Nilima Gandhi, Shelby Yamamoto, Nadia Hernandez Martinez, Tanya Labencki, scary Halloween guy (Satyendra Bhavsar), and Heather Jones-Otazo.
RIGHT: November 2003 potluck dinner at Hart House Farm. Left to right: Rosa Wu, Ellen Wu, Sarah Gewurtz, Vishnu Radhakrishnan, Harshan Radhakrishnan, Nilima Gandhi, Satyendra Bhavsar, Stuart Storey, Chris Clark.

Tanya Labencki

parties proved yet again to be very popular events among graduate environmental students, staff and faculty. Everyone enjoyed catching up with fellow members of U of T's environmental community, as well as snacking on some delicious treats and winning some terrific free door prizes.

Outdoor Pursuits and WWF CN Tower Climb

On November 22-23, 2003, GESA held an overnight retreat for its members at Hart House Farm. Organized by **Tanya Labencki**, ten GESA members spent two days at the farm hiking on the Bruce Trail, exploring caves along the Niagara Escarpment, eating delicious food at a pot-luck dinner, and playing detective in a few rounds of a murder-mystery game. Like always, everyone enjoyed their time away at the farm and getting to know their fellow environmental graduate students.

More recently, GESA members exercised their climbing power and fundraising abilities in World Wildlife Fund Canada's annual CN Tower Climb. On April 22, 2004, GESA members **Tanya Labencki** and **Craig Butt** and guests **Andrea Harding** and **Darryl Vaz** entered the team challenge raising over $700 for WWF, and placing 37th overall in the co-ed category with an average team climb time of 20 minutes, 27 seconds. On April 24, **Sarah Gewurtz** and **Shelby Yamamoto** participated in the public climb, finishing with lightning fast speed in 16 minutes and 23 minutes, respectively. All participants had fun and raised a great deal of money for a great charity, and it is hoped that this event will become a GESA tradition in future years.

GESA activities do not stop during the summer months. A camping trip planned for August.

Upcoming Activities, Fall 2004

Please keep your eye on student listserve postings of IES and the Division of Environmental Engineering, as well as the GESA website: **(www.utoronto.ca/env/ies/gesa/)**. Towards the end of summer, GESA will be recruiting new and returning members to join the Executive. **GESA will also be involved in IES' Orientation on September 10, 2004 and would like some help from returning students to help plan this event and welcome new students.**

Tanya Labencki

Graduate environmental community enjoying conversation and delicious treats at a spring GESA party.

For information on GESA and its activities, please visit www.utoronto.ca/env/ies/gesa, or email gesa.ies@utoronto.ca.

Environmental Career Day has record attendance

By Tanya Labencki

On March 3rd, 2004, the University of Toronto held its third annual Environmental Career Day at Hart House. This very successful event took many months of planning by a steering committee, which this year included representatives from the Graduate Environmental Students Association (GESA), Institute for Environmental Studies (IES), Division of the Environment, Toronto Undergraduate Geography Society, Innis College's Environmental Studies Program, and the Division of Environmental Engineering.

Following from last year's success, all registered university and community college students from southern Ontario with valid student ID were invited to attend.

The day began with the morning session's Speakers Series. Opening remarks were given by **Rodney White** (Director, IES), followed by six fantastic talks from a diverse set of speakers: **John Ferguson**, Environmental Commissioner of Ontario; **Andy Kenney**, Faculty of Forestry, University of Toronto; **John Murphy**, Resource Environmental Limited; **Ray Clement**, Ministry of the Environment; **Liz Lundy**, World Wildlife Fund; and **Michael Mesure**, Fatal Light Awareness Program. All speakers were highly enthusiastic about their career choice, which was received by the attending students as career advice in itself. Several of the speakers reiterated that any difficulties they experienced in attaining a career in the environmental field were greatly outweighed by job satisfaction they found in the end! The morning session finished with closing remarks by **Phil Byer,** Chair of the Division of Environmental Engineering.

An invitation-only lunch was held for the speakers, exhibitors, organizing committee, volunteers and select students. Shortly thereafter, the afternoon session promptly began at 1:30 p.m. with a flurry of students entering the Great Hall for the Environmental Exposition. Twenty-five exhibitors from government, consulting and environmental non-governmental organizations were in attendance, providing students with potential career and summer job opportunities, volunteer experience and important career advice. The day ended with an evening reception, with opening remarks given by **Michael Marrus**, then Dean of the School of Graduate Studies.

This year, Environmental Career Day had a record attendance of a total of 345 student registrations. It could not have been possible without the dedication of the organizing committee and volunteers, as well as funding generously provided by the Department of Geography, Division of the Environment, Division of Environmental Engineering, Faculty of Arts and Science, Institute for Environmental Studies, Office of the Vice-President and Provost, School of Graduate Studies and Students' Administrative Council.

For more information, please visit www.utoronto.ca/env/careerday2004/

Tanya Labencki is President of GESA.

GRADUATE STUDENTS

A brief glimpse of the research conducted by some of IES' graduate students.
Featured are abstracts from their presentations at IES Research Day held April 16, 2004.

Tanya Labencki

M.Sc. candidate, Geography/IES Environmental Studies Program

Characterization of washoff from atmospheric deposition on urban impervious surfaces

By Tanya Labencki

The urban environment has elevated levels of contaminants in all media, stormwater being no exception. Many of the contaminants found in urban stormwater originate from sources other than those traditionally associated with high contaminant loads such as roadways. An organic film on urban impervious surfaces accumulates atmospherically derived gas- and particle-phase contaminants beyond that found with "clean" surfaces. The contaminants in the film are then washed-off with precipitation.

This study examines wash-off from impervious (urban) surfaces (e.g. glass, polyvinyl chloride, metal, asphalt, teflon, brick). Preliminary data show that the polycyclic aromatic hydrocarbons (PAH) washed from these surfaces are similar to those found in the organic film and in urban air. PAH wash-off profiles are also indicative of a fossil fuel combustion signature. Wash-off occurs independently of chemical solubility, which may be attributable to the high concentration of polar organics in the film and mechanical removal. Thus, the organic film on all impervious surfaces effectively concentrates atmospherically deposited contaminants and conveys them to urban surface waters. This research points to the importance of atmospheric deposition as a contributor to stormwater loads and the role of organic films as mediators of wash-off, in addition to direct emissions to roadways.

Tanya Labencki obtained an Honours B.Sc. in the Environmental Science Co-op Program at McMaster University in 2002, and worked in both the government and private sectors towards her degree. She is currently a M.Sc. candidate in the Department of Geography and IES' Environmental Studies collaborative program and the current president of the Graduate Environmental Students' Association **(see pages 24-25)**. She also volunteers through the Fatal Light Awareness Program (FLAP) rescuing injured migratory birds from office tower collisions. She was the recipient of two IES awards in 2003-04: the George Burwash Langford Prize and the Arthur and Sonia Labatt Fellowship **(see page 31).** Her Master's supervisor is **Miriam Diamond** of Geography.

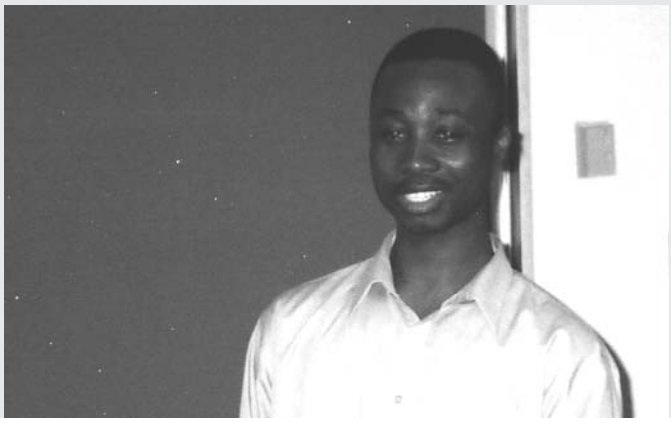
Ernest Opoku-Boateng

Ph.D. candidate, Department of Geography/IES Environmental Studies Program

Urban environmental finance in Canada: an analysis of opportunities and barriers to action

By Ernest Opoku-Boateng

In the last few decades upper tier governments have given Canadian cities more responsibilities, but no commensurate financial powers. This, coupled with the growing complexity of urban environmental problems and declining intergovernmental transfers, mean that cities' ability to pay for environmental services like water and solid waste is becoming weaker. Against this background, policymakers and researchers alike have called for a review of current strategies for financing urban environmental services and programmes, focusing more on appropriate pricing and the use of market-based instruments and incentives to encourage responsible resource use as well mobilize resources for environmental protection. Questions however still remain as to what opportunities actually exist in Canadian cities to apply these instruments and what challenges would have to be overcome in order to be successful.



Using the concept of environmental finance as a framework of analysis, this thesis examines the opportunities for and the barriers to the adoption of market-based financial instruments to achieve higher environmental standards in Canadian cities within the context of an ecological modernization process.

Ernest Opoku-Boateng obtained a First Class Honours degree in Geography and Resource Development from the University of Ghana. He then worked in the same institution as a teaching and research assistant attached to the "Population Impact Project" (an outfit that assesses population/environment interrelationships and adolescent reproductive health issues in Ghana). He has also worked as a natural hazards research assistant for Meteorological Service of Canada's Adaptation Impacts Research Group (AIRG) at U of T. Having recently completed his third year towards a Ph.D. in the Department of Geography and IES' Environmental Studies collaborative program, his research interests include climate change, urban environmental finance and planning in developed and developing countries, as well as natural disaster management. His Ph.D. supervisor is **Rodney White** of Geography and IES.

Anthony Liu

Ph.D. candidate, Department of Physics/
IES Environmental Studies Program

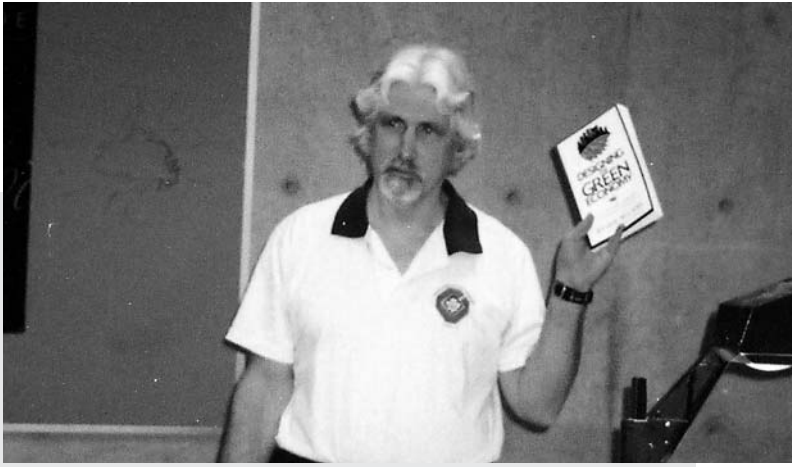
Impact of excessive rainfall on waterborne diseases in Southern Ontario: the Walkerton case

By Anthony Liu

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 the Walkerton area of southern Ontario.

The five-day cumulative rainfall, beginning with four days of 10-20 mm rainfall each day, followed on the fifth day by a 70 mm rainfall were 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 recent study across the United States by Curriero et al. published in the *American Journal of Public Health* (August 2001, 91: 1194 - 1199), identified that in more than 51% of the cases, there was a direct relationship between the upper 10th percentile threshold for extreme precipitation events and waterborne diseases. Using a similar approach, this study revealed that the five-day cumulative rainfall amounts exceeded both the 90th percentile, and the 2 standard deviation, of the 30-year rainfall mean for Walkerton. In the future, it may be possible to use the combination of quantitative precipitation forecasts, measured cumulative precipitation amounts, and identified precipitation thresholds, such as the upper 10th percentile for cumulative rainfall, to develop a WellHead Protection Alert System (WellPAS) that could provide advisories in advance of the risk of excessive rainfall. Co-authors of this study are: **Don MacIver**, **Heather Auld**, **Joan Klaasan** and **Adam Fenech** of the Meteorological Service of Canada and **Roger Hansell** of Zoology and IES.

Anthony Q. Liu is a Ph.D. candidate in the Atmospheric Science Program at the Department of Physics and IES' Environmental Studies collaborative program. His research focuses on severe winter weather over southern Ontario, under the supevision of **Kent Moore**. He also studies impacts and adaptations associated with severe weather and climate change in urban environments. He was the recipient of the IES Arthur and Sonia Labatt Fellowship in 2002-03 and 2003-04. He worked as a visiting scientist at the University of Toronto supported by both the Chinese government and U of T from 1999 to 2000. Before that he worked as a lecturer at the Faculty of Environment Studies, Ocean University of China.



Brian Milani

Ph.D. candidate, Adult Education, Community Development and Counselling Psychology (OISE/UT)/
IES Environmental Studies Program

Building materials in a green economy: community-based strategies for dematerialization

By Brian Milani

Creating a green economy is not just about environmental protection, but establishing ecological alternatives in every sector of the economy that move benignly with natural process, while regenerating communities and ecosystems. Cutting-edge thinking on green development recognizes there would be two key dimensions to creating ecological economies: 1. creating cyclical "closed loop" materials and energy flows, and
2. gearing production toward service (i.e. directly meeting human and environmental need) rather than material output.

The built-environment can be a strategic fulcrum for green economic conversion in society as a whole, since it is responsible for perhaps forty percent of the economy's materials and energy throughput, and has great potential impacts in extraction, manufacturing and waste management.

This thesis surveys the many dimensions involved in transforming materials use in buildings to create a closed-loop service-oriented building industry. It includes chapters on, respectively, the evaluation, production, consumption, recycling, and regulation of building materials. It attempts to explore potentials in these areas by simultaneously reviewing the practical initiatives already taking place in green building --including life-cycle analysis, green building assessment, eco-labelling, eco-industrial development, design-for-disassembly, deconstruction services, natural building and alternative materials, product stewardship, extended producer responsibility, building code reform, green procurement, collective consumerism, and green market creation (to mention just a few). How can these many fronts be combined and coordinated to really green the building industry and create healthy sustainable communities?

Brian Milani is a former carpenter and green builder who teaches and writes on green economics and community development. A longtime environmental and labour activist, he has been involved with the Coalition for a Green Economy for over ten years. He is the author of *Designing the Green Economy: the Postindustrial Alternative to Corporate Globalization* (Rowman & Littlefield, 2000), and has taught in Business and Environment (graduate) and Business and Society (undergraduate) programmes at York University. He expects to complete his doctoral thesis at OISE/UT's Department of Adult Education and IES' Environmental Studies collaborative program in the fall of 2004. His supervisor is **Edmund O'Sullivan of OISE/UT.** His website is at www.greeneconomics.net.

Shehrina Tabassum

M.Sc. candidate, Institute of Medical Sciences/
IES Environment and Health Program

Symptomatic responses in studies of controlled human exposures to concentrated ambient fine particles (CAP) and/or ozone (O_3)

By Shehrina Tabassum

Fine particles and O_3 have been associated with an increase in respiratory morbidity. The objective was to determine symptom responses with exposures to CAP and/or O_3. In a controlled human exposure study, 18 mild asthmatics and 44 non-asthmatic non-smokers aged 21-34 were exposed to filtered air (FA) and CAP (mean ± SD, 139 ± 30 g/m3) for 2 hours with half receiving O_3 (120 ppb). Subjects were asked to list any symptoms that occurred during exposure and record their severity on a 1 (trace) to 5 (incapacitating) scale. Symptoms during exposure were also assessed by questionnaire administered post exposure that included 35 symptoms, using the same 1-5 rating scale. In addition, subjects were asked to subjectively rate the overall severity of each exposure on a scale of 0 (no perceived exposure) to 100 (incapacitating), as well as if they thought they were exposed to a pollutant.

The data shows that if subjects reported they were exposed to a pollutant they also reported a greater number of symptoms during CAP exposures ($P = 0.001$), O_3 ($P = 0.01$) and CAP+O_3 ($P = 0.0003$), and a higher exposure severity rating for CAP ($P=0.009$), compared to those who reported that they were not exposed or did not know. There were no significant differences in the number of symptoms reported or the exposure severity rating for asthmatics compared to non-asthmatics. This data suggests a relationship between subjective perception of pollutant(s) exposure and symptoms reporting that merits further study.

Shehrina Tabassum is a M.Sc. student enrolled in the Institute of Medical Sciences in the Environment and Health collaborative program. Her research is conducted at the Gage Occupational and Environmental Health Unit under the supervision of **Frances Silverman**. She graduated with a B.Sc. degree in environmental science from Bangladesh, interned at the Asian Development Bank and worked as a Program Officer at the World Conservation Union-Bangladesh chapter. She is also currently working part-time as the Program Assistant at the Sustainability Network. Prior to going back to school for her M.Sc., Shehrina spent two years as Researcher and Volunteer Coordinator for Environmental Defence Canada.

Luciana Sivertson

Ph.D. candidate, Department of Anthropology/
IES Environmental Studies Program

Multi level watershed management in the Sibun River Bio-Region, Belize, Central America: collaboration and challenges

By Luciana Sivertson

Based on recent ethnographic fieldwork in Belize, Central America, this research focuses on multi-level watershed management of the Sibun River Bio-Region with a particular focus on Armenia Village and the challenges encountered with collaborative efforts.

In Belize, there are several levels at which watershed approaches have been initiated. These are most notably the national level, the international non-governmental organization level, the community based non-governmental organization level, and the local village level. Focusing on broad based policy development, watershed approaches towards water conservation and biodiversity at the national level are relatively new to the Belize natural resource and environment scene. The international level has played a significant role in influencing watershed policy. At the community based level, the Sibun River Watershed Association, established in 1997, is currently active in the water conservation field. At the local level, primary efforts have concentrated on the development of a water project to provide safe and efficient access to water in the village.

Currently, in the village, there is limited access to clean and plentiful water sources. Belize is a fruitful research area for natural resource studies. Although there is some consensus on the basic concept of a watershed approach to managing natural resources, there are numerous challenges with collaboration at the different levels. There are varying priorities and varying definitions of a watershed approach. Finally, there is limited in-depth information on village needs, such as land use activities, water use needs, and cultural perceptions of resource use.

Luciana Sivertson is a Ph.D. candidate in Anthropology and IES' Environmental Studies collaborative program. She lived in Belize, Central America for a year and a half while conducting the above doctoral fieldwork. Her research interests include human ecology, land use studies, political ecology, policy and scientific applications to environmental management, community based watershed initiatives, and water quality monitoring. She has co-authored several government reports and contributes articles to the *Sibun Watershed News*, a bi-monthly watershed news publication in Belize. Most recently, Luciana is co-authoring a paper titled "Armenia Village as a land of refuge and hope: local stories link oral history with change", which will appear in *The Journal of Belizean Studies*. Her Ph.D. supervisor is **Krystyna Sieciechowicz** of Anthropology.

2003-04 Graduates

Congratulations to the following students who graduated from one of IES' two collaborative graduate programs in 2003-04.

Environmental Studies Program

Eric Dunbar, M.Sc. graduate November 2003, Botany/IES; supervisor: James Eckenwalder, Botany.
The differential population success of two non-indigenous elms (Ulmus pumila and U. glabra) introduced into river valleys in Toronto, Canada.

Angela Loder, M.A. graduate November 2003, Political Science/IES; supervisor: Richard Stren, Political Science.
Green roofs and restorative environmental design: bringing nature back into the city.

Amy Mader, M.A. graduate November 2003, Economics/IES; supervisor: Don Dewees, Economics.
Supporting renewable energy technologies: the benefits and costs of implementing a renewable portfolio standard in Ontario.

Amanda Mongeon, M.Ed. graduate November 2003, OISE/UT (Adult Education, Community Development & Counselling Psychology/IES; supervisor: Roxana Ng, OISE/UT.
Course work only program.

Kathryn Palmer, M.A. graduate November 2003, Geography/IES; supervisor: Scott Prudham, Geography.
The role of ENGOs in the land use planning process in Ontario: case study of the Oak Ridges Moraine.

David Sandomierski, M.A. graduate November 2003, Political Science/IES; supervisor: Richard Stren, Political Science.
Human security and sustainability.

Marli Santos, M.A. graduate March 2004, OISE/UT (Curriculum, Teaching & Learning)/IES.
Discovering new paths for global citizenship education in Brazil: three case studies.

Adam Watson, M.A. graduate March 2004, Geography/IES; supervisors: Alana Boland and Virginia Maclaren, 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.

Environment and Health Program

Heather Jones-Otazo, M.Sc. graduate June 2004, Geography/IES; supervisor: Miriam Diamond, Geography.
Screening-level human health risk assessment: Development and application of a multimedia urban risk model.
(Recipient of John Brown Prize in 2001-02, George Burwash Langford Prize in 2002-03, and Arthur and Sonia Labatt Fellowship in 2001-02, 2002-03 and 2003-04.)

Larissa Lisnevskaia, M.Sc. graduate March 2004, Medical Science/IES; supervisor: Frances Silverman, Medicine.
Acute effects of controlled exposure to concentrated particles with/without added ozone on heart rate variability.
(Recipient of Arthur and Sonia Labatt Fellowship, 2000-01.)

Saeed Sheshehgar, M.S.W. graduate November 2003, Social Work/IES; *Course work only program.*

2003-04 New & continuing students

The following is a list of new and continuing graduate students enrolled in the IES' collaborative graduate program in Environmental Studies or Environment and Health in 2003-04.

Environmental Studies Program

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

Sugako Amasaki, M.I.St., Information Studies/IES. *Course work only program.*

Martha Barriga, M.A., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES; supervisor: Daniel Schugurensky, Adult Education.
Immigration from the perspective of adult environmental education.

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

Rachel Bryant, Ph.D., Philosophy/IES; supervisor: Ingrid Stefanovic, Philosophy.

Craig Butt, Ph.D., Chemistry/IES; supervisors: Scott Mabury, Chemistry; and Derek Muir, National Water Resources Institute. *Neutral polyfluorinated organic compounds in biota.* **(Recipient of Arthur and Sonia Labatt Fellowship, 2002-03.)**

Pauline Chang, M.Ed., OISE/UT (Curriculum, Teaching & Learning)/IES.

Leon Chartrand, Ph.D., Theology, St. Michael's College/IES; supervisor: Stephen Dunn, 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: Linda Cameron, OISE/UT (CTL). *Outdoor and environmental education (bioregional education); qualitative research methods (phenomenology and heuristic research).*

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

Arden Court, M.Ed., OISE/UT (Curriculum, Teaching & Learning)/IES.

Patrick Darkhor, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/IES.

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.

Xiaojuan Feng, M.Sc., Geography-Scarborough/IES; supervisor: Myrna Simpson, Physical and Environmental Sciences, Scarborough.
Sorption of organic contaminants on soil.

Christopher Filler, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psychology)/ IES; supervisor: Daniel Schugurensky, Adult Education.
Course work only program.

Chris Gore, Ph.D., Political Science/IES; supervisor: Richard Stren, Political Science.
Electricity and infrastructure in Uganda: governing the process of reform. **(Recipient of Arthur and Sonia Labatt Fellowship in 2000-01 and 2001-02; see page 31.)**

James Gray-Donald, Ph.D., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES.
Stories of transformation: experiences of facilitation and change within a novel environmental education program in El Agustino (Lima, Peru).

Continued on page 30 ...

GRADUATE STUDENTS

Continued from page 29 .

Sarah Hartley, Ph.D., Political Science/IES; supervisor: Grace Skogstad, Political Sci. *A comparison of policy responses to environmental risk: the case of agricultural biotechnology in Canada and the UK.* **(Recipient of the Arthur and Sonia Labatt Fellowship in 2002-03; see page 31.)**

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

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

Taina Kanerva, M.A., OISE/UT (Curriculum, Teaching & Learning)/IES.

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

Fareeha Khalid, M.I.St., Information Studies/IES.

Martin Kijazi, Ph.D., Forestry/IES; supervisor: Shashi Kant, Forestry. *Sustainable forest management: institutions, values and social welfare.* **(Recipient of the Arthur and Sonia Labatt Fellowship in 2003-04; see page 31.)**

Sarah King, Ph.D., Religion/IES; supervisor: Ingrid Stefanovic, Philosophy. *The religious dimensions of Canadian Environmental Conflict: the case of Burnt Church, New Brunswick.* **(Recipient of Arthur and Sonia Labatt Fellowship, 2003-04; see page 31.)**

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

Anthony Kola-Olusanya, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: Linda Cameron, CTL. *Children and environmental learning.*

Tanya Labencki, M.Sc., Geography/IES; supervisor: Miriam Diamond, Geography. *Characterization of washoff from urban impervious surfaces.* **(Abstract, page 26.) (Recipient of the George Burwash Langford Prize and the Arthur and Sonia Labatt Fellowship, 2003-04; see page 31.)**

Kara Lefevre, Ph.D., Zoology/IES; supervisor: Helen Rodd, Zoology. *Avian frugivory and habitat disturbance: implications for tropical rainforest ecology.*

Anthony Liu, Ph.D., Physics/IES; supervisor: Kent Moore, Physics. *Severe winter weather over southern Ontario.* **(See abstract of his other research, page 27; recipient of the Arthur and Sonia Labatt Fellowship in 2002-03 and 2003-04; see page 31.)**

Elizabeth Lundy, M.A., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: Barrie Bennet, CTL. *Evaluation of pilot program of ecoschools.*

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 McKelvie, Ph.D., Geology/IES; supervisor: Barbara Sherwood Lollar, Geology. *Stable isotope fractionation as an indicator of fuel oxygenate biodegradation at gasoline release sites.* **(Recipient of the Arthur and Sonia Labatt Fellowship in 2002-03; see page 31.)**

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

Brian Milani, Ph.D., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES; supervisor: Edmund O'Sullivan, Adult Education. *Building materials in a green economy: community-based strategies for dematerialization.* **(Abstract, page 27.)**

Kate Moss, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/IES; supervisor: Dennis Thiessen, CTL. *The role of education in ecological economics.*

Jane Okalebo, M.Sc.F., Forestry/IES; supervisors: Vic Timmer and Dave Martell, Forestry. *Optimizing the production of maize: Grevillea Alley cropping systems for Embu, Kenya, using the Wanulcas model and Tabu search algorithm.*

Ernest Opoku-Boateng, Ph.D., Geography/IES; supervisor: Rodney White, Geography/IES. *Urban environmental finance in Canada: an analysis of opportunities and barriers to action.* **(Abstract, page 26.)**

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

Andrea Reid, M.Ed., OISE/(Adult Education, Community Development & Counselling Psychology)/IES; supervisor: Roxana Ng, Adult Education. *Course work only program.*

Carolyn Richardson, Ph.D., Philosophy/IES; supervisor: Ingrid Stefanovic, Philosophy. *Reimagining environmental philosophy.*

David Sider, Ph.D., Geography/IES; supervisor: Virginia Maclaren, Geography. *Community based environmental management in India.* **(Recipient of the Arthur and Sonia Labatt Fellowship in 2000-01 and 2001-02.)**

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

Luciana Sivertson, Ph.D., Anthropology/IES; supervisor: Krystyna Sieciechowicz, Anthropology, Scarb. *Multi level watershed management in the Sibun River Bio-Region, Belize, Central America: collaboration and challenges.* **(Abstract, page 28.)**

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.* **(Recipient of the Arthur and Sonia Labatt Fellowship in 2000-01 and 2001-02.)**

Sandra Toquica-Diaz, Ph.D., Botany/IES; supervisor: Elizabeth Edwards and Suzanne Lesage, Botany. *Molecular monitoring in a large-scale model aquifer comparing natural attenuation, biostimulation and bioaugmentation for the remediation of pce-contaminated groundwater.*

Amar Wahab, Ph.D., OISE/UT (Sociology & Equity Studies in Education)/IES; supervisors: Margrit Eichler and Alissa Trotz, OISE/UT (SESE). *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.* **(Recipient of the Arthur and Sonia Labatt Fellowship in 2000-01.)**

Carolyn Webb, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psychology)/IES. *Coursework only program.*

Bob Willard, Ph.D., OISE/UT (Adult Education, Community Development & 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.*

Environment and Health Program

Ahmed Al-Yami, M.H.Sc., Public Health Sciences/IES; *Course work only program in Occupational and Environmental Health.*

Kate Bassil, Ph.D., Public Health Sciences/IES; supervisor: Donald Cole, Public Health Sciences. *Syndromic surveillance for emerging infectious disease in urban settings.*

Gloria Cardoso, M.Sc., Health Policy, Management and Evaluation/IES.

Nita Chaudhuri, Ph.D., OISE/UT (Adult Education, Community Development and Counselling Psychology)/IES; supervisor: Donald Cole, Public Health Sciences. *Participatory education using an eco-system approach in waste water use in urban agriculture in Senegal.*

Shehrina Tabassum, M.Sc., Medical Science/IES; supervisor: Frances Silverman, Medicine. *Symptomatic responses in studies of controlled human exposures to concentrated ambient fine particles (CAP) and/or ozone (O3).* **(Abstract, page 28.)**

Shelby Yamamoto, M.Sc., Public Health Sciences/IES; supervisor: Donald Cole, Public Health Sciences. *A screening level risk assessment for children's exposure to chemical contaminants associated with urban and peri-urban agriculture.*

Graduate environmental students awarded

Congratulations to the recipients of 2003-04 IES graduate awards presented at IES Research Day on April 16, 2004.

George Burwash Langford Prize

This prize provides support and encouragement for student service and research at IES. This year, $350 was awarded to **Tanya Labencki**, a M.Sc. candidate in Geography and IES' Environmental Studies Program. She is the President of Graduate Environmental Students' Association (GESA) and is researching characterization of washoff from urban impervious surfaces **(see page 26)**.

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 by a full-time graduate student in the Gage Occupational and Environmental Health Unit, the Dept. of Chemical Engineering and Applied Chemistry, the Dept. of Public Health Sciences, and/or IES. This year, $1000 was awarded to **Satyendra Bhavsar**, a Ph.D. candidate in Chemical Engineering and Environmental Engineering. He is developing mathematical tools that will aid in understanding chemical behaviour in the environment and their potential risk.

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 award given to students doing research in toxicology who demonstrate academic excellence, strength of character, and financial need. This year, $1500 was awarded to **Heather Jones-Otazo**, a M.Sc. graduate (June 2004) in Geography and IES' Environment and Health Program. Her thesis was titled *Screening-level human health risk assessment: development and application of a multimedia urban risk model*.

AIRG Graduate Research Paper Award

The Adaptation and Impacts Research Group (AIRG) of Meteorological Service of Canada awards an annual prize for the best U of T graduate student research paper addressing one or more of following of AIRG's research interests **(see page 19)**. This year's recipient was **Rebecca Hanson,** a M.Sc. candidate in Geography, who wrote a paper titled *Vulnerability case study: Hurricane Juan's impact on Halifax regional municipality*.

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. This year five recipients were awarded $5000 each: 1. **Heather Jones-Otazo**, M.Sc. graduate June 2004, Geography/IES Environment and Health Program; 2. **Martin Kijazi**, Ph.D. candidate, Forestry/IES Environmental Studies Program (ESP) 3. **Sarah King**, Ph.D. candidate, Religion/IES ESP; 4. **Tanya Labencki**, M.Sc. candidate, Geography/IES ESP; and 5. **Anthony Liu**, Ph.D. Physics/IES ESP.

For more information, contact Donna Workman, d.workman@utoronto.ca.

Fifth anniversary of Labatt Fellowships

By Rodney White, IES Director

On November 20 2003, IES celebrated the fifth anniversary of the **Arthur and Sonia Labatt Graduate Fellowships** with a reception hosted by then Dean of the School of Graduate Studies (SGS), **Michael Marrus**. The highlights of the event were short presentations by five past recipients of this award who reported on their completed -- or soon to be completed -- doctoral research. These fellowships are awarded annually to support IES students who demonstrate academic excellence and financial need. The speakers and past recipients of the award were:

Marcy Erskine (Ph.D. graduate, Anthropology/IES Environment and Health): *Adoption of preventative health technology;*

Chris Gore (Ph.D. candidate, Political Science/IES Environmental Studies): *Energy and development in Uganda*;

Sarah Hartley (Ph.D. candidate, Political Science/IES Environmental Studies): *The case of genetically modified crops in Canada and the UK*;

Jennifer McKelvie (Ph.D. candidate, Geology/IES Environmental Studies): *Assessing the feasibility of methyltert-butyl ether bioremediation*; and

Kym Snarr (Ph.D. candidate, Anthropology/IES Environmental Studies): *The howling monkeys: life in fragmentation on the north coast of Honduras*.

Both photos: Imran Hasan

LEFT: Sonia and Arthur Labatt (centre) are joined by Michael Marrus, then Dean of SGS, and Rodney White, IES Director (left) and Jon Dellandrea, VP and Chief Advancement Officer (far right) in the celebration of the fifth anniversary of their graduate fellowships. RIGHT: Fellowship recipients and event speakers, left to right: Chris Gore, Sarah Hartley, Kym Snarr, Marcy Erskine, and Jennifer McKelvie.

Natural City symposium provides dialogue on ecological intregrity of our cities

Ingrid Stefanovic,
Director, Division of the Environment, and Chair of the Natural City symposium.

From June 23 to 25, 2004, the Division of the Environment, IES, and World Society for Ekistics hosted the ***Natural City*** symposium, a gathering of over 95 speakers and 300 participants from around the world, to consider how to better understand and promote the ecological integrity of our cities. It aimed to foster dialogue among faculty members, policy makers, business and the wider community, to advance understanding and propose recommendations for specific policy initiatives to be carried forward into the classrooms, the boardrooms and cabinet sessions.

Why the "natural" city? The term captures ideas contained within many similar notions, such as the healthy city, the sustainable city, the safe city. However, what the term does do, that these other terms do not, is explicitly challenge the urban/nature divide. It questions the mindset that suggests that pristine nature is "good" and the concrete jungle is "bad".

Our keynote speaker, attorney **Robert F. Kennedy Jr.**, presented a hugely inspiring talk where he explained how he had prosecuted governments and companies for polluting the Hudson River and Long Island Sound. His final comments reminded us of the need of a passionate, spiritual commitment to safeguarding our planet.

We began by setting a policy context in a panel discussion between **John Godfrey**, Parliamentary Secretary for Cities; **Marilyn Churley**, NDP Deputy Leader and Environment Critic; **John Wilkinson**, Parliamentary Assistant to the Hon. Leona Dombrowsky and **David Gurin**, former Metropolitan Toronto Planning Commissioner. Architect **Ken Yeang** showed us how his firm was designing and building "green skyscrapers" around the world, while **Bill Vanderburg** of U of T's Dept. of Civil Engineering brought us back to the university, arguing that for natural cities to evolve, stronger inter-disciplinary educational programs were a prerequisite.

Rebecca Pinkus

Keynote speaker Robert F. Kennedy Jr. delivers an inspiring talk at the *Natural City* symposium.

The first day was devoted in large measure to issues relating to Toronto -- from brownfields development to developing the waterfront. A highlight was a session where **Edward Burtynsky**, Founder and Director of Toronto Image Works, presented photographs of manufactured landscapes from Oakville to China, bringing us face to face with the realities of environmental devastation.

Day Two addressed a variety of issues, from **Lauri Swami**'s (Ontario Power Generation) advocacy of nuclear generation in an urban setting to IES Director **Rodney White**'s reflections on financing the ecological city. Presentations spanned geographical distances as well as disciplinary boundaries. The Hon. **David Crombie** discussed the importance of civil society in advancing the natural city.

Day Three presented undergraduate student work in greening our campuses, from New Zealand to Canada. From green roofs and urban forests, to transportation and planning alternatives, critical issues were raised relating to sustainability.

A number of valuable recommendations were generated over the course of the three days. Linkages between the university and municipalities were established for future collaborations and reports have yet to be issued for distribution to key, environmental decision making agencies. Much remains to be done -- but also, much was accomplished in what will remain for many of us a highlight gathering of 2004.

For more information, visit
www.utoronto.ca/divenv/NaturalCity/
or email natural.city@utoronto.ca.

LOOKING FORWARD: Upcoming workshops

Environmental Finance
October 28, 2004, Toronto
www.environmental-finance.utoronto.ca
By Rodney White, IES Director

IES, in conjunction with U of T's Risk Management Institute, will host a half-day workshop on Environmental Finance, planned as the first of a series. The focus for this inaugural event will be *The Investor's Perspective on Environmental Finance*. Panellists will be drawn from companies already active in the field, such as Innovest Strategic Value Advisors, Acuity Investment Management, and Mercer Investment Consulting. The workshop will follow on from a breakfast seminar hosted by the Ontario Environment Industry Association. This initiative is, in part, a response to the impending reality of accounting for greenhouse gas emissions alongside the more traditional types of assets and liabilities. Trading in GHG emission reduction credits will become a fact of everyday business life in the European Union in January 2005.

For further information, visit the website above or contact Donna Workman (d.workman@utoronto.ca) or Rodney White (rodney.white@utoronto.ca).

Social & Economic Impacts of Climate Change
November 30-December 1, 2004, Ottawa
www.utoronto.ca/envstudy/socioeconomic
By Doug Macdonald, Director, Environmental Studies Program, Innis College

U of T's Division of Environment, Innis College Environmental Studies Program and IES, with the Climate Change Health Office of Health Canada, will co-sponsor this two-day workshop. It will bring together university researchers, policy makers from all government levels, and environmental and industry representatives for the presentation of papers and dialogue on such topics as social support networks and vulnerability to summer heat waves in cities, positive and negative dollar impacts of severe weather impacts and the current state of Canadian adaptation policy. One theme will be theoretical approaches to understanding the complex web of causality amongst health, social and economic impacts Another will consider how this academic understanding can best be used by public and private decision makers.

To present a paper or attend the workshop, please contact Gaby Binette, socioec.climate@utoronto.ca.

2003-04 Environmental Studies seminars

The following seminars were presented as part of the Environmental Studies seminar series, usually held Wednesdays at 4:00 p.m. For more information, visit www.utoronto.ca/env/ies or contact Mona El-Haddad, m.elhaddad@utoronto.ca.

Vicki Barron, Executive Director, Waterfront Regeneration Trust: *Regeneration of the Canadian Shores of Lake Ontario.*

David R. Boyd, Environmental lawyer; former Executive Director, Sierra Legal Defence Fund: *Book Launch Tour for "Unnatural Law: Rethinking Canadian Environmental Law and Policy" (UBC Press)*. (Co-hosted by the Faculty of Law and Innis College's Environmental Studies Program; sponsored by the David Suzuki Foundation.)

Phil Byer, Professor, Department of Civil Engineering and IES, U of T **(see page 12)**: *Waste management in SE Asia: lessons from WASTE-ECON projects.* (Co-hosted by the WASTE-ECON Program.)

Amrita Daniere, Associate Professor and Director of Planning, Department of Geography, U of T: *Southeast Asian urban slums: cooperation, trust and social capital.*

David Etkin, Natural Hazards and Risk Analyst, Adaptation and Impacts Research Group, Meteorological Service of Canada **(see page 22):** *Natural disasters: root causes of vulnerability.*

Greg Evans, Professor, Dept. of Chemical Engineering and Applied Chemistry, U of T: *Investigating the origins of Toronto's airborne particulate matter.*

Chris Kennedy, Associate Professor, Dept. of Civil Engineering, U of T: *The urban metabolism of the Greater Toronto Area.*

Bruce Lourie, Executive Director, The Richard Ivey Foundation: *Mercury in the environment: the science-policy interface in standard-setting.*

Doug Macdonald, Director, Environmental Studies Program, Innis College, U of T; and **Keith Stewart**, Smog and Climate Change Campaigner, Toronto Environmental Alliance: *Now that we've ratified, what are we doing to meet our Kyoto commitment?* (Co-hosted by the Sustainable Toronto project.)

At a special seminar co-hosted by IES and the *Sustainable Toronto* project, Keith Stewart of Toronto Environmental Alliance and Doug Macdonald of U of T's Innis College present their views on Canada's ratification of the Kyoto agreement.

Scott Prudham, Assistant Professor, Dept. of Geography and IES, U of T **(see page 19)**: *Social forestry then and now: reflections on the historical politics of scale in British Columbia forest governance.*

Sean Thomas, Assistant Professor, Faculty of Forestry, U of T: *Long-term logging impacts on a Malaysian rain forest.*

Dan Toner, Acting Director, Laboratory Services Branch, Ontario Ministry of the Environment: *The impact of Ontario's new drinking water legislation on laboratory testing.*

Martin Whittaker, Managing Director, Innovest Strategic Value Advisors (now with Swiss Re, New York; **see page 20**): *Environmental finance: why climate change is putting the heat on investors.*

Bob Willard, Ph.D. candidate, OISE/UT and IES, U of T: *The business case for sustainability: how strong is it?*

2003-04 Environment & Health seminars

Co-hosted by the Gage Occupational and Environmental Health Unit, Faculty of Medicine

The following seminars were presented as part of the Environment and Health seminar series, usually held Thursdays at 4:00 p.m. For more information, visit www.utoronto.ca/env/ies or contact Mona El-Haddad, m.elhaddad@utoronto.ca.

Paul Borron, Senior Scientist, Norcarex Bio Corporation: *How does pulmonary surfactant alter responses to infection, inflammation and pollutants?*

Murray Finkelstein, Medical Consultant, Ontario Ministry of Labour; Assistant Professor, McMaster University: *Air pollution and neighborhood-related health effects.*

Bonnie Henry, Associate Medical Officer of Health, City of Toronto Health Department: *SARS: a view from a public health department.*

Major Steve MacEwen, Environmental Engineer, Canadian Forces: *Environmental and industrial health hazard studies in Afghanistan.*

Rosana Pellizzari, Community Medicine Resident, Peel Health Dept.: *Fighting the bite: a compendium of West Nile Virus issues in Ontario.*

James Scott, Assistant Professor, Dept. of Public Health Sciences, U of T: *An old problem in a new environment: current developments on environmental moulds.*

Susan Tarlo, Professor, Dept. of Public Health Sciences, U of T: *Indoor moulds and human health: current clinical and epidemiological experience.*

Dorothy Wigmore, Occupational hygienist, ergonomist and educator. *Seeing the workplace with new eyes: an introduction to workplace mapping.*

IES Research Day

By Rodney White, IES Director

Environmental Studies is a very broad field, so broad that there is some concern both within and without that it is not truly a discipline, like, say History or Chemistry, or any subject that has been in the university curriculum for 150 years or more.

The seven presentations made at this year's IES Research Day certainly reflect the breadth of environmental research. Yet they also represent common threads of concern that bind apparently disparate research fields together. These recurrent themes include the hydrological cycle, the carbon cycle, air quality, and the built environment -- the habitat of choice for a steadily growing number of human beings. They are also linked by a common concern as to our trajectory on this planet. Is our modern lifestyle sustainable? This is not research simply for the sake of research. Each research question deals with a matter of some urgency. Held annually in the spring, this half-day event is a small sampling of the variety of research conducted by IES faculty and students. This year, presentations were made by **Jing Chen**, Professor, Department of Geography on *Carbon sequestration in reforested areas in China* and by IES students **Tanya Labencki**, **Anthony Liu**, **Brian Milani**, **Ernest Opoku-Boateng**, **Shehrina Tabassum**, and **Luciana Sivertson**. **(Please see pages 26-28 for abstracts of students' presentations and page 31 for students' awards and recipients.)**

For more information on this event, please contact Mona El-Haddad, m.elhaddad@utoronto.ca.