



Centre for Environment
UNIVERSITY OF TORONTO

2007 Annual Report

Centre for Environment
UNIVERSITY OF TORONTO

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**By Ingrid Lemán Stefanovic,
Director, 2005-2010.**

Recently, I took a stroll along the waterfront on one of those summer days that are the stuff of dreams. The lake was cobalt blue, the air was fresh and clear and the greenery made me feel as if I could melt into it. It was perfect and I was made to feel that the planet was a glorious place to be.

Seated on a bench, taking in these wondrous surroundings, I noticed a young boy nearby. He was happily tossing bread crumbs to the geese. On the one hand, I realized that, at the age of five, he was contributing to the disruption of an ecosystem already out of balance. The proliferation of geese was a testimony to that fact. On the other hand, I could not help but notice his overwhelming delight in interacting with the birds. The picture in front of me was a microcosm of a larger societal conundrum. On the one hand, we are drawn to nature, loving to interact with living entities and the environment as a whole. On the other hand, too often, our short-sighted actions disrupt the long term stability of the planet.

The hope is that, through education and awareness, we can begin to confront the consequences of our actions. The faculty, staff and students at the Centre for Environment have been actively engaged during this past year in addressing these very problems. The University of Toronto has a huge community, spread across three campuses, of people who are deeply committed to improving the state of the environment. (See our new searchable database on the Centre website for a full listing. Thanks to our IT Manager, **Imran Hasan**, for his leadership in developing this database.) At the Centre, we aim to provide a nexus for many of these people to come together, to collaborate, to share their ideas and to inspire change.

The year has been busy and productive. We were honoured to host former U.S. Vice-President **Al Gore**, during his recent visit to the University and to be involved in a day-long symposium entitled *Moving Canada Towards Sustainability* [see page 6], convened under the auspices of the Provost's Round Table on the Environment. The Round Table has been meeting since last fall to review the current state of environmental programs across the university and provide recommendations to enhance these initiatives.

The Centre's undergraduate and graduate programs continue to grow and, thanks to our Manager of Program Development and External Relations, **Donna Workman**, our community outreach initiatives are flourishing. Our Distance Education professional development certificate programs have increased, both in enrolments as well as in offerings, with new programs in energy to be offered in 2008 [see page 15]. We are told that our Environmental Finance workshops, attracting hundreds of participants from business, industry, academia and government, are already establishing a unique reputation for the Centre in the City of Toronto and in business communities [see page 5].

We have been delighted to welcome **The Jane Goodall Institute of Canada** which is now formally housed at the Centre and we look forward to hearing Dr. Goodall speak once again at Convocation Hall on September 15, 2007 [see page 11].

Formal collaborations with UN agencies have resulted in the development of a Toronto Regional Centre of Expertise on Education for Sustainable Development, as well as in research linkages to promote the Convention on Biological Diversity in Canada [see page 9].

New, large-scale collaborative research projects are underway,



Lisa Sakulensky Photography

Former U.S. Vice-President Al Gore and Centre for Environment Director Ingrid Stefanovic prior to his "Inconvenient Truth" presentation at the University of Toronto in February 2007.

in areas of energy, air quality and the social implications of environmental remediation. The incredible energy of our outgoing Research Director, **Dr. Beth Savan**, has resulted in three substantial groups of researchers across the faculties collaborating in these proposals, one of which has already been partially funded [see page 9]. I wish to publicly thank Dr. Savan for her outstanding commitment to her responsibilities as Research Director. Without her drive, these interdisciplinary, collaborative projects would never have been launched.

On the theme of research, I also wish to welcome **Professor Miriam Diamond** as our incoming Research Director. Taking up the reigns from Beth Savan, Professor Diamond is already well known to the environment community. As *Canadian Geographic's* "Environmental Scientist of the Year," Professor Diamond has earned a reputation as one of the most frequently quoted scientists in her area and a highly respected expert on health effects of environmental contaminants. Studying the migration of chemicals through our urban areas, Professor Diamond has perfected a scientific technique that is based on collecting samples from windows – a methodology that Tom Webster, an environmental epidemiologist from Boston University's School of Public Health calls "definitely cutting edge." Like Beth Savan, Miriam Diamond possesses an energy and commitment to environmental research that is unstoppable. We are thrilled that she has agreed to help to build the research profile at the University of Toronto's Centre for Environment.

My final welcome extends to **Professor Phil Byer** of the Department of Civil Engineering, and **Professor Hilary Cunningham** of the Department of Anthropology, who will each serve consecutive terms of Acting Director while I take a sabbatical leave from July, 2007 to June, 2008. I thank them for their support and assure them that their leadership roles at the Centre will provide some of the most rewarding moments of their career.

Environment Seminar Series



Dan Epstein/The Varsity

Marilyn Churley, former politician and environmental activist, talks about her efforts to stop the construction of a power plant in the Portlands on Toronto's waterfront.

The following seminars were presented in this series in 2006-07. Full abstracts and biographies may be found on our website.

Kerry Bowman, Bioethicist, Mount Sinai Hospital and Joint Centre for Bioethics, U of T. *Protecting Great Apes and respecting human well being.* Commercial hunting, facilitated by western-owned logging operations, has become the leading threat to the survival of many African primates. Because their environments have been connected to African human lives and communities for millennia, aligning solutions to African needs and realities is therefore essential. This seminar highlighted initiatives to protect Great Apes and alternatives to bushmeat trade.

Marilyn Churley, Former City Councillor and member of Ontario Provincial parliament. *It's like deja vu all over again: citizens fight to stop the construction of a mega gas plant in the Toronto Portlands.* This presentation focussed on the long struggle by the east-end communities of South Riverdale and the Beach to clean up air pollution from local industry. Ms. Churley described her past involvement as a community activist and talked about the Ontario government's plans to build a gas-fired electrical generating plant on the waterfront. She talked about the "Stop the Plant" group and the importance of community activism.

Ron Dembo, Founder and CEO, Zerofootprint, Toronto. *Innovative ways to effect environmental change effectively.* We have been treating the environment as infinite and as if no costs are associated with using it. Consequently, we are in a world with a ballooning population and a consumption level that, on average, is more than the earth can support. We are slowly evolving to a world in which the environment will be priced into the goods and services we use. In this presentation, some ventures were described that could have enormous impact and could be funded entirely using capital markets.

Brian Denney, Chief Administrative Officer, Toronto and Region Conservation Authority (TRCA). *'The Living City': TRCA's vision for the future of the Toronto region.* (Eric Krause Memorial Lecture) The TRCA has adopted the concept of "The Living City" as its vision for the future of environmental management in the portion of the Greater Toronto Area for which it is responsible. This seminar highlighted its activities in research and policy development, acquisition and management of green space systems, climate change mitigation and adaptation, source water protection, natural heritage systems, storm water management, the Oak Ridges Moraine and the waterfront.

Tony Genco, President and CEO, Parc Downsview Park Inc. *Downsview Park: a natural city in the making.* The transformation of the lands that were once part of a Canadian forces base in Downsview have been the subject of much debate and deliberation. This presentation featured the history and the context under which Parc Downsview Park Inc., the crown corporation responsible, has been operating and how it will contribute to the development of the concept of park and a natural city in the making in the 21st century.

Sonia Labatt, Associate Member, Centre for Environment graduate faculty; and **Rodney White**, Professor, Department of Geography, U. of Toronto. *Are carbon markets achieving their environmental objectives?* The Kyoto Protocol provided the framework and set the targets for global markets trading greenhouse gas emission reduction credits or the "Carbon Market". In the first year, the European Union Emissions Trading Scheme (EU ETS) grew rapidly and the "price of carbon" climbed, then crashed, due to over-allocation of emission permits. If set appropriately, volumes and price may strengthen, thereby providing incentives for companies to reduce emissions or to buy credits from companies which have done so.

Heather Maclean, Associate Professor, Department of Civil Engineering, U. of Toronto. *What role can biofuels play in Canada and U.S. transportation sectors?* Feedstocks such as corn grain, dedicated energy crops and agricultural and forest residues can displace petroleum-based fuels and may lead to a more sustainable transport sector because they are "renewable", can be produced domestically, and their production and use can result in lower net greenhouse gas emissions. Biofuels have only had a tiny market penetration here in the form of corn ethanol produced with large amounts of fossil fuels and blended with gasoline.

Brian McCarry, Professor and Chair, Department of Chemistry, McMaster University. *Mobile and stationary monitoring of air quality in Hamilton.* Air quality data has been collected at stationary sampling sites in Hamilton, which have helped determine the sources of air pollution and their changing levels over the past three decades. However, data from stationary sites gives little information as to the levels of pollutants experienced proximate to emissions sources. A mobile air quality monitoring survey was conducted by

Environment Series:
Wednesdays, 4 p.m.
Environment & Health Series:
Thursdays, 4 p.m.

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outfitting a van with real-time monitoring instruments. Ambient pollutant levels were found to be high to very high. The implications for human health, industries, and regulatory agencies were discussed.

David McRobert, In-house Counsel and Senior Policy Advisor, Environmental Commissioner of Ontario. *Environmental policy struggles, participation rights and e-democracy: lessons learned in implementing Ontario's Environmental Bill of Rights (EBR).* The EBR provides residents and stakeholders with legal rights to participate in environmental decision-making. The most important and popular facet of the EBR is the Environmental Registry, which provides a type of Internet Bulletin Board with proposed government policies, laws and approvals. The EBR's ongoing experiment in electronic democracy was discussed.

Clement Oniang'o, Professor, Department of Philosophy and Religious Studies, U. of Nairobi, Kenya. *Ethno-environmental consciousness in Kenya: past, present and future.* Traditionally, the African society in general co-existed with nature harmoniously and peacefully. Now, this relationship has changed due to overpopulation, human greed, foreign ideology of exploitation, the quest for development, and above all, the necessity for survival. The future is worse given the high rate of escalating poverty which, by definition, renders ethno-environmental consciousness pragmatically untenable, irrelevant, and an "unaffordable luxury".

Mohini Sain, Professor, Faculty of Forestry, U. of Toronto. *Bio-crude to manufacturing: from plants and trees to bioplastics and biocomposites.* There has been a recent shift towards energy efficient systems of biofuels and bioproducts which are potentially cheaper, cleaner and renewable. In bioplastics and composite products, synthetic polymers and glass fiber are still the dominant raw materials derived from petroleum resources through energy intensive processes. The hurdles to get bioproducts more accepted were discussed.

Margaret Zeidler, President, Urbanspace Property Group, Toronto. *Heritage preservation: an effective green strategy for cities.* As much as 30% of Ontario's landfill sites are filled with demolished building debris. Contrary to popular belief, old buildings often require less energy to operate. With 60% of Ontario's CO₂ emissions created in the operation of buildings, why do we throw away some of the most energy efficient ones? The greenest building is the building that already exists.

Environment and Health Seminar Series

The following seminars were presented in this series in 2006-07. Full abstracts and biographies may be found on our website.

Monica Campbell, Manager, Environmental Protection Office, Toronto Public Health. *Influence of heat and air pollution on mortality in Toronto.* This presentation featured a study of differential and combined impacts of extreme temperatures and air pollution on human mortality from 1954 to 2000 in four Canadian cities and included projections on further impacts on mortality arising from global warming. Heat waves, mortality and adaptive mechanisms in Toronto were examined.

Donald Cole, Associate Professor, Department of Public Health Sciences, U. of Toronto. *Documenting and reducing adverse pesticide-related health effects among small potato farmers in Ecuador.* Highly hazardous pesticides are used for agriculture in many lower and middle income countries. This seminar featured a study of pesticide use and health burden among small potato farmers in Ecuador the work done to shift policies and practices towards more healthy and sustainable approaches.

Minh T. Do, Ph.D. candidate, Public Health Sciences, U. of Toronto; Research Associate, Cancer Care Ontario. *Biological monitoring in community health studies: the Falconbridge community example.* Quantifying exposure is one of the major challenges in investigating the exposure of communities to environmental hazards. This presentation looked at biomonitoring as a tool used to measure levels of internal human exposure and chemical concentration in the environment with a focus on recent work in the Falconbridge community in the Greater Sudbury Area.

Sharon Dell, Pediatric Respiriologist and Associate Scientist, Hospital for Sick Children; Assistant Professor, Dept. of Paediatrics, U. of Toronto. *Challenges in study design of environmental effects: the 'T-CHEQ study' of children's asthma and traffic-related air pollution in Toronto.* This seminar highlighted the vulnerability of children to the effects of ambient air-pollution and the association between traffic-related air pollution and children's lung health. Also discussed was a multi-stage population based study investigating the association between asthma and traffic-related air pollution in Toronto school children.

Kirsty Duncan, Adjunct Professor, Dept. of Geography, U. of Toronto. *The flu pandemic: forewarned is forearmed.* Experts agree that an influenza pandemic is inevitable and possibly imminent, since the highly pathogenic H5N1 influenza virus is mutating rapidly, affecting new hosts, and expanding its geographic range. We now have an opportunity to prepare for a pandemic, and to reduce economic and social impacts, cases, hospitalizations and deaths. In this presentation, the current threat and a framework for pandemic preparedness for organizations were discussed.

Michael Gilbertson, Ph.D. Candidate, Occupational and Environmental Health Research Group, University of Stirling, Scotland. *Indications of congenital Minamata disease in Canadian Areas of Concern in the Great Lakes basin.* The 35-year-old Great Lakes Water Quality Agreement of Canada and the United States was signed to rid the Great Lakes of persistent toxic substances but has caused division among the scientific, administrative, non-government organizations and industrial communities. This presentation featured a Health Canada study which found previously undetected outbreaks of congenital Minamata disease.

Julia Knight, Senior Investigator, Prosserman Centre for Health Research, Assoc. Professor, Dept. of Public Health Sciences, U. of Toronto. *Artificial light, melatonin, circadian disruption and breast cancer.* Only two published studies have directly addressed the association of melatonin, a hormone produced by the pineal gland and an important component of the circadian system or biological clock, with breast cancer. However, there are a large number of studies indicating an increased risk of breast cancer among shift workers. This presentation also described a study of factors related to melatonin production finding that physical activity was positively related to increased melatonin levels.

Gail Krantzberg, Professor and Director, Dofasco Centre for Engineering & Public Policy, McMaster University. *Emerging chemicals: the future of Great Lakes policy.* There has been major increase in the measurement and detection of organic chemicals not classified as persistent organic pollutants, including polybrominated diphenyl ether flame retardants (PBDEs) and fluorinated surfactants used for non-stick cookware and water and stain repellent coatings. Effects on environmental and human health and policy implications for chemical management were discussed.

Lynn Marshall, MD, Assistant Professor, Northern Ontario School of Medicine, Lakehead and Laurentian Universities; Lecturer, Dept. of Family and Community Medicine, U. of Toronto. *Conundrums of complex, chronic, environment-linked conditions and strategies to deal with them.* This seminar addressed the prevalence, diagnosis, functional assessment, etiology, treatment and prevention of Sick Building Syndrome, Environmental Sensitivity/Intolerance, Chronic Fatigue Syndrome, and Fibromyalgia, which are more prevalent than AIDS, breast or lung cancer, yet poorly recognized and stigmatized.

Chris Metcalfe, Professor, Environmental and Resource Studies, Trent University. *Pharmaceuticals released into the environment: assessing the risks.* Pharmaceuticals are released into the aquatic environment as a result of discharges of wastewater from municipal wastewater treatment plants. Biosolids containing pharmaceuticals may be placed in landfills or spread onto agricultural land, where they may flow into surrounding surface water or leach into groundwater. This seminar reviewed studies on the fate of pharmaceuticals in the environment and the effects of exposure.

Bliss L. Tracy, Head, Radiological Impact Section, Radiation Protection Bureau, Health Canada. *Radon in the home: How frequent a problem? The science behind the new Canadian radon guideline for homes.*

Radon is a colourless, odourless, radioactive gas produced naturally from the decay of uranium in rocks and soils. It can build up to hazardous levels in confined spaces and has been known to constitute a lung cancer hazard among uranium miners. This presentation looked at studies that found a risk of lung cancer at the levels of radon found in many homes.

Bruce Urch, Ph.D. candidate, Institute of Medical Science and Centre for Environment, U. of Toronto. *Acute health effects of controlled exposures to ambient fine particulate matter (PM2.5) and ozone in healthy adults.* Studies have shown consistent associations between elevated daily levels of air pollutants and cardiorespiratory morbidity and mortality. This presentation featured a study finding significant decrease in the diameter of the brachial artery and an increase in diastolic blood pressure following human exposure to fine particulate matter and ground-level ozone.

Loren Vanderlinden, Supervisor, Environmental Health Assessment and Policy, Environmental Protection Office, Toronto Public Health. *Balanced messages on healthy fish consumption for groups vulnerable to methylmercury.* Recommendations made by public health units on the amount of fish to be consumed to optimize health benefits while minimizing methylmercury exposure among women of childbearing years and children have been inconsistent. The risk reduction messages developed by Toronto Public Health for vulnerable subgroups and ethnocultural communities with frequent fish consumption were discussed.

Special & Joint Seminars

The following were presented in 2006-07.

Ed Burtynsky, Photographer and founder of Toronto Image Works. *Changing the earth* (Douglas Pimlott Memorial Lecture). [See p. 4.]

Ben Cashore, Associate Professor, School of Forestry and Environmental Studies, Yale University. *The emergence of non-state, market-driven global governance: lessons from the forestry sector.* (With Political Science, Forestry, Internationalization and Public Policy Seminar Series.)

Johanne Gelinas, Commissioner of the Environment & Sustainable Development. *The perspective of the Commissioner of the Environment & Sustainable Development in Canada.* (With Rotman School of Management and the Social Investment Organization.)

Al Gore, Former U.S. Vice-President. *An Inconvenient Truth.* [See p. 6.]

Walter Kohn, Professor of Physics, Emeritus and Research Professor, U. of California, Santa Barbara; 1998 Nobel Laureate in Chemistry. *The Power of the Sun: film, lecture and discussion.* (With Ctr for International Health, Fac. of Medicine, Dept of Physics, Dept of Chemistry.)

Werner Kurz, Senior Research Scientist, Canadian Forest Service, Natural Resources Canada, Victoria, B.C. *The potential role of Canada's forest in a mitigation strategy.*

Nicholas Parker, Co-Founder and Chairman of Cleantech Capital Group LLC. *Cleantech: the new venture investment category.* (With AIC Institute for Corporate Citizenship and Rotman Net Impact, Joseph L. Rotman School of Management.)

Research Day

Research Day features research presentations by faculty and students of the Centre for Environment, as well as a presentation of graduate student awards. The following research presentations were made on May 1, 2007. For full abstracts and biographies, please visit our website. For a listing of graduate awards presented, please see page 28.

JONATHAN ABBATT, Professor, Dept. of Chemistry; Instructor and Full Member of graduate faculty, Centre for Environment. *The impact of aerosol particles on cloud formation.* With increasing abundance of small aerosol particles in the atmosphere, there is concern that clouds are being affected on a global scale and that some global warming is masked by the cooling effects of particles and changing clouds. This talk focussed on the conversion process of aerosol particles to cloud droplets and the different mechanisms for liquid water droplet formation and ice formation.

LIANA DEL GOBBO, M.Sc. student, Dept. of Geography and CFE Environment and Health Program. *Contaminant and nutrient concentrations in fish consumed by ethnic communities in the Greater Toronto Area: sampling approaches and challenges.* Fish and seafood are known to accumulate contaminants such as methyl-mercury (MeHg) and polychlorinated biphenyls (PCBs). An analysis was conducted of contaminants and nutrients in twenty fish species consumed by Toronto's ethnic groups, precluded by Health Canada's surveys. The data will be provided to Health Canada as a guide to which species require monitoring.

JESSICA D'ÉON, Ph.D. student, Dept. of Chemistry and CFE Environmental Studies Program. *Popcorn bags and chemistry? Exploring routes of human exposure to fluorinated chemicals.* Perfluoroalkyl phosphate surfactants (PAPS) are used to impart water and oil repellancy in certain food-contact paper applications (e.g. microwave popcorn bags, fast food wrappers, etc.) and have been shown to migrate into food. In this research, blood of rats dosed with PAPS was found to contain untransformed PAPS and elevated levels of the fluorinated materials observed in human blood. PAPS may therefore migrate from the gut into the bloodstream and be biotransformed into the fluorinated contaminants observed in the blood of the general human population.

CHRISTOPHER GORE, Ph.D. Candidate, Dept. of Political Science and CFE Environmental Studies Program. *Electricity and reform in Uganda: the politics of process.* In 2006, about 5% of Uganda's population of 28 million had access to electricity while Ugandans were paying one of the

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highest prices for electricity in the sub-continent. This research examined the current electricity crisis and the efforts to improve the sector through reform and the construction of new hydroelectric facilities and argued that the process of reform has been central to Uganda's problems.

HERB MAIER, M.Env.Sc. graduate, CFE Professional Program at the Dept. of Physical and Environmental Sciences, U of T Scarborough. *The interchange between ground and surface water in streams and implications for invertebrate communities inhabiting the stream bed.* This research used groundwater flow and transport models to predict the sub-surface transport and fate of nutrients entering the stream bed. The findings may have important implications in studies of hyporheic invertebrate communities that may survive gradual changes to their living conditions by migrating to more hospitable aquatic habits.

BETH SAVAN, Research Director (2006-07) and Senior Lecturer, Centre for Environment; Sustainability Director, University of Toronto. *The Rewire Research Program: changing behaviour to conserve energy.* Rewire is a research and action project at U of T which aims to empower its members to reduce their energy consumption through simple changes in habits and behaviours. The program uses "toolkits" and includes details of the impact of specific behaviours, implementation strategies, and tools to promote sustainable behaviour. Early results indicate modest success in changing some behaviours and in reducing overall energy consumption.

MARI WATANABE, B.Sc. student, CFE Environment & Health Specialist Program; and **KO-CHUEN LAM**, B.A. student, CFE Environment & Society Program and Dept. of Psychology. *How sustainable is U of T? An evaluation using the Campus Sustainability Assessment Framework of the Sierra Youth Coalition.* Students in ENV 421H, an undergraduate environmental research course, worked with the U of T Sustainability Office (SO) to assess the current state of U of T sustainability in terms of land-use practices, health and well-being, energy use, and policies, using indicators of the Sierra Youth Coalition (SYC). Recommendations were made to SO and SYC, in terms of improving the assessment process and sustainability. [Please see page 26 for more details on the project.]

Edward Burtynsky presents Pimlott lecture

The Centre for Environment was honoured to have world-renowned Canadian photographer, **Edward Burtynsky**, present the 2006-07 Douglas Pimlott Memorial Lecture. Mr. Burtynsky presented and discussed slides featuring his stunning photographic collection of global industrial landscapes. His imagery explores the intricate link between industry and nature, combining the raw elements of mining, quarrying, manufacturing, shipping, oil production and recycling into visions that find beauty and humanity in the most unlikely of places and raises questions about the impact that humans make on our environment. His photographs are featured in *Manufactured Landscapes: The Photographs of Edward Burtynsky* (Yale University Press, 2003), *Burtynsky – China* (Stiedl, 2005) and *Burtynsky: Quarries* (Steidl, November, 2007). His life and work were also recently featured in the documentary film, *Manufactured Landscapes*, directed by Jennifer Baichwal.

The Pimlott Memorial Lecture and Undergraduate Awards are presented annually in honour of the late Professor Douglas Pimlott, former Professor of Zoology and Forestry and the first Director of the former Environmental Studies Program at Innis College.

For more information on Edward Burtynsky, please visit <http://www.edwardburtynsky.com/index.html>. For the Pimlott award recipients, please see page 29.



Renowned Canadian photographer, Edward Burtynsky presented slides of his collection of photos revealing some of the impact of industry on our environment. The photo above is from his *Urban Mines* collection (Oxford Tire Pile No. 1, Westley, California 1999).

Edward Burtynsky/Toronto Image Works

Environmental Finance Workshop Series

2006-07 Environmental Finance Workshop Series:

1. **Green Real Estate: How to Tap into this Emerging Investment Niche** (January 29, 2007)
2. **Infrastructure: Sustainability & Building the Public Realm** (March 7, 2007)
3. **Canadian Options for Global Warming: Implications for Canadian Business** (May 11, 2007)

By *Susan McGeachie*

In 2002, the environment became front page news when Canada ratified the Kyoto Protocol, a treaty that requires our nation to reduce greenhouse gas emissions to 6 percent below 1990 levels from 2008 to 2012. The overall response from the financial community at the time was surprisingly muted on how this requirement might impact stock valuations and selections. Analysts felt that legislative and regulatory uncertainty in this country prevented them from providing a precise discounting or valuation on environmental issues. Even with the absence of a supportive regulatory framework, however, events were unfolding that held companies (and their investors) accountable for environmental performance. The Carbon Disclosure Project (www.cdproject.net), the Equator Principles (www.equator-principles.com) and the Principles for Responsible Investment (www.unpri.org) are prime examples. These initiatives, along with other influences such as Al Gore's *An Inconvenient Truth*, have in recent years put environmental concerns, particularly climate change, on top of the agenda for most businesses, investors, creditors and insurers. With that has come the advent of a relatively nascent discipline, environmental finance, which studies the impact of environmental issues on all areas of finance, including loans, insurance and investment decisions.

Since 2004-05, the Centre for Environment has held an annual series of environmental finance workshops to promote dialogue on this topic among academics, businesses, government and the investment community.

The first workshop in the 2006-07 series, *Green Real Estate: How to Tap into this Emerging Investment Niche*, explored the opportunities presented by investing in green real estate. First, there is the reduced operating costs, attractive to building owners and renters alike. Next, there is the provincial government's plan to make the market more favourable for green building developments through Ontario building code enhancements, chlorofluorocarbons (CFC) phase-outs, building labelling initiatives and climate change considerations. A working example of green building construction here in Toronto was provided by the Toronto Atmospheric Fund (TAF), one of the workshop's sponsors. TAF has provided a loan to Tridel to finance the incremental costs of constructing new condominiums that exceed energy efficiency standards by 30 percent (www.toronto.ca/taf/).

One of the most important aspects of building communities is the underlying infrastructure that supports them, such as public transit, roads, energy grids and water/sewage systems. But who pays for these services and facilities? Should it be the government through tax dollars, or private firms operating (and profiting) from the communities they serve? So went the discussion in the second workshop: *Infrastructure: Sustainability and Building the Public Realm*. One of the concerns about private investment in public infrastructure is sustainability. **James Cowan**, from Macquarie North America Ltd., demonstrated how private investment could also be sustainable with examples of more cost effective and



Imman Hasan

Nicholas Parker, Chairman of Cleantech Group LLC gives a presentation on his company at a workshop on Canadian Options for Global Warming: Implications for Canadian Business. The workshop was included in last year's successful Environmental Finance workshops offered by the Centre for Environment.

FOR MORE INFORMATION:

on past or 2007-08 workshops:
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efficiently run privately owned infrastructure projects. **Graeme Bevans**, from the Canada Pension Plan Investment Board (CPPIB), also highlighted one of CPPIB's major investments in a water company that, as a part of daily operations, invests significant amounts of money into new and enhanced infrastructure and investments that include appropriate sustainability measures. The catch is that this investment is with a company in the UK which would provide the benefits of the investments to UK residents. **Skip Willis**, of ICF Consulting picked up on this point with a call to Canadian firms to offer similar types of investments that could help improve our own foundation of infrastructure services.

The final workshop, *Canadian Options for Global Warming: Implications for Canadian Business* focused on what is arguably the most important environmental issue today. Leading Canadian experts in environmental finance spoke about techniques to manage climate change related risks and capitalize on opportunities. Topics included carbon trading, climate change impacts on banks and financing, cleantech and carbon sequestration.

In addition to the workshop series, the Centre for Environment offered two public lectures this year in this area. The first was given by **Nicholas Parker**, Chairman of Cleantech Group LLC, on investment opportunities in emerging clean technologies and the second lecture was delivered by **Johanne Gelin**, Commissioner of the Environment and Sustainable Development, on federal management of climate change.

This workshop series will continue in 2007-08; please visit the website above for more information.

Susan McGeachie is a director with Innovest Strategic Value Advisors. She is also an Associate Member of the Centre for Environment's Graduate Faculty and Co-Instructor, with Jane Ambachtsheer, of ENV 1707H Environmental Finance: Risk Management and Business Opportunities.

Al Gore presents “An Inconvenient Truth” to the University of Toronto



Lisa Sakulensky Photography

Al Gore, former Vice-President of the United States, delivered a passionate message at his presentation of his Academy-award winning film, “An Inconvenient Truth” in the sold-out Convocation Hall.

An Inconvenient Truth: A public lecture by the Honorable Al Gore, former U.S. Vice-President Moving Canada Towards Sustainability Symposium February 21, 2007, University of Toronto

By Ingrid Leman Stefanovic

One of the highlights relating to “environment at U of T” this year must certainly be the creation of the Provost’s Round Table on the Environment. When the Centre for Environment was being planned, one recommendation was to continue the conversation, beyond the creation of this single unit, about how to better support environment programs across the three campuses. By striking a Round Table, our Provost, **Professor Vivek Goel**, has ensured that such dialogue is maintained.

The Round Table consists of members from the Centre for Environment as well as the Departments of Geography, Physics, the Aboriginal Studies program, the Faculties of Applied Sciences and Engineering, Forestry, Law and Medicine (Department of Public Health Sciences) as well as representation from the U of T at Mississauga, U of T at Scarborough and the School of Public Policy and Governance.

Hoping to build upon the growing public interest in environment, members of the Round Table decided in the fall of 2007, to organize a day-long symposium entitled *Moving Canada Towards Sustainability*. The aim was to discuss global environmental issues through the perspectives of some of the ongoing research of scientists and scholars across the University.

Three major themes were highlighted at the Symposium, convened on February 21st, 2007: 1. Global Climate Change: Impacts and Adaptations; 2. Environment and Health; and 3. Energy Challenges.

The event concluded with a presentation that highlighted the accomplishments of the University in advancing sustainability on campus. From bioremediation to environmental law, ethics to toxicology, speakers covered a range of topics in a high-powered day that highlighted the richness of interdisciplinary interests in the field of environment at the University of Toronto. (For more information and videos of these presentations, please visit

FOR MORE INFORMATION:

Moving Canada Towards Sustainability Symposium
www.utoronto.ca/environment

<http://www.utoronto.ca/environment>.)

The Symposium was followed that same evening by a special lecture hosted by the Centre for Environment and featuring the former Vice-President of the United States, **Mr. Al Gore**. With a fierce bidding war that followed a one and a half hour ticket sellout of Convocation Hall, Al Gore’s popularity was evident. Quoted by *The Toronto Star*, Business student **Kwajo Gyabaa** explained that “to a lot of university students, he’s almost like a cultural symbol. He represents a lot of what youth are thinking about and concerned about and his is an activism that’s viable.”

While Al Gore’s presentation was, in large measure, a presentation of his Academy-award winning film, *An Inconvenient Truth*, more happened that evening beyond the simple recitation of slides. Mr. Gore’s presence was mesmerizing and his passion unstoppable. Speaking for a full two hours, he was still willing to take questions from the audience. The final message came from the floor, from Federal NDP Leader, **Jack Layton**, who invited Mr. Gore to take his message to the House of Commons!

An Inconvenient Truth has been delivered hundreds of times in the last few years, in cities across the planet. Each time, some information is updated and modified in order to accommodate the growing storehouse of knowledge that we are accumulating about global climate change. What is particularly moving is that Mr. Gore manages to take the complexities of science and translate the message about global warming to a lay audience in such a compelling and lucid manner. This is no easy task. Environmental scientists who were in the audience will confirm that the message is accurate: human-induced global warming is affecting the future health of society and the ecosystem as a whole.

Yet, Al Gore’s message does not end there. It continues, with the recognition that solutions are within our reach. Alternative energy and building technologies are already viable, new policies and agreements are underway that enable action as never before. It is up

Toronto Mayor David Miller speaks at the symposium “Moving Canada Towards Sustainability”, which discussed global environmental issues through the perspectives of some of the ongoing research of scientists and scholars across the University.



Lisa Sakulensky Photography

to us to continue to build on these successes to ensure that progress is sustained.

Following his high-powered lecture, Mr. Gore was present at a breakfast meeting the following morning, organized by the Centre for Environment in conjunction with Mercer Investment Consulting and the Rotman School of Management. The meeting brought together over 30 senior pension and investment executives from across Canada who were interested in being informed by Mr. Gore and his colleagues about their company, Generation Investment Management. Generation invests in global, public equities that aim to deliver superior returns while preserving principles of environmental sustainability.

The visit of Al Gore to the University of Toronto ended with a strong, positive take-away message, that investing in environment can be economically viable and that neither financial security nor ecological well-being need to be sacrificed in sound investments.

The Centre for Environment was deeply honoured to have had the opportunity to host Mr. Gore. He remains one of the most influential environmental spokespeople of our times. He delivers a message that is crucial to the well-being and survival of our planet and he does so with a passion that infects. What is more, he is an amazingly fine person. In spending time with him, it is evident that stardom cannot hide his kindness and his good nature. In a consumer society built on competition, it is rare to encounter such a political figure who engages directly and on a human level with those with whom he speaks.

In many ways, to be an environmentalist is to be one who is open-minded, tolerant of differences that emerge in an interdisciplinary setting and whose care for the world is unremitting. Al Gore captures all of these characteristics. He may be an internationally-acclaimed Academy Award winner. Most importantly, he is a man committed to improving the state of the world – and one who retains his humility and humanity in the process. This is no small accomplishment, given his international reputation – but in the end, it is precisely his ability to retain a sense of goodness in the midst of his success that inspires respect. Certainly, as we each move ahead, committed to improving the health of our planet, it is wise to heed Mr. Gore's example and remember that a sense of equity, fairness and moral integrity are the ultimate guides to preserving a sustainable world.

*Ingrid Leman Stefanovic is Director of the Centre for Environment.
Email: ingrid.stefanovic@utoronto.ca.*

The Natural City featured in two new publications

The Centre for Environment was pleased to host two **Natural City** conferences in 2004 and 2006, aimed to rethink how urban and natural environments must be integrated to promote sustainability. In 2004, keynote **Robert F. Kennedy, Jr.**, joined 95 speakers for a thought-provoking three-day event. In 2006, the conference's theme was "Success Stories" and featured a pre-conference highlight lecture by renowned primatologist, **Dr. Jane Goodall**, and a keynote address by **Stephen Lewis**, UN Special Envoy for HIV/Aids in Africa.

Some of the papers presented at the 2004 conference, with additional papers presented in 2006, have recently been published in a special triple issue of *Ekistics* (volume 71, issues 424, 425, 426), an international journal dedicated to the study of human settlements. Copies of this special issue, edited by Ingrid Stefanovic, Director of the Centre for Environment, may be obtained by sending a request, accompanied by a cheque or money order of US\$150, to the Athens Technological Organization, Athens Centre of Ekistics, 24 Strat. Synedsmou Street, 106 73. Athens, Greece.

Ingrid Stefanovic and Stephen Scharper, also of the Centre, are currently co-editing *The Natural City: Re-Envisioning the Built Environment*, to be published by U of T Press, featuring articles on themes ranging from ecofeminism to First Nations visions. For more information, please contact Ingrid Stefanovic (ingrid.stefanovic@utoronto.ca) or Stephen Scharper (stephen.scharper@utoronto.ca).

Please visit www.naturalcity.ca for more information on the Natural City conferences.

Industrial ecology for a sustainable future

International Society for Industrial Ecology Conference
June 17-20, 2007, University of Toronto; www.isie.ca

By *Chris Kennedy*

Close to 350 people from 30 countries attended the fourth conference of the International Society for Industrial Ecology (ISIE) on the U of T campus, hosted by the Faculty of Applied Science and Engineering and the Centre for Environment. The gathering of the world's industrial ecology community also sprouted a number of other workshops and symposia on Material Stocks and Flows; Industrial Symbiosis; Applications of Input Output models for IE; Eco-efficiency; and Complex Systems. Many of the attendees, experts on the technical foundations of sustainable development, stayed for the week.

Marina Fischer-Kowalski, Director of the the Institute of Social Ecology in Vienna, opened the first day with a plenary on the global challenge that is faced in transitioning to a sustainable social metabolism. The day also featured plenaries on major international projects involving ISIE members: the Organisation for Economic Co-operation and Development's material flow analysis guidelines and the Industrial Transformation project of the International Human Dimensions Programme on Global Environmental Change.

Designing Infrastructure for Sustainable Cities was the main theme for Day 2. International consultant **Aromar Revi** presented some visionary designs for sustainable urban development from Greater Panjim, India, and other cities around the world. At the conference dinner, **John Campbell**, President and CEO of Waterfront Toronto, presented current and future plans for the sustainable development of the Toronto waterfront.

The material and energy flows associated with the massive economic growth of China pose a formidable challenge to the planet. **Yi Qian**, Professor at Tsinghua University, summarized the changes of resource use in China and discussed some of the strategies being used to manage environmental impacts, including adoption of principles of industrial ecology.

The plenary on the closing day was given by U of T Professor Emeritus **Henry Regier**. *From Stasis, Trend, Cycle, Stochastic Noise and Deterministic Chaos to Ecogenic Emergence* was a suitable title to kick off a day focussed in Complex Systems!

Chris Kennedy is an Associate Professor in the Department of Civil Engineering. For more information, please visit www.isie.ca or email christopher.kennedy@utoronto.ca.

Environment and Health Projects

Collaborative project reviewed effectiveness of public health interventions during heat episodes

By *Kate Bassil*

The Centre for Environment has been working in collaboration with partners at U of T's Department of Public Health Sciences, University of Alberta and local public health units on a project funded by the National Collaborating Centre for Environmental Health. The project, titled *What is The Evidence on Applicability and Effectiveness of Public Health Interventions in Reducing Morbidity and Mortality during Heat Episodes?*, is led by **Donald Cole** and **Kate Bassil**, Associate Professor and Ph.D. student respectively, Department of Public Health Sciences and **Karen Smoyer Tomic**, Associate Professor, Department of Earth and Atmospheric Sciences, University of Alberta.

Other U of T collaborators include the Centre for Environment's **Alan Abelsohn** (Sessional Lecturer), and **Clare Wiseman** (Assistant Professor) and the Department of Geography's **Sarah Wakefield** (Assistant Professor) and **Joanna Angus** (recent M.A. graduate), and the Department of Anthropology's **Mike Callaghan** (Ph.D. student).

Partners from local public health units include **Lori Greco**, Supervisor of the Chronic Disease and Injury Prevention Division, Region of Peel Public Health; **Douglas Sider**, Associate Medical Officer of Health, Niagara Region Public Health; and **Marco Vittiglio**, Manager of the Emergency Planning & Preparedness Unit, Toronto Public Health.

Heat events have been associated with a diverse range of adverse health effects including excess mortality as well as many symptoms falling under the broad umbrella of "heat-related illness". The impact of heat on health was clearly evident following the Chicago heat wave in 1995 which resulted in over 700 excess deaths and more recently, after the heat waves in Europe in 2003 which resulted in over 45,000 heat-related deaths. This negative impact of heat on health continues to be a persistent concern and is expected to become even more pressing in the future given the predicted meteorological changes linked to climate change. Thus, mitigating this negative impact is an important task for public health practitioners who are faced with the challenge of developing and implementing effective interventions to address both the immediate effects of heat as well as devising longer-term strategies in response to future heat events. A major gap that has been identified both in the literature as well as through communication with public health practitioners is the clear lack of information regarding the effectiveness of different public health interventions for heat-related illness.

In response to this knowledge gap, the current project is being undertaken to summarize the kinds of public health interventions used across Canada and provide evidence on the effectiveness of these interventions. The pros and cons of each intervention strategy and the literature that links these to public health practice will be examined. A complete report of the findings will be forthcoming in the fall of 2007.

Kate Bassil is a Ph.D. candidate in Epidemiology in the Department of Public Health Sciences. For more information, please contact her at kate.bassil@utoronto.ca or contact Donald Cole at donald.cole@utoronto.ca.

Study assessed Canadian post-secondary education and training in children's environment and health

By *Ingrid Leman Stefanovic and Clare L.S. Wiseman*

The purpose of a recently completed Centre for Environment project for Health Canada was to assess current post-secondary education and training opportunities in environment and health (EH) in Canada, with a specific focus on children's health and environment (CHE). The goal was to recommend a path forward for the Government of Canada to support enhanced capacity among health care professionals and researchers.

Current educational programs offered in EH at universities and colleges were identified using an internet and library search. Other educational opportunities for health professionals were also examined (i.e. continuing education). A total of 275 individuals with a variety of backgrounds were invited to participate in a survey to help identify programs offered and barriers in the current educational system, and to develop recommendations.

Our scan of current post-secondary institutions revealed a number of EH programs offered in Canada. Although some could be rated as strong, most, however, do not cover the field of EH in a comprehensive manner. Of specific concern is the fact that EH issues are generally absent in the education and training of doctors, nurses and other health professionals at post-secondary institutions.

There are a number of barriers which hinder the integration of EH and CHE in curricula at post-secondary institutions. The lack of funding available to support EH education and research is clearly a major problem. In addition, other major barriers identified included a lack of recognition of the importance of EH and CHE as a focus of study; a lack of institutional and government support; limited or unavailable expertise in EH and CHE; conflicting jurisdictional responsibilities between major actors at the provincial and federal levels and the challenges of delivering interdisciplinary programs.

The report recommends that the Government of Canada take a proactive role to: 1) increase awareness of the importance of EH and CHE as areas of research and teaching by developing government-endorsed websites and fact sheets, organizing a National Task Force, and supporting the development of "Centres of Excellence"; 2) encourage collaborative planning and coordination between government agencies to enhance CHE research and teaching across the country; 3) consolidate and identify new sources of research funding to support a coordinating Environment and Health Institute, establish Research Chairs in EH, identify new sources of funding to expand EH clinics, and support the work of NGOs in the areas of EH and CHE; and 4) champion legislation at a national level to better protect children from environmental hazards.

Special thanks go to Research Assistants **Suzannah Bennett** and **Elise Ho**, as well as to **Imran Hasan** (Information Technician), **Haris Chowdhry** (Survey Design and Internet Set-up), **Rishi Dhir** (Data Analysis) and **Alan Abelsohn** (Consultant) for their assistance on this project. We are also grateful to **Susan Ecclestone**, Senior Policy Analyst, and to **Jessi Mahon**, Policy Analyst, in the Vulnerable Populations Division, Safe Environments Programme of Health Canada, for their support and advice during this project.

Ingrid Leman Stefanovic, Professor and Director of the Centre for Environment, and Clare Wiseman, Assistant Professor at the Centre, were Principal Investigator and Research Coordinator, respectively, of this project. For more information, please email ingrid.stefanovic@utoronto.ca or clare.wiseman@utoronto.ca.

New interdisciplinary projects underway

By Bryan Purcell and Beth Savan

One of the key goals of the Centre for Environment (CFE) is to become a focal point for strong interdisciplinary environmental research projects. Over the past year, we have made significant progress towards this goal. We developed a research strategy based on the CFE's five areas of concentration: applied environmental science; environment and health; environmental policy, including energy policy; environmental ethics; and environment and international development, as well as the overarching theme of "the natural city". This led to the development of three major, interdisciplinary research projects.

The first project responds to the environment and health theme and is led by **Miriam Diamond**, Professor of Geography and the Centre's new Research Director in 2007-08. This project, entitled *Making the Connection: Studies of Air Pollution, Health Impacts, and Interventions*, will critically evaluate and recommend

interventions aimed at reducing immediate to long-term adverse health effects from exposure to outdoor air pollution. A multi-disciplinary approach will be taken, with knowledge transfer facilitated by close connections with government agencies, NGOs and health provider partners. Our original letter of intent, submitted to the Canadian Institute for Health Research, was ranked #2 amongst 35 submissions with funding provided for the next phase of full proposal submission.

The second project, entitled *Sustainable Energy Solutions*, responds to the theme of environmental and energy policy. This project is led by **Bryan Karney**, Chair of Environmental Engineering and CFE graduate faculty member. This project will take a holistic approach focusing on energy demand management, energy mix analysis, energy storage options, and renewable energy generation. A five year funding proposal has been submitted to the Ministry of Research and Innovation's Ontario Research Fund, with other potential funding sources identified for the future.

The third project, *Building Community Capacity to Measure the Quality of Urban Green Spaces*, is a project which responds to the overarching "natural city" theme and is in collaboration with **Evergreen**, an environmental NGO with a long track record of advocacy and action on community greening. The Centre is forming a research partnership with Evergreen in order to develop a framework for evaluating the social, ecological, economic, and health benefits of greening projects. A funding application has been submitted to the Ontario Trillium Foundation.

In addition to these new projects, other smaller research projects are underway, primarily in the area of environment and health [see page 8]. Together they will help to establish the Centre as the focal point for innovative environmental research at the University of Toronto.

Bryan Purcell is former Environment Research Coordinator and Beth Savan is Senior Lecturer and former Research Director (2006-07) at the Centre for Environment.

Two new initiatives with United Nations

By Ingrid Leman Stefanovic and Donna Workman

The Centre for Environment has recently become involved in two new collaborative United Nations initiatives: one with the City of Toronto and another with the Secretariat of the Convention on Biological Diversity.

The Toronto Regional Centre of Expertise on Education for Sustainable Development

Citing the recently drafted Memorandum of Understanding, the Toronto Regional Centre of Expertise (RCE) is a "coalition of formal, informal, and non-formal educators collaborating to promote the objectives of the UN Decade for Education for Sustainable Development (ESD) in the Toronto region, and in doing so, empower students, the general public, and professionals to transform the Toronto region to a sustainability-oriented society."

The Toronto RCE is a collaborative effort, bringing together the University of Toronto, the City of Toronto, York University, the Toronto District School Board, the Toronto Zoo, Citizens' Environment Watch, the Toronto & Region Conservation Authority, Seneca College, the Ontario ESD Working Group and Environment Canada.

In addition to creating an inventory of existing ESD initiatives and identifying case studies that represent Toronto's "best practices," the RCE will focus on expanding formal and informal educational initiatives relating to the recently-released City of Toronto's Climate Change, Clean Air and Sustainable Energy Action Plan.

Toronto was invited to join the international RCE network in 2005. After a number of informal consultations and meetings coordinated by the City of Toronto, **Ingrid Stefanovic**, Director of

the Centre for Environment, was elected to serve as Chair of the Steering Committee of the RCE for a one year term.

Local initiatives of the Toronto RCE will help coordinate and strengthen local community efforts to enhance awareness and education in the field of sustainable development in Toronto. At the international level, the RCE will feed into the "Global Learning Space for Sustainable Development" coordinated by the UN University. Nationally, it will contribute to Canada's response to the UN Decade for Sustainable Development and the province's Education Alliance for a Sustainable Ontario (EASO).

United Nations Convention on Biological Diversity

The Centre for Environment has also signed on as a new member of a collaborative agreement between the Secretariat of the Convention on Biological Diversity of the United Nations Environment Programme and Canadian universities and research centres. Ratified at the 1992 Rio Earth Summit by 150 government leaders, the Convention on Biological Diversity is dedicated to promoting sustainable development. Through stronger collaboration with the academic and research community, the Secretariat aims to enhance the quality of scientific and technical advice in the Convention's work and the implementation of policy directives.

The first planning meeting with university representatives was held at the Secretariat's headquarters in Montreal on September 26, 2006. Collaborative research initiatives on themes of biological diversity will continue to be explored.

Ingrid Leman Stefanovic is Director of the Centre for Environment. Donna Workman is Manager, Program Development and External Relations, Centre for Environment. For more information, please email d.workman@utoronto.ca.

Adaptation & Impacts Research Division

Part of the Science and Technology Branch of Environment Canada, the Adaptation and Impacts Research Division's (AIRD) 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. A key element of the research agenda is carried out through partnerships and collaborations, such as the formal arrangements with specific universities: British Columbia, Waterloo, New Brunswick and Toronto, where the group has a co-operative research relationship with the Centre for Environment and the Department of Physical and Environmental Sciences at U of T at Scarborough. AIRD's collaborative research at the Centre 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 Director is **Don MacIver**.

Researchers and Projects

Brad Bass

Office: Centre for Environment, Room 3039, 33 Willcocks St., U of T, tel: 416-978-6285; fax: 416-978-3884; brad.bass@ec.gc.ca

Research Interests: Simulating adaptation with anticipatory/emergent computing; ecological engineering adaptations to atmospheric change (green walls, green roofs and living machines); energy sector adaptations to climate, policy and technological change; climate change scenarios.

Projects:

1. *Simulating Adaptation with Anticipatory/Emergent Computing.* This research program uses agent-based simulation in the COBWEB (Complexity and Organized Behaviour Within Environmental Bounds) platform to explore the behaviour of complex systems in a changing environment.
2. *Ecological Engineering Adaptations to Atmospheric Change.* The Environmental Services Performance-research model is used to simulate the effectiveness of green roofs and walls in reducing energy consumption. Living machines are used to assess the impact of different green roof plants on air quality.
3. *Energy Sector Adaptations to Climate, Policy and Technological Change.* Energy sector adaptations to climate and policy changes have been explored for Ontario and different regions using the Canadian Regional Energy Model, developed in collaboration with the University of Regina.
4. *Climate Change Scenarios.* The main node of the Climate Change Scenarios Network (CCSN) is located within the Centre for Environment. The CCSN is used to disseminate global climate model output, analytical tools and technical advice for climate impact assessment.

Grace Koshida

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Research Interests: Agricultural and urban drought impacts; high-impact weather events; disaster mitigation; climate change impacts on Canadian water resources.

Projects:

1. *Canadian Agricultural Adaptations to 21st Century Droughts: Preparing for Climate Change?* The objective of this project, completed in March 2007, was to determine the effectiveness of

FOR MORE INFORMATION:

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

current adaptation options in reducing the vulnerability of agriculture to drought. Regional stakeholder consultations and case studies were carried out in Southern Ontario, Nova Scotia and Prince Edward Island.

2. *The Tap Runs Dry: Lessons Learned and Forgotten by Southern Ontario Communities During Past Severe Droughts and Implications for Climate Change.* This project, completed in March 2007, focussed on documenting past drought impacts and responses in southern Ontario communities. Drought contingency plans in cities have primarily focused on temporary reactive management of water shortages rather than on water supply protection plans. One of the key outputs from the project was a vulnerability index and web-based mapping tools to quantify and visualize drought vulnerability.

Monirul Mirza

Office: Dept. of Physical and Environmental Sciences, Room S-653, U of T at Scarborough, 1265 Military Trail, Toronto, Ontario, M1C 1A4; tel: 416-208-4874; fax: 416-287-7279; monirul.mirza@utoronto.ca

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

Projects:

1. *Climate Change and the Canadian Energy Sector.* This book project, co-authored by Brad Bass and Heather Auld, is to be published by Springer U.S. by the end of 2007. The objective was to develop a nationally consistent set of energy sector scenarios of historical and future climate. The vulnerability of the Canadian Energy Sector to climate change was also investigated. Possible adaptation measures were suggested.
2. *Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* M. Mirza was a contributing author in The Intergovernmental Panel on Climate Change (IPCC) of the United Nations' Fourth Assessment Report (AR4) and Synthesis Report to be published in September and November, 2007, respectively.
3. *International Assessment of Agricultural Science and Technology for Development (IAASTD); ESAP Regional Assessment.* The IAASTD is an international effort involving 900 participants and 110 countries that will evaluate the relevance, quality and effectiveness of agricultural knowledge, science, and technology (AKST), and the effectiveness of public and private sector policies and institutional arrangements in relation to AKST. It is a three-year collaborative effort (2005-2007) that will assess AKST in relation to meeting development and sustainability goals of reducing hunger and poverty, improving nutrition, health and rural livelihoods, and facilitating social and environmental sustainability. M. Mirza is leading the "Scenarios" Chapter of the East, South Asia and the Pacific Regional Assessment. The Report is expected to be published in January 2008.

Jane Goodall Institute moves to U of T



Michael Neugebauer



Rebecca Pinkus

In 2007, the Centre for Environment has established a collaboration with the Jane Goodall Institute of Canada founded by Dr. Jane Goodall, DBE, UN Messenger of Peace. The collaboration will provide opportunities for student internships and new research initiatives on topics relating to primate and community based conservation research, particularly in Africa.

By Donna Workman

The Centre for Environment is pleased to be partnering with the Jane Goodall Institute of Canada (JGI), a major, international non-profit organization dedicated to wildlife research, environmental education and the conservation and welfare of all species while encouraging social change within the developing world. The new partnership, announced in January 2007, relocated JGI's national office to the University of Toronto and includes collaborations on teaching and research, guest speakers on JGI's conservation programs in Africa and opportunities for University of Toronto students to participate in JGI's programs at the University as well as abroad.

Founded in 1977, JGI continues Dr. Jane Goodall's pioneering research of chimpanzee behaviour: research that transformed scientific perceptions of the relationship between humans and animals. Today, the Institute is a global leader in the effort to protect Great Apes and their habitats and is widely recognized for its innovative conservation and development programs in Africa and for *Roots & Shoots*, a global environmental and humanitarian education program. It has been 30 years since Dr. Goodall founded the Jane Goodall Institute in California, in response to what she saw as an overwhelming need for action in the face of the rapid degradation of critical habitat for chimpanzees and other African wildlife. Today, the Institute has evolved into a dynamic international

organization that supports wildlife research, conservation and education.

A graduate scholarship in Dr. Goodall's name has been created to allow for international student exchanges between Africa and the Centre for Environment. It is our hope that this scholarship will encourage Canadian students to better understand the challenges of sustainability that the developing world is facing. At the same time, the scholarship will provide support for students from African countries to share their ideas and dreams with us and to jointly explore solutions to enhance environmental health and well-being. [See page 29.]

Dr. Goodall will receive an Honorary Doctorate from the University of Toronto in November 2008. A ceremony will be held at that time to honour the occasion and thank donors for their contributions to the scholarship. For more information, please contact Donna Workman (see shaded box).

In a special lecture prior to the *Natural City Conference* in 2006, Dr. Goodall presented her message *The Future of Hope*. On September 15, 2007, Dr. Goodall will return to the University to present *Gombe and Beyond*, marking the 30th anniversary of the founding of the Jane Goodall Institute. She will describe some of the latest research being undertaken at Gombe Stream National Park in Tanzania, where the 47-year chimpanzee research program she initiated continues today. She will also discuss the critical need to protect Africa's Great Apes and other wildlife species in the

FOR MORE INFORMATION:

Jane Goodall Institute of Canada:
www.janegoodall.ca
 tel: 416-978-3711
 email: info@janegoodall.ca

September 15, 2007 U of T Lecture:
 Tickets: www.uofttix.ca, 416-978-8849.
 Information: Donna Workman
 tel: 416-978-7077
d.workman@utoronto.ca

face of mounting pressures, including the commercial bushmeat trade, and about the hope that has been introduced by the Jane Goodall Institute's innovative community-centred conservation programmes, which meld habitat conservation with efforts to improve the lives of African communities. **For tickets, please visit www.uofttix.ca/ or call 416-978-8849.**

On September 17, 2007, Dr. Goodall will host a question and answer session for Centre for Environment students as well the grade 10 science class of the University of Toronto Schools on the theme of *Community-Centred Conservation: Finding Ways to Meet the Needs of People and Wildlife and Habitat*. Students were asked to submit their questions which will be chosen by a panel of experts in collaboration with Dr. Goodall.

Donna Workman is Manager, Program Development and External Relations, Centre for Environment.

U of T Sustainability Office



Gail Alivio

One of the U of T Sustainability Office's successful projects called *Rewire* was officially launched with a "wire cutting" ceremony on September 26, 2006. From left to right are U of T President David Naylor, Philip Jessup (Executive Director, Toronto Atmospheric Fund), Peter Love (Chief Energy Conservation Officer, Conservation Bureau), Richard Lü (Chief Conservation Officer, Toronto Hydro Corp.), Beth Savan (Director, U of T Sustainability Office) and Matto Mildenberger (U of T fourth year student).

By Bryan Purcell and Beth Savan

The Centre for Environment is pleased to have had a successful relationship with the University of Toronto Sustainability Office. The Office was established in late 2004 with considerable support from across the University, meeting the need for a central body that would undertake energy and resource conservation projects and initiatives. Through the Office, the university community is engaged in contributing to a healthier campus by bridging the gap between sustainability research and institutional practice.

The Office's short term mission is to substantially reduce the consumption of energy and other resources at the University. In the medium term, it will develop and employ policies and programs to increase energy conservation and green space, and reduce waste and pollution. Finally, in the long term, the Office aims to create a culture of sustainability at the University, which will be reflected in its functions and operations, resulting in tangible environmental, economic and social benefits.

The direction of the Office is under the guidance of the Sustainability Director **Beth Savan**, also Senior Lecturer at the Centre for Environment. Two coordinators and a number of full-time interns are directly involved with the Office's projects. Additionally, each year between 30-40 work-study and part-time summer students are employed to assist in project planning and implementation, and approximately 75 students are engaged through course work, independent study courses, and placements.

The energy and creativity of students has been central to the success of the Sustainability Office. Through the *Seeds of Change* program, successful student-led initiatives are adopted by the Office and spread across campus. Three of our largest projects were conceived and implemented in this manner. The first, a student-run bicycle network known as *Bikechain*, provides free bicycle maintenance and fix-it-yourself workshops to the campus community, and serves as a hub for the city's vibrant cycling culture. The second, a unique, community-based energy

FOR MORE INFORMATION:

www.sustainability.utoronto.ca

tel: 416-978-6792

email: sustainability@utoronto.ca

conservation campaign known as *Rewire*, empowers students, staff, and faculty to reduce their energy usage through simple changes in lifestyle and technology. The third, a paper conservation campaign known as *ReSource*, aims to radically reduce the massive amount of paper consumed by the university, currently estimated at over a billion sheets of paper every year. For each of these projects, rigorous monitoring and research ensures that we learn from our experience — both how to conserve resources more effectively and what the implications are for the broader society. Our goal is to publish findings for all projects in scholarly and popular journals.

The Sustainability Office is also working with the Facilities and Services Department to retrofit a number of buildings on campus to increase energy efficiency and reduce greenhouse gas emissions. Currently, a 20 million dollar retrofit program is underway, which will replace lighting systems in Robarts Library, the Ontario Institute for Studies in Education, and the Medical Sciences Building. The project will also replace 18 "chillers" (central cooling systems) on campus, increasing their efficiency by 30 percent and safely disposing of the chlorofluorocarbons (CFC) currently being used in the old chillers. Once completed, these retrofits may save the university 1.3 million dollars per year and reduce annual greenhouse gas emissions emissions by 3100 tonnes of eCO₂, the equivalent to taking 600 cars off the road.

In its newest initiative, the Sustainability Office is partnering with the Toronto Atmospheric Fund and other organizations to assess the feasibility and benefits of deploying Plug-in Hybrid Electric Vehicles (PHEVs) in public and private sector fleets. PHEVs' batteries can be charged from grid power and operate for up to 100 kilometres without using the vehicle's engine, providing twice the fuel economy of a conventional hybrid vehicle. A pilot fleet of 10 vehicles, including one U of T vehicle, will be converted into PHEVs and tested under a variety of conditions.

The Sustainability Office works collaboratively with the Centre for Environment (CFE) in a number of areas. CFE provides the Sustainability Office with its current office space, and assists the Office with administrative and IT support. The Sustainability Office provides opportunities for CFE students in the form of professional, work/study, volunteer placements, course work projects, and supervision of independent study courses. For example, CFE undergraduate student **Emmanuel Mabe** is currently working on a detailed, campus-wide survey of solar energy potential for an independent study course.

The Office has had considerable success in bridging academia with action by using the campus as a living laboratory to advance sustainability. The collaborative relationship between the Sustainability Office and the Centre for Environment has been central to this success and has brought tangible benefits to both organizations in the form of increased student engagement and new research opportunities. The coming year will no doubt bring further opportunities for collaboration between the two organizations in the area of sustainability research and practice.

Bryan Purcell is Environment Research Coordinator at the U of T Sustainability Office and Beth Savan is U of T Sustainability Director and also Senior Lecturer at the Centre for Environment.

Undergraduate Programs

The Centre offers a variety of core, specialist and major environmental programs, including a new Environmental Ethics Major Program, as well as directed minor programs.

Core Programs

Three core programs provide a choice of interdisciplinary B.A. or B.Sc. minor, major or specialist streams:

1. Environment and Science (B.Sc.) is a core multidisciplinary program with a strong science focus which students combine with another science program. This combination provides the scientific basis for an understanding of the physical, chemical and biological behaviour of planet Earth and gives the student an introduction to the economic, political and cultural influences that govern the choices we make about the environment.

2. Environment and Society (B.A.) is a core program which students combine with another program in the social sciences, sciences or humanities. This combination allows students to develop expertise in a specific discipline, to see the contribution the discipline makes to the protection and enhancement of the environment while developing an awareness of the scientific, socio-economic, political, technological and cultural influences that govern our choices.

3. Environmental Policy and Practice (B.A.): This program offers rigorous academic study of the economic, social and political forces driving today's issues — globalization, species extinction, the Kyoto Protocol on climate change, the fight for sustainable cities, smog, toxic pollution and human health. Students gain both academic skills and knowledge and practical skills and experience, both in the class-room and in the community and gives students a grounding in scientific literacy and evolving cultural attitudes toward nature.

Interfaculty combination with International Development Studies, UTSC: Students may pursue this program (Specialist or Major) in conjunction with a Major program in International Development Studies at U of T at Scarborough (UTSC). UTSC students pursuing a Specialist program in International Development Studies may also do this in conjunction with the Centre's Major program in Environmental Policy and Practice.

Collaborative Specialist & Major Programs

Seven programs combine the Centre's interdisciplinary core with a focused set of discipline-specific courses:

1. Earth Systems (B.Sc. with the Department of Physics) brings the basic science orientation of Environment and

FOR MORE INFORMATION:

www.environment.utoronto.ca
or contact David Powell:
416-946-8100,
david.powell@utoronto.ca

Science together with an understanding of the solid earth, oceans, and atmosphere on a planetary scale emphasizing the Earth as a unified, dynamic system.

2. Environment and Health (B.Sc. with Human Biology at New College and Basic Medical Science) integrates life and health sciences components with an environment and science program, providing the scientific basis for understanding the physical, chemical and biological behaviour of planet earth, the workings of the human body, and the relationships between the two. Students are also introduced to the economic, political and cultural influences that govern the choices we make about the environment and their implications for human health.

3. Environmental Chemistry (B.Sc. with the Department of Chemistry) focuses on the development of a fundamental background in chemistry as applied to understanding the impacts of human activities on the soil, air, and water. Emphasis is given to developing analytical skills and mechanistic understanding.

4. Environmental Geosciences (B.Sc. with the Department of Geology) focuses on physical, chemical and biological events that have occurred over the past 4.5 billion years including the present influences of humans as agents of geologic change. Topics include earth materials, sedimentary geology, aqueous geochemistry, hydrogeology and biogeochemistry.

5. Past Environments (B.Sc. with the Department of Anthropology, and the Archeology Program) is a multi-disciplinary program focused on the changing nature of the relationship between the environment and humans over the past 2 million years.

6. Environment and Toxicology (B.Sc. with the Department of Pharmacology) Toxicology is the study of the harmful effects of chemicals. The Environment and Toxicology program examines the adverse effects of chemicals at the ecological level. This program prepares students for advanced graduate study and research in environmental toxicology, and for consultative positions in governmental agencies and industry.

7. Environmental Ethics (B.A. with the Department of Philosophy) explores how value judgements and world views affect environmental decision-making.

Directed Minors

Eight minors are offered, intended for students interested in acquiring a limited body of environmental knowledge in one discipline.

1. Environmental Anthropology (B.A.);
2. Environmental Biology (B.Sc.);
3. Environmental Chemistry (B.Sc.);
4. Environmental Economics (B.A.);
5. Environmental Geosciences (B.Sc.);
6. Geographic Information Systems (B.A.);
7. Life and Environmental Physics (B.Sc.); and
8. Physical and Environmental Geography (B.Sc.)

Courses

2007-08 offerings and instructors indicated are subject to change. (*Not offered.)

- ENV199Y Debating and Understanding Current Environmental Issues (*Ing, Macdonald*)
- ENV200Y Assessing Global Change: Science and the Environment (*Zimmerman, Ing*)
- ENV223H Fundamental Environmental Skills (*Ing*)
- ENV234Y Environmental Biology (*Eckenwalder*)
- ENV235Y Physics and Chemistry of Planet Earth (*Abbatt, Mitrovica*)
- ENV236Y Human Interactions with the Environment (*Cowling*)
- ENV299Y Research Opportunity Program (*Bass, Savan*)
- ENV315H Chemical Analysis of Environmental Samples (*Gorton*)
- ENV320Y National and International Environmental Policy Making (*Macdonald*)
- ENV321Y Approaches to Environmental Issues (*Lukasik, Cypher, Phillips*)
- ENV332H Culture and Nature (*Warkentin*)
- ENV333H Ecological Worldviews (*Leduc*)
- ENV335H Environmental Design (*Waite-Chuah*)
- ENV340H Informed Environmental Practice
- ENV341H Environment & Human Health (*Abelsohn*)
- ENV350H Energy and Environmental Policy and Politics (*Houldin*)
- ENV395Y Special Topics Field Course (*Davis*)
- ENV410H Environmental Research Skills (*Neilson*)
- ENV420Y Environmental Research (also ENV 421H; *Ing, Macdonald*)
- ENV422H Environmental Law (*Muldoon*)
- ENV423H Public Policy and Environment (*Houldin*)
- ENV424H Environment & Community Engagement*
- ENV440Y Professional Experience Course (*Savan*)
- ENV441H Politics of the Environment*
- ENV442H Corporate Perspectives on Environment*
- ENV443H Applied Environmental Research* (also ENV444H*)
- ENV445H U.S. Environmental Politics*
- ENV446H Cities and Urban Environmentalism in a Global Context
- ENV447H The Power of Economic Ideas (*Houldin*)
- ENV481H Special Topics in the Environment I
- ENV482H Special Topics in the Environment II
- ENV483Y Special Topics in the Environment III
- ENV490Y Senior Essay
- ENV491Y Independent Studies Project (also 492H/493H)
- JGE221Y Environment & Sustainable Development (*Diamond, Hartmann, Leduc*)
- JIE307Y Urban Sustainability (*Opoku-Boateng*)

Graduate Programs

The Centre offers two interdisciplinary collaborative graduate programs and a one-year stand-alone Master's Professional Program in Environmental Science located at U of T at Scarborough. A stand-alone Masters in Environment is in the planning stages at the present time.

Collaborative Graduate Programs

The Centre offers two collaborative graduate programs at the Master's and Ph.D. level, which provide students with an opportunity to pursue interdisciplinary, graduate education, in conjunction with disciplinary grounding in departments and faculties. Students are required to enroll in one of the collaborating units listed below. By special arrangement, students may be admitted from other departments than those listed. Core courses are required to facilitate interdisciplinary learning.

1. Environmental Studies

This program is offered by the Centre for Environment, in conjunction with the graduate units of Adult Education, Community Development and Counselling Psychology (OISE/UT), Anthropology, Chemical Engineering and Applied Chemistry, Chemistry, Economics, Ecology and Evolutionary Biology, Forestry; Geography; Geology; Information Studies; Management, Philosophy, Program in Planning (Geography), Political Science, Religion, Sociology; Sociology and Equity Studies in Education (OISE/UT), and Women and Gender Studies. The program encompasses a broad range of sub-fields within environmental policy, management and environmental science.

2. Environment and Health

The Centre for Environment offers this program in conjunction with the graduate units of Geography and Planning, Medical Science, Public Health Sciences, and Women and Gender Studies. It has the aim of providing students in the health sciences with a broad environmental perspective while exposing environmental students to the health implications of environmental quality. In this respect, the program is designed to meet the needs of students who are concerned with sociological and policy approaches, as well as those working on the pathophysiology of human disease and those who are focussing on the pathways of contaminants in the environment.

Courses (Collaborative Programs)

2007-08 course offerings and instructors indicated are subject to change.

Core Courses

- ENV 1001H Environmental Decision Making (*P. Byer, K. Maly*)
- ENV 4001H Seminars in Environment and Health (*A. Abelsohn, D. O'Hara, C. Wiseman*)

Other Courses

- ENV 1002H Environmental Policy (*D. Macdonald*)
- ENV 1004H Urban Sustainability (*newly offered in 07-08; B. Bass*)
- ENV 1005H Business and Environmental Politics (*newly offered in 07-08; D. Macdonald*)
- ENV 1410H Analytical Environmental Chemistry (*S. Mabury*)
- ENV 1444H Capitalist Nature (*W.S. Prudham*)
- ENV 1701H Environmental Law (*P. Muldoon*)
- ENV 1703H Water Resources Management (*A.P. Grima*)
- ENV 1704H Environmental Risk Analysis and Management (*A.P. Grima*)
- ENV 1706H Natural Hazards and Natural Disasters (*M. Mirza*)
- ENV 1707H Environmental Finance: Risk Management and Business Opportunities (*J. Ambachtsheer, S. McGeachie*)
- ENV 2000H Independent Study
- ENV 2001H Special Topics in Environment and Health
- ENV 2002H Special Topics: Environmental Governance
- ENV 3000H Special Topics: Environment and Health
- JEI 1901H Technology, Society & Environment (*W. Vanderburg*)

FOR MORE INFORMATION:

Collaborative Graduate Programs:

www.environment.utoronto.ca
or contact Pavel Pripa, 416-978-3475,
pavel.pripa@utoronto.ca

M.Env.Sc. at U of T Scarborough:

<http://www.utsc.utoronto.ca/envsci/menvsci>
or contact Julie Quenneville, 416-287-7357,
menvsc@utsc.utoronto.ca

- JEI 1902H Technology, Society & Environment II (*W. Vanderburg*)
- JGE 1212H Fate of Contaminants in the Environment (*M. Diamond*)
- JGE 1420H Urban Waste Management: An International Perspective (*V. Maclaren*)
- JGE 1609H Cities, Industry and the Environment (*P. Desrochers*)
- JGN 2607H Advanced Techniques in Hydrology (*K. Howard*)
- JNC 2503H Environmental Pathways (*C. Jia*)
- JPV 1201H Politics, Bureaucracy and the Environment (*not offered*)
- JVP 2147H Environmental Philosophy (*K. Maly*)

Master of Environmental Science Professional Program

This one-year professional degree program offered by the Centre is physically located and administered in the Department of Physical and Environmental Sciences at U of T at Scarborough (UTSC). This stand-alone program in the field of "biophysical interactions in terrestrial and aquatic systems" focuses on the transport and fate of contaminants in natural and degraded environments. The objective of the program is to produce skilled practitioners of environmental science, well-trained in field and laboratory techniques, primarily to meet the needs of private industry and governmental and non-governmental organizations. It consists of three programs: I) coursework plus research paper, II) coursework plus internship and III) part-time study of I or II.

Courses (M.Env.Sc. at UTSC)

2007-08 course offerings and instructors indicated are subject to change.

- ENV 1100H Advanced Seminar in Environmental Science (*B. Greenwood*)
- ENV 1101Y Research Paper in Environmental Science
- ENV 1102H Analytical Chemistry for Geoscientists (*not offered*)
- ENV 1103H Air and Water Quality Sampling and Monitoring (*not offered*)
- ENV 1104H Methods for the Detection of Pathogens (*R. Fulthorpe*)
- ENV 1105H Soil Contamination Chemistry (*M. Simpson*)
- ENV 1106H Geology and Geophysics of the Shallow Subsurface (*N. Eyles*)
- ENV 1107H Remediation Methods (*N. Hijazi*)
- ENV 1108H Environmental Science Field Camp (*N. Eyles, K. Howard, R. Fulthorpe*)
- ENV 1109H Advanced Techniques in Geographic Info. Systems (*M. Doughty*)
- ENV 1110H Sediment/Contaminant Transport in Aquatic Systems (*B. Greenwood*)
- ENV 1111H Freshwater Ecology and Biomonitoring
- ENV 1112H Boundary Layer Climates and Contaminant Fate (*W. Gough*)
- ENV 1113H Groundwater Hydrochemistry & Contaminant Transport (*K. Howard*)
- ENV 1114H Directed Readings in Environmental Science I
- ENV 1115H Directed Readings in Environmental Science II
- ENV 1116H Internship Placement
- ENV 1117H Climate Change Impact Assessment (*W. Gough*)
- ENV 1118H Fundamentals of Ecological Modelling (*G. Arhonditsis*)
- ENV 1119H Quantitative Environmental Analysis (*G. Arhonditsis*)
- ENV 1120H The Dynamics of Contaminant Dispersal in Fluids (*M. Wells*)
- ENV 1121H Modeling Fate of Organic Chemicals in the Environment (*F. Wanja*)
- ENV 1122H Global Environmental Security & Sustainable Development (*Mirza*)
- ENV 1701H Environmental Law
- ENV 1704H Environmental Risk Analysis and Management

Certificate Programs

The success of the online distance education programs has led to an addition of four new programs. A Juris Doctor in Environmental Studies with Law is also offered.

Distance Education

The Centre for Environment offers a selection of internet-based environmental certificate programs that are designed for beginners as well as professional and educational development for environmental practitioners, professionals, and management. We are pleased to announce that new programs in **Renewable Energy** (Certificate and Advanced Certificate) have commenced in the fall of 2007 and an **Advanced Certificate in GIS for Environmental Management** is proposed to start in the spring of 2008. The latter builds on the existing Certificate in GIS for Environmental Management. Another new **Certificate program in Environment and Health** is proposed to start in the fall of 2008.

In January 2007, the Centre for Environment also entered into a partnership with the **Canadian Centre for Environmental Education (CCEE) at Royal Roads University**, Victoria, B.C., to deliver on-line distance education courses which may be used as elective courses towards CCEE's newly created Certificate in Environmental Practice. For more information, please visit <http://www.ccee.ca/>.

Graduates of the certificate programs 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.

Environmental Management

Instructors: Kimberley Snarr and Hannah Dvorak-Carbone.

Certificate: Environmental management includes impact assessment, but also involves other strategies and tools, such as adaptive management, risk assessment, environmental site audits, assessments and remediation and conflict resolution. The objectives of this program, consisting of two courses, is to develop an understanding of the basic premises, theories and practices associated with environmental management and provide an insight into the systems approach by which management can be employed to mitigate a wide range of environmental problems.

Advanced Certificate: This program, consisting of four courses, builds on the

objectives of the Certificate program and is designed to bridge the gap between theoretical knowledge and methodologies of environmental management with a detailed deconstruction of Canadian issues. Grounded in a holistic approach to sustainable development, the advanced certificate program aims to develop strategic, consensual, and inclusive solutions to resource and environmental management case studies. The program also raises awareness of the complexity of risk management in addressing health, economics and environmental conservation.

GIS for Environmental Management

Instructor: Michael Govorov.

Certificate: Environmental GIS (Geographical Information Systems) describes the use of geo-spatial management methodology and tools in order to assist in the decision making processes that together form an environmental management strategy. The objectives of this program are to build a foundation for understanding of GIS and Remote Sensing theory and techniques, and develop GIS software skills to solve practical tasks related to environmental management. The program is comprised of the two courses which use GIS software.

Advanced Certificate: Proposed to start in the spring of 2008, this program will build on the fundamentals of the Certificate program by offering additional courses in geospatial technologies for environmental mapping with GIS, environmental remote sensing and GIS modeling for environmental applications.

Renewable Energy

Certificate: Renewable energy is becoming one of the fastest growing industries in the face of the current environmental crisis, resulting from dependence on fossil fuels and unprecedented global rate of development. This new program consists of two courses that explore historical and current perspective on forms of renewable energy, their current usage in developed and developing nations, drivers in forming markets, and political will. The interdisciplinary approach provides a holistic view of the impact of renewable energy to the current global energy picture.

Advanced Certificate: Students may combine the two courses in the above

FOR MORE INFORMATION:

Distance Education:
<http://distanceed.environment.utoronto.ca/>
or contact Donna Workman:
416-978-7077
d.workman@utoronto.ca

Juris Doctor Certificate:
www.law.utoronto.ca
416-978-3716
law.admissions@utoronto.ca

Renewable Energy certificate with the two courses in Environmental Management certificate program to obtain an Advanced Certificate in Renewable Energy. The incorporation of renewable energy into the foundation of environmental management provides students with the necessary strategies and basic premises to place the various forms of renewable energy into the systems approach of environmental management. Grounded in a holistic approach to sustainable development, the advanced certificate program aims to develop strategic, consensual, and inclusive solutions to the renewable energy and environmental management case studies.

Juris Doctor Certificate in Environmental Studies

This certificate program is offered by the Faculty of Law and the Centre for Environment and is designed for Juris Doctor (J.D.) students interested in environmental law and policy. The program enables these students to specialize in their area of interest and obtain a form of accreditation for doing so. In addition to the J.D. degree, students in the program will receive a certificate issued by the Faculty of Law stating that they have successfully completed the program requirements.

In the first year, students will complete all first year courses in the Faculty of Law. In the second and third years, students will complete a minimum of 48 law school credits, including *Environmental Law*. Students will also take one core course, one elective course, write a research paper, and complete an internship.

Appointed and/or Administrative Faculty

(See pages 17-22 for research profiles. The Centre for Environment is noted as CFE.)

- * Philip Byer, *Professor, Civil Engineering/CFE*
Acting Director, CFE, July-Dec, 2007
- Hilary Cunningham, *Professor, Anthropology;*
Graduate Coordinator, CFE;
Acting Director, CFE, Jan-June, 2008
- Miriam Diamond, *Professor, Geography*
Research Director, CFE
- Karen Ing, *Senior Lecturer, CFE;*
Undergraduate Coordinator, CFE
- Douglas Macdonald, *Senior Lecturer, CFE*
- W. Scott Prudham, *Associate Professor,*
Geography/CFE
- * Beth Savan, *Senior Lecturer, CFE;*
Stephen Scharper, *Associate Professor,*
Anthropology, U of T Mississauga/CFE
Acting Grad. Coord., CFE, Jan-June, 2008
- + Ingrid Stefanovic, *Professor, CFE/Philosophy*
Director, CFE
- Willem Vanderburg, *Professor,*
Civil Engineering/CFE
- Clare Wiseman, *Assistant Professor, CFE*
Coordinator, Environment and Health Program
- * **On leave January to June, 2008**
- + **On leave July, 2007 to June, 2008.**

Undergraduate Instructors

(Please see page 13 for courses.)

- Jonathan Abbatt, *Chemistry*
- Alan Abelsohn, *Family & Community Medicine*
- Brad Bass, *Environment Canada*
- Sharon Cowling, *Geography*
- Jennifer Cypher, *York University*
- Anthony Davis, *Geography*
- Miriam Diamond, *Geography*
- James Eckenwalder, *Ecology & Evolutionary Biology*
- Mike Gorton, *Geology*
- Franz Hartmann, *Toronto Environmental Alliance*
- Russ Houldin, *Ontario Energy Board*
- Karen Ing, *Centre for Environment*
- Timothy Leduc
- Lynda Lukasik
- Douglas Macdonald, *Centre for Environment*
- Jerry Mitrovica, *Physics*
- Paul Muldoon, *Environmental Review Tribunal*
- Alison Neilson
- Ernest Opoku-Boateng
- Catherine Phillips
- Beth Savan, *Centre for Environment*
- Sheila Waite-Chuah, *Ont. Coll. of Art & Design*
- Traci Warkentin
- Ann Zimmerman, *Ecology & Evolutionary Biology*

Distance Education Instructors

(Please see page 15 for courses.)

- Hannah Dvorak-Carbone, *The Children's Nature Institute, Los Angeles, California*
- Michael Govorov, *Malaspina University-College, British Columbia*
- Kimberley Snarr, *Ph.D., Dept. of Anthropology and Centre for Environment, U of T*

Graduate Faculty

(See page 14 for graduate course instructors.)

Full Members:

- Jonathan Abbatt, *Chemistry*
- Barry Adams, *Civil Engineering*
- Grant Allen, *Chem. Engineering & Applied Chemistry*
- Robert Andrews, *Civil Engineering*
- George Arhonditsis, *Physical & Environmental Sciences, UT Scarborough*
- Spencer Barrett, *Ecology & Evolutionary Biology*
- Terry Blake, *Forestry*
- Alana Boland, *Geography*
- Brian Branfireun, *Geography, UT Mississauga*
- Michael Bunce, *Social Sciences, UT Scarborough*
- Philip Byer, *Civil Engineering/CFE*
- Catherine Chalin, *Public Health Sciences*
- Jing Chen, *Geography*
- Donald Cole, *Public Health Sciences*
- Paul Cooper, *Forestry*
- Paul Corey, *Public Health Sciences*
- Donald Cormack, *Physical & Environmental Sciences, UT Scarborough*
- Sharon Cowling, *Geography*
- Frank Cunningham, *Philosophy*
- Hilary Cunningham, *Anthropology*
- Helene Cyr, *Ecology & Evolutionary Biology*
- Amrita Daniere, *Geography*
- Anthony Davis, *Geography*
- George Dei, *Sociology & Equity Studies in Education (OISE/UT)*
- Donald Dewees, *Economics*
- Miriam Diamond, *Geography*
- James Eckenwalder, *Ecology & Evolutionary Biology*
- Elizabeth Edwards, *Chemical Engineering & Applied Chemistry*
- Margrit Eichler, *Sociology & Equity Studies in Education (OISE/UT)*
- Mark Engstrom, *Ecology & Evolutionary Biology/ROM*
- Greg Evans, *Chem. Engineering & Applied Chemistry*
- Nick Eyles, *Physical & Environmental Sciences, UT Scarborough*
- Roberta Fulthorpe, *Physical & Environmental Sciences, UT Scarborough*
- William Gough, *Physical & Environmental Sciences, UT Scarborough*
- Brian Greenwood, *Physical & Environmental Sciences, UT Scarborough*
- L. Danny Harvey, *Geography*
- D. Linn Holness, *Public Health Sciences*
- Tad Homer-Dixon, *Political Science*
- Ken Howard, *Physical & Environmental Sciences, UT Scarborough*
- Charles Jia, *Chem. 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)*
- Scott Mabury, *Chemistry*
- Laurel MacDowell, *History, UT Mississauga*
- Virginia Maclaren, *Geography*
- Heather MacLean, *Civil Engineering*
- Jay Malcolm, *Forestry*
- David Martell, *Forestry*
- Patricia McCaig, *Political Science*
- Andrew Miall, *Geology*
- Eric Miller, *Civil Engineering*
- G.W. Kent Moore, *Physics, UT Mississauga*
- D. Scott Munro, *Geography, UT Mississauga*
- Jennifer Murphy, *Chemistry*
- Anthony Price, *Physical & Environmental Sciences, UT Scarborough*
- W. Scott Prudham, *Geography/CFE*
- Douglas Reeve, *Chem. Engineering & Applied Chem.*
- Helen Rodd, *Ecology & Evolutionary Biology*
- Rowan Sage, *Ecology & Evolutionary Biology*

- Mohini Sain, *Forestry*
- K. Richard Sandbrook, *Political Science*
- Andrea Sass-Kortsak, *Public Health Sciences*
- Lawrence Sawchuk, *Anthropology, UT Scarborough*
- Stephen Scharper, *Anthropology, UT Mississ./CFE*
- Barbara Sherwood Lollar, *Geology*
- Krystyna Sieciechowicz, *Anthropology*
- Frances Silverman, *Medicine*
- Andre Simpson, *Physical & Environmental Sciences, UT Scarborough*
- Myrna Simpson, *Physical & Environmental Sciences, UT Scarborough*
- Grace Skogstad, *Social Sciences, UT Scarborough*
- C. Tattersall Smith, *Forestry*
- Sandy Smith, *Forestry*
- Mark Stabile, *Management; Public Policy and Governance/Economics*
- Ingrid Stefanovic, *CFE/Philosophy*
- Kimberly Strong, *Physics*
- Wayne Sumner, *Philosophy*
- Susan Tarlo, *Public Health Sciences*
- Vic Timmer, *Forestry*
- Ross Upshur, *Family and Community Medicine and Public Health; Bioethics*
- Willem Vanderburg, *Civil Engineering/CFE*
- Sarah Wakefield, *Geography*
- Denis Walsh, *Philosophy*
- Frank Wania, *Physical Sciences & Environmental Sciences, UT Scarborough*
- Mathew Wells, *Physical & Environmental Sciences, UT Scarborough*
- Peter Wells, *Pharmacy*
- Rodney R. White, *Geography*
- Dudley Williams, *Physical & Environmental Sciences, UT Scarborough*
- Ann Zimmerman, *Ecology & Evolutionary Biology*

Associate Members:

- Jane Ambachtsheer, *Mercer Investment Consulting*
- Brad Bass, *Environment Canada*
- Nathan Basiliko, *Geography, UT Mississauga*
- Kerry Bowman, *Joint Centre for Bioethics*
- Quentin Chiotti, *Pollution Probe*
- James Dooley
- Andrew Green, *Law*
- A.P. (Lino) Grima
- H. Roland Hosein, *GE Canada Inc.*
- Andy Kenney, *Forestry*
- Sonia Labatt
- Douglas Macdonald, *Centre for Environment*
- Sue McGeachie, *Innovest Strategic Value Advisors*
- Monirul Mirza, *Environment Canada*
- Paul Muldoon, *Environmental Review Tribunal*
- Barbara Murck, *Environmental Sciences, UT Mississauga*
- Dennis O'Hara, *St. Michael's College*
- Stefan Salbach
- Beth Savan, *Centre for Environment*
- Lesbia Smith, *Public Health Sciences*
- Peter Telford
- Kathi Wilson, *Geography, UT Mississauga*
- Mark Winfield, *York University*
- Clare Wiseman, *Centre for Environment*
- Cindy Woodland, *Pharmacology*

Members Emeriti:

- Paul Aird, *Forestry*
- Rorke Bryan, *Forestry*
- Frances Burton, *Social Sciences, UT Scarborough*
- Ian Burton, *Environment Canada*
- William Michelson, *Sociology*
- R.E. (Ted) Munn
- Edmund O'Sullivan, *Adult Education, Community Development & Counselling Psychology (OISE/UT)*
- Henry Regier
- D.N. Roy, *Forestry*
- Richard Stren, *Political Science*
- Joseph Whitney
- G. Ronald Williams

Faculty Research Profiles

Profiled are faculty who hold administrative and/or budgetary appointments at the Centre for Environment.

Philip Byer

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<http://www.civil.engineering.utoronto.ca/info/about/staff/professors/byer.htm>

S.M. (Civil Eng.), S.B. (Electrical Eng.), Ph.D. (Civil Eng.), Mass. Inst. Technology Professor, Department of Civil Engineering and Centre for Environment.

Acting Director, Centre for Environment, July to Dec, 2007; on leave Jan-June/08.

Co-Instructor of ENV1001H Environmental Decision-Making.

Research Interests:

Environmental planning and decision making; multiobjective project evaluation; environmental assessment; risk management; brownfields redevelopment; solid waste management; climate change.

Featured Research Project:

Classification System for Assessing and Promoting Development of Brownfield Sites.

Contract from Earth and Environmental Technologies, Ontario Centre of Excellence (with E. Tam, University of Windsor), to 2008. Significant economic, legal and environmental concerns present obstacles to

the redevelopment of thousands of brownfields in Canada, which have the potential to stimulate economic growth, community revitalization, and urban renewal. In this joint project, we are developing a methodology for classifying brownfields on the basis of a broad set of factors including site characteristics, alternative remedial actions, existing and proposed site uses, potential liability, and community settings, in order to prioritize sites for redevelopment, identify obstacles to their redevelopment and serve as a communications tool among stakeholders.

Recent Publications:

Byer, P.H., C.P. Hoang, T.T.T. Nguyen, S. Chopra, V. Maclaren and M. Haight. 2006. Household, hotel and market waste audits for composting in Vietnam and Laos, *Waste Management and Research* 24 (5): 465-472.

Cuddihy, J., C. Kennedy and P. Byer. 2005. Energy use in Canada: environmental impacts and opportunities in relationship to infrastructure systems. *Canadian Journal Of Civil Engineering* 32 (1): 1-15.

Tam, E.K.L. and P.H. Byer. 2004. Estimating the liability of redeveloped contaminated lands. *Journal of Urban Planning and Development (ASCE)* 130 (4): 184-194.



Featured Recent Publication:

Byer, P. and J.S. Yeomans. 2007. Methods for addressing climate change uncertainties in project environmental impact assessments, *Impact Assessment and Project Appraisal* 25 (2): 85-99.

Three basic analytical approaches to uncertainty analysis – scenario analysis, sensitivity analysis, and probabilistic analysis – are presented that proponents could use for integrating climate change-induced impacts and their uncertainties into their environmental assessments. Their use is illustrated on the environmental impacts of a run-of-the-river hydroelectric project.

Hilary Cunningham

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<http://www.chass.utoronto.ca/anthropology/>

M.A. (Anthropology), Toronto; Ph.D. (Anthropology), Yale University. Associate Professor, Department of Anthropology.

Graduate Coordinator, Centre for Environment

(Acting Director, Jan to June, 2008.)

Research Interests: North American international borders, environmental politics at borders, social stratification and human mobility, biotechnology and intellectual property regimes.

Featured Research Project:

Securing the "Homeland": Local Communities in the Context of New Security Practices at the U.S.-Canada Border. SSHRC, 2005-2008. The implementation of new security measures at the U.S.-Canada border has raised discussion about how they will affect the lives of citizens and non-citizens. What is not clear is a picture of the "social distribution" of the new measures,

that is, a sense of how the lives of specific groups of people will be changed by them. This research examines how communities living within and across the border are experiencing the emergence of "Homeland Security" as a political and ideological project aimed at reorganizing sovereign power in the U.S. It also looks at how discourses about "nature" and "security" are intersecting in novel ways in communities where "emergency preparedness" now encompasses not only responses to natural disasters but also terrorist threats.

Recent and Upcoming Publications:

Cunningham, H. (with J. Maskovsky). (eds.) *The Metropolitan Ethnographies*. Cornell University Press (Forthcoming.)

Cunningham, H. (with S. Scharper). 2006. The genetic commons: resisting the neoliberal enclosure of life, social analysis. *Social Analysis* 50(3): 195-216.

Cunningham, H. 2004. Nations rebound? Crossing borders in a gated globe. Special ed. on borders. *Identities: Global Studies in Culture and Power* 11(3): 329-350.

Featured Upcoming Publication:

Cunningham, H. (with J. Maskovsky). 2007. The state of sovereignty: national security in a neoliberal age, in I. Susser and J. Maskovsky (eds.), *State of Fear*. This chapter explores the ways in which new



security cultures in the U.S. establish spatial and ideological connections between international borders in "frontiers" with the urban spaces of the "interior" resulting in new "calibrated political geographies." Cunningham, H. Ecology, poverty and possible urban worlds, in I. Stefanovic and S. Scharper (eds.) *The Natural City: Re-envisioning the Built Environment*. University of Toronto Press. (Forthcoming.) This chapter explores the nexus between poverty alleviation and environmental sustainability in cities and critically examines the potential of the "global" city to address both.



Miriam Diamond

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Diamond.htm](http://www.geog.utoronto.ca/info/faculty/Diamond.htm)

B.Sc. Hons (Toronto), M.Sc. (Alberta),
M.Sc.Eng. (Queen's), Ph.D. (Toronto)
Professor, Department of Geography; cross
appointed to Department of Chemical
Engineering and Applied Chemistry.
**Research Director, Centre for Environment,
2007-08.**

Instructor of joint Geography and CFE
courses JGE221Y Environmental and
Sustainable Development and JGE1212H
Contaminants in the Environment.

Research Interests: Environmental
chemistry; sources, fate, exposure and
potential health effects of chemical
contaminants; environmental modelling;
water pollution; air pollution; chemical
dynamics in cities. *Awarded Canadian
Geographic's Canadian Environmental
Scientist of the Year, 2007.*

Featured Research Projects:
*Where are contaminants coming from and
going to in Toronto?* (OMOE, TRCA, Great
Lakes Comm., Environment Canada,
NSERC) Quantifies contaminant
discharges and emissions coming via urban
rivers, deposited from the atmosphere and
from sewage treatment plant discharges.
*The effect of metals discharged into the
environment.* (Int. Council of Mining and
Metals, NSERC, Xstrata, Iron Ore Co. of
Canada) Investigates chemistries of metals
and the receiving environment to derive a
general method of estimating potential
ecotoxicity of metals entering the
environment. Included is an assessment for
Canada and for generic "global" conditions.
What's in our fish? (Health Canada, Toronto
Public Health, CIHR) Quantifies

concentrations of several chemical
contaminants and beneficial omega three
fatty acids in fish and seafood purchased
from ethnic Toronto markets not included
in Health Canada analyses. Also studied is
the effect of cooking on concentrations of
perfluorinated compounds in food packages
and freezing on omega three fatty acids.

Recent Publications:

Diamond, M.L. and E.M. Hodge. 2007.
From source to effect: urban contaminant
dynamics. *Environmental Science &
Technology* 41(11): 3796-3805.
Gandhi, N., S. Bhavsar, S.B. Gewurtz, M.L.
Diamond, A. Evenset, G.N. Christensen and
D. Gregor. 2006. Development of a multi-
chemical food chain model: application to
PBDE in Lake Ellasjoen, Bear Island,
Norway. *Environmental Science &
Technology* 40(15): 4714-4721.
Nabulo, G., H. Oryem-Origa and M.
Diamond. 2006. Assessment of lead,
cadmium and zinc contamination of
roadside soils, surface films and vegetables
in Kampala City, Uganda. *Environmental
Research* 101(1):42-52.
Klein, G., E.M. Hodge, M.L. Diamond, T.
Dann, G. Stern, M.S. Denison, P. Harper.
2006. Gas-phase ambient air contaminants
exhibit significant dioxin- and estrogen-like
activity in vitro. *Environmental Health
Perspectives* 114(5): 697-703.



Karen Ing

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M.Sc. (Zoology), Toronto.
Senior Lecturer, Centre for Environment.
**Undergraduate Coordinator, Centre for
Environment.**
Instructor of ENV223H *Fundamental
Environmental Skills.*
Co-Instructor of SSC/ENV199Y *Debating
and Understanding Current Environmental*

Issues, ENV200Y *Assessing Global
Change: Science and the Environment* and
ENV421H/420Y *Environmental Research.*

Research Interests:
Climate change impacts on fish populations
and habitat space; science literacy in
environment decision making;
interdisciplinary team teaching.

Featured Research Projects:
*Impacts of Climate Change on Ice
Formation in Canadian Lakes.* This study is
in collaboration with scientists from Ontario
Ministry of Natural Resources, Environment
Canada and Canadian Centre for Remote
Sensing. Models based on historical records
of lake ice formation and climate are being
generated and compared with more current
remote sensing observations to better
delineate present and future thermal seasons
in lakes so as to explore potential climate
impacts on aquatic communities.

Ecosystems and Human Well-Being. This
study is in collaboration with Shashi Kant of
the Faculty of Forestry, and funded by the
United Nations Environment Program
(UNEP) awarded for "Developing a
Comprehensive Understanding of
Environment and Development". A project
goal is to increase awareness and

understanding of the links between
ecosystem and human well-being, especially
in developing countries. Recent project
efforts include delivery of a course to
faculty and students in Zhejiang Forestry
University in China and Vietnam National
Forestry University in Hanoi. The course
titled "Ecosystems and Human Well Being"
was based on the Assessment Framework
published in 2003 by the UNEP-sponsored
Millennium Ecosystem Assessment Project
and linked the condition of ecosystems and
ecosystem services to human well being
thus encouraging a more holistic and
interdisciplinary approach to the
environment.

Douglas Macdonald

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Hon. B.A., M.A., Toronto;

Ph.D. (Environmental Studies), York.

Senior Lecturer and Associate Member of
graduate faculty, Centre for Environment.

Instructor of ENV320Y National and
International Environmental Policy Making,
ENV1002H Environmental Policy,
ENV1005H Business and Environmental
Politics. Co-Instructor of SSC/ENV199Y
Debating and Understanding Current
Environmental Issues and ENV420Y/421H
Environmental Research.

Research Interests:

Politics of Canadian environmental policy
making; waste and pollution policy; the
business firm and trade association as
environmental policy actors, Canadian and
international climate change policy.

Featured Research Projects:

*Study of Voluntarism as a Policy Instrument
for Climate Change.* SSHRC grant; with
Jean Mercier, Université Laval (Principal
Investigator) and three other Laval faculty,
representing political science, economics

and administrative studies; 2004-2007. The
interdisciplinary team is conducting a study
of experience to date with voluntarism as an
environmental policy instrument used by the
Québec and Canadian governments and the
potential for future use of voluntary
programs in Canadian climate policy.

Other projects include a study of political
factors influencing climate change policy of
the Stephen Harper government; January,
2006 to April, 2007, and a study of state and
non-state actor interest in legitimacy as a
factor influencing environmental policy.

Recent Publications:

Macdonald, D. 2007. *Business and
Environmental Politics in Canada.*
Broadview Press, Peterborough, Ontario.
240 pages. [See abstract on page 22.]

Macdonald, D. (with D. VanNijnatten). 2005.
Sustainable development and Kyoto
implementation in Canada: the road not
taken. *Policy Options*, July-August, 2005.

Featured Upcoming Publication:

Winfield, M. and D. Macdonald. The
harmonization accord and climate change
policy: two case studies in federal-provincial
environmental policy. In G. Skogstad and H.
Bakvis (eds.) *Canadian Federalism*, second
edition. Oxford University Press, Toronto,
Ontario. (Forthcoming 2007.)

This study examines and compares two



federal-provincial processes for the
development of a national environmental
policy: 1) the two levels of government were
able to reach agreement on the 1998
Harmonization Accord and to work together
for its implementation; and 2) the process
ruptured in 2002 when the federal
government decided to ratify the Kyoto
Protocol. Since then, the governments of
Canada and some provinces have developed
climate policy unilaterally, with almost no
coordination. This difference is explained
by the differing roles played by the federal
government and by the very powerful
motivation of oil-producing provinces.

W. Scott Prudham

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3886; scott.prudham@utoronto.ca;
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B.A. & B.Sc., McMaster; M.A. (Geography),
Victoria; Ph.D. (Energy and Resources),
California, Berkeley.

Associate Professor, Department of
Geography and Centre for Environment.
Instructor of ENV1444H Capitalist Nature.

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.

Featured Research Projects:

Changing Urban Waterfronts. SSHRC, 2005
to 2008: With G. Desfor, York U, and T.
Conway, U of T at Mississauga. Explores
the past and present political ecology of
Toronto's waterfront, with emphasis on
how ideas about and the politics of the
environment, as well as environmental
processes, have shaped the waterfront's
transformation and regulation.

*The political ecology of industrial and
alternative forestry in British Columbia.*

Ongoing interest in the politics of forest
access and environmental change in BC,
including an historical focus on the
scientific and political foundations of
industrial sustained yield forest regulation,
and a focus on community forestry.
Ongoing collaboration with the Youbou
TimberLess Society, to support their efforts
to achieve forest policy reform.

Commodification and the environment.

Ongoing interest in the intersection of
commodification, commodity production
and environmental change. Includes the
production and circulation of genetically
modified novel life forms in the agriculture
and food sectors, and forest based economy
of western North America. Also includes
commodification of nature as policy, as in
the development of carbon dioxide markets.

Recent and Upcoming Publications:

Prudham, S. Tall among the trees:
Organizing against globalist forestry in
rural British Columbia. *Journal of Rural
Studies*. 50 pages. (In press.)

Prudham, S. The fictions of autonomous
invention: accumulation by dispossession,
commodification, and life patents in
Canada. *Antipode*. 37 pages. (In press.)

Heynen, N., J. McCarthy, S. Prudham, and P.
Robbins (eds.) 2007. *Neoliberal*



*Environments: False Promises and
Unnatural Consequences.* Routledge Press,
UK. 320 pages. [See abstract on page 22.]

Prudham, S. 2007. Sustaining sustained
yield: class, politics and post-war forest
regulation in British Columbia.

*Environment and Planning D: Society and
Space*. 25: 258-283.

Prudham, S. and A. Morris. 2006. Making
the market 'safe' for GM foods: the case of
the Canadian Biotechnology Advisory
Committee. *Studies in Political Economy*.
78(Autumn): 145-175.

Prudham, W.S. 2005. *Knock on Wood:
Nature as Commodity in Douglas-Fir
Country.* Routledge Press, NY. 272 pages.



Beth Savan

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b.savan@utoronto.ca;
<http://www.sustainability.utoronto.ca/>
B.Sc. Hons., Toronto; Ph.D., London, U.K.
Senior Lecturer, Centre for Environment;
Director, University of Toronto
Sustainability Office.
Instructor of ENV440Y Professional
Experience Course.
On leave January to June, 2008.

Research Interests:

Sustainability planning, energy conservation, community based research, environmental education and community based social marketing; environmental assessment.

Featured Research Projects:

Community Based Research (CBR) in Canada. (The Wellesley Institute, 2004-06) CBR is important in yielding concrete knowledge and understanding that can guide policies and programmes to reduce health and social disparities. A survey of community and university CBR practitioners was conducted to learn more about the context and efficacy of CBR in Canada. The study also looked at barriers and suggests solutions.

Rewire, a project of the U of T Sustainability Office [see page 12], is a pioneering study which aims to reduce U of T faculty, students and staff energy use by applying the principles of environmental psychology and Community Based Social Marketing. The attitudes of participants and energy use data are being evaluated. The results will be applied to parallel programs in resource use and transportation and will provide the basis for scholarly publications. Funded by Ontario Power Authority, EcoAction, Ontario Centres for Excellence, Natural Resources Canada, Toronto Atmospheric Fund and variety of sponsors within U of T.

Recent Publications:

Flicker, S, B.I. Savan, B. Kolenda and M. Mildenerger. A snapshot of community-based research in Canada: Who? What? Why? How? *Health Education Research.* (In press.)
Flicker, S, B.I. Savan, M. McGrath, B. Kolenda and M. Mildenerger. If you could change one thing; what community-based researchers wish they could have done differently. *Community Development Journal.* (In press.)
Flicker, S, B.I. Savan, B. Kolenda and M. Mildenerger. 2006. *A Snapshot of Community-Based Research in Canada.* Wellesley Central Health Corporation.

Featured Upcoming Publication:

Purcell, B., B. Savan and C. Caners. The University of Greentopia. In A. Wilcox and C. Palassio (eds.), *Greentopia*, Coach House Books, Toronto, Ontario. (Forthcoming.) In Greentopia, the University of Toronto would be the lynchpin of a green community, generating environmental business, employment and design as well as a pollution and carbon-free atmosphere. The knowledge and enthusiasm of its members can be harnessed to develop the greenest neighborhood in the country and serve as a model for environmental sustainability.



Stephen Scharper

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2) Department of Anthropology, U of T at Mississauga, Room 118, 3359 Mississauga Rd. N., North Building, Mississauga, L5L 1C8; tel: 905-569-4912; fax: 905-828-3837;
stephen.scharper@utoronto.ca.
B.A. Hons., Toronto; M.A. (Theology), Toronto; Ph.D. (Religious Studies), McGill.

Associate Professor, Department of Anthropology, U of T Mississauga, and Centre for Environment.

Acting Graduate Coordinator, Centre for Environment, January to June, 2008.

Research Interests:

Environmental ethics, environmental worldviews, liberation theology and ecology, religions and environmentalism.

Featured Research Project and Activities:

Religion and Ecology: Exploring the Interconnection of Liberationist and Ecological Theologies. SSHRC, 2006-2009. This research project on the integration of liberation theology and newer religious approaches to environmental questions, such as the new cosmology of Thomas Berry. This research attempts to probe differences and confluences between social justice approaches and more spiritual, worldview based environmental approaches.

Since October 2006, has served as a bi-monthly *Faith and Ethics* columnist for the Saturday edition of the *Toronto Star*. The topics covered include climate change, environmental racism, water privatization, the "Dark Sky" movement, and religious environmental activism. Moreover, he serves as a regular panelist on CBC

Radio's *Sounds Like Canada* spirituality panel.

Recent Publications:

Scharper, S.B. 2006. Finding our place: the ecological challenge to being human. In A. Luengo (ed.), *Eco Nightmare: Culpability, Responsibility and the Environmental Crisis.* Walter Gordon Massey Symposium Papers. Massey College, University of Toronto. Pages 35-43.
Scharper, S.B. 2006. Liberation theology's critique of the developmentalist worldview: implications for religious environmental engagement. *Environmental Philosophy*, 3(1): 47-69.
Scharper, S.B. 2006. The genetic commons: resisting the neoliberal enclosure of life. *Social Analysis* 50(3): 193-202.

Featured Upcoming Publication:

Stefanovic, I. and S. Scharper (eds.) *The Natural City: Re-Envisioning the Built Environment.* University of Toronto Press. (Forthcoming.) This edited volume features works by eminent philosophers and leaders in the field of religion and ecology and will present articles on themes ranging from ecofeminism to First Nations visions. [Please see abstract on page 22.]

Ingrid Leman Stefanovic

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B.A., M.A. and Ph.D. (Philosophy), Toronto.
Professor, Department of
Philosophy and Centre for Environment.
Director, Centre for Environment.
(On leave July, 2007 to June, 2008.)

Research Interests: Environmental philosophy, environmental and architectural phenomenology, philosophical foundations of sustainable development policies; values and assumptions affecting environmental decision making and risk assessment.

Featured Research Projects:

Evaluative Images of the Lake Ontario Waterfront Trail (SSHRC). A research project investigating perceptions and values of the 700+ km long Lake Ontario Waterfront Trail, that provides the opportunity to hike or bike by or through 31 cities, towns and villages; 182 parks and natural areas; and countless historic areas, galleries and museums. The research is concluding with investigating children's perceptions of "nature in the city."

Willem Vanderburg

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B.A.Sc., M.A.Sc., Ph.D (Mechanical Eng.), Waterloo.
Professor, Department of Civil Engineering and Centre for Environment.
Director, Centre for Technology and Social Development.
Instructor of joint Civil Engineering and Centre for Environment courses JEI 1901H *Technology, Society and the Environment I* and JEI 1902H *Technology, Society and the Environment II*.

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; relationship between culture of society and "cultures" of science and technology, with emphasis on embedded values, beliefs and world-views.

Featured Research Project:

Knowledge Infrastructure for Solar Cities.

Assessment of Post-Secondary Education and Training in Relation to Health and the Environment, with a Specific Focus on Children's Health and Environment.

The project evaluated current educational programs and provided recommendations to the Federal Government to strengthen research and teaching programs relating to Children's Health and Environment.
[Please see article on p. 8.]

Recent Publications:

Stefanovic, I.L. 2006. (ed.) Triple issue of *Ekistics*. Articles from 2004 and 2006 *Natural City* conferences Vol. 71 (424, 425, 426) [See page 7.]
Etkin, D. and I.L. Stefanovic. 2005. Mitigating natural disasters: the role of eco-ethics. *Mitigation and Adaptation Strategies for Global Change*. 10(3): 467-490. Reprinted in C. Emdad Haque (ed.) 2005. *Mitigation of Natural Hazards and Disasters: International Perspectives*. Springer, The Netherlands. Pages 135-158.
Stefanovic, I.L. 2004. Children and the ethics of place. In Frodeman, R. and Foltz, B. (eds.), *Rethinking Nature: Essays in Environmental Philosophy*. Indiana Univ. Press, Bloomington, IN. Pages 55-76.
Stefanovic, I.L. 2000. *Safeguarding Our Common Future: Rethinking Sustainable Development*. State University of New York Press, New York. 272 pages.

Ongoing. The evolution of contemporary cities into solar cities will be affected by the decisions of countless specialists according to an established intellectual and professional division of labour. These specialists belong to groups responsible for advancing and applying a body of knowledge, making up a knowledge infrastructure. Some characteristics of these infrastructures are being studied insofar as they inhibit the evolution toward solar cities. The results will be used to unleash the potential of preventive approaches aimed at achieving the desired results while simultaneously preventing or minimizing undesired consequences.

Recent Publications:

Vanderburg, W.H. June 2006. Can the University escape from the labyrinth of technology? *Bulletin of Science, Technology and Society* 26(3): 4 parts, pages 176-221.
Vanderburg, W.H. 2006. Knowledge infrastructures for solar cities. *Bulletin of Sci., Tech. and Society*. 26(2): 151-159.
Vanderburg, W.H. 2005. *Living in the Labyrinth of Technology*. University of Toronto Press. 550 pages.
Vanderburg, W.H. 2000. (2002, 2nd printing). *The Labyrinth of Technology*. University of Toronto Press. 368 pages.



T. Stefanovic

Upcoming Publications:

Stefanovic, I.L. and S. Scharper (eds.) *The Natural City: Re-Envisioning the Built Environment*. University of Toronto Press. (Forthcoming.) [See abstract on page 22.]
Stefanovic, I.L. Post-reductionist paradigms of health and place: how beneficial are they to environmental policy and practice? In J. Eyles and A. Williams (eds), *Health and Place*. Ashgate. (Forthcoming.)
Stefanovic, I.L. and A. Phillips. Great Lakes cities and their waterfronts: Toronto case study. In W. Kellogg. *Waterfront Development*. (Forthcoming.)



Featured Upcoming Publications:

Vanderburg, W.H., 2007. Evolving cities into a sustaining and sustainable habitat. *Ekistics*. This article is part of the ongoing project, *Knowledge Infrastructure for Solar Cities*, described above.
Vanderburg, W.H., 2007. A more sustainable energy strategy. *Bulletin of Science, Technology and Society*. This article describes a comprehensive approach, including both supply and demand-side options, for shifting to more sustainable energy systems.



Clare Wiseman

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B.E.S. Hons. (Waterloo), M. Nat. Res.
Mgmt. (Simon Fraser), Dr. phil.nat.
(Frankfurt).

Assistant Professor, Centre for Environment.
**Coordinator of the Environment and
Health Collaborative Program, Centre for
Environment.**

Co-Instructor of ENV 4001H *Graduate
Seminars in Environment and Health.*

Research Interests: Organomineral associations in soils, human health effects of contaminant exposure, children's health and environment issues, platinum-group element emissions and their potential impacts.

Featured Research Projects:

Assessment of Post-Secondary Education and Training in Relation to Health and the Environment, with a Specific Focus on Children's Health and Environment.

(Health Canada, Dec. 2006 to June 2007.)

With Ingrid Leman Stefanovic, Centre for Environment. **[Please see article on p. 8.]**

Platinum Group Element Emissions into the Environment: their Concentrations, Distribution and Human Health Risks.

Ongoing with Fathi Zereini, Wolfgang Goethe University of Frankfurt. Studies platinum group element (PGE) emissions from automobiles equipped with catalytic converters into the environment and how their concentrations have steadily increased over time in Germany. Concentrations of PGE in various environmental media are measured and the potential human health impacts assessed. Future research will focus on PGE emissions in Canada.

Recent Publications:

Zereini, F., C. Wiseman, and W. Püttmann, 2007. Changes in palladium, platinum and rhodium concentrations and their spatial

distribution in soils along a major Autobahn in Germany from 1994 to 2004. *Environmental Science & Technology* 41: 451-456.

Wiseman, C.L.S. 2006. Palladium from catalytic converters: exposure levels and human risk. In F. Zereini and F. Alt (eds.), *Palladium Emissions in the Environment: Analytical Methods, Environmental Assessment and Health Effects*, Springer-Verlag, Berlin, pages 565-574.

Wiseman, C.L.S. and W. Püttmann. 2005. Soil organic carbon and its sorptive preservation in central Germany. *European Journal of Soil Science* 56: 65 - 76.

Featured Recent Publications:

Wiseman, C.L.S. and W. Püttmann. 2006. Interactions between mineral phases in the preservation of soil organic matter. *Geoderma* 134: 109-118.

Discusses the results of a study on the interactions between clay minerals and organic carbon in soils in Germany. The results indicate that aluminum and iron oxides interact with phyllosilicates to form complexes or aggregates which may play an important role in stabilizing organic carbon in soils. Such relationships may ultimately determine the extent to which soils may serve as a sink for carbon in strategies to mitigate climate change.

New books by faculty

Douglas Macdonald

Macdonald, D. *Business and Environmental Politics in Canada.* Broadview Press, Peterborough, Ontario. 240 pages.

This book examines the ways in which large firms at the centre of major pollution issues have worked to influence environmental policy from the 1960s to the present. Although action is primarily intended to contribute to profitability, firm participation is influenced also by its need for legitimacy by complying with environmental regulation and corporate-image advertising and by actively promoting environmental norms, such as sustainable development. Firms always rely upon the strategy of privileged access to environmental decision-makers and only supplement closed-door negotiation with public campaigns for support when the former process is not yielding desired results. Despite exerting considerable influence upon policy, regulation has forced firms to make significant improvements to their environmental performance. The concluding message is that the firm is not a pathological monster, untouched by societal norms. It is adaptive and legitimacy-seeking and will respond, given sufficient external pressure.

W. Scott Prudham

Heynen, N., J. McCarthy, S. Prudham, and P. Robbins (eds.) 2007. *Neoliberal Environments: False Promises and Unnatural Consequences.* Routledge Press, UK. 320 pages.

Over the past few decades, the governance of nature has taken its most radical turn propelled by a dramatic reprise of liberal faith in less regulated markets and minimalist states, and underpinned by advocacy for extending exclusive property rights to nearly everything

imaginable. This complex turn, with its countless yet uncharted implications for environmental quality and governance, is captured by the contentious concept of neoliberalism. Today, neoliberalism provides the context and direction for how humans affect and interact with the non-human world and with one another. But what does this mean for nature? This volume brings together specific case studies that link neoliberalism with concrete environmental changes, politics, and outcomes in diverse, international contexts. It evaluates specific political ecologies and dynamics, and the implications of particular neoliberal reforms and enforcements.

Ingrid Stefanovic & Stephen Scharper

Stefanovic, I. L. and S. Scharper (eds.) *The Natural City: Re-Envisioning the Built Environment.* University of Toronto Press.

(Forthcoming.) This edited volume explores the philosophical and spiritual issues that are necessary conditions of building sustainable human settlements. To engage in more thoughtful planning of our built environments, we require more than rooftop gardens or tree-lined avenues, as important as they may be for sustainable cities. We need to engage in a deeper questioning of what it means to genuinely dwell in our world. While some people may perceive nature and cities to be separate entities, our book reflects our view that (a) cities and the provision of shelter are natural moments in the development of society and (b) urban and natural environments must be balanced within our dwelling places for sustainable, healthy settlements to occur. The current volume argues that the separation and opposition of nature and urban culture is counterproductive to the goals of sustainable development.

Graduate Students' Research

The following is a listing of graduate students convocated or enrolled in one of three graduate programs of the Centre for Environment in 2006-07: 1. Environmental Studies collaborative program (noted below as CFE ESP), 2. Environment & Health collaborative program (noted below as CFE EHP), or 3. M.Env.Sc. professional program. Abstracts of research papers or theses are included for convocated students (alumni).

ENVIRONMENTAL STUDIES Collaborative Program 2006-07 Alumni

Dirk Druet, M.A., November, 2006; Political Science/CFE ESP; supervisor: Tad Homer Dixon, Political Science. Course work program.

Taina Kanerva, M.A., November, 2006; OISE/UT (Curriculum, Teaching & Learning)/CFE ESP; supervisor: Erminia Pedretti, OISE/UT. *Developing Eco-Consciousness: a Critical Exploration of the Ontario Grade 12 Environment and Resource Management Course*. This study examines a Grade 12 course, *The Environment and Resource Management*, the sole environmental studies course offered in Ontario at the secondary level. It involves analysis of the formal Ontario curriculum and critical ethnographic research in one urban, multicultural secondary grade 12 class in the Toronto area. The paper is presented through a theoretical framework of eco-pedagogy and eco-literacy and explores how teachers and students reflect and re-construct mainstream environmental discourses and representations of nature as they negotiate the curriculum, particularly with respect to the development of an eco-consciousness. This analysis is based upon the competencies outlined by the Centre for Eco-literacy (2006; www.ecoliteracy.org/education/competencies.html) which states that to create a citizenry able to design and maintain sustainable societies, one must cultivate competencies of the head, heart, hand and spirit. This thesis concludes with a series of recommendations for creation of an environment conducive to the development of eco-consciousness.

April LaCroix, M.A. Nov, 2006, Geography/CFE ESP; supervisor: Sarah Wakefield, Geography. *Water Perceptions and Policies on the Borders of the U.S.: A Comparison of Canada and Mexico*. Condensed abstract: The northern and southern borders of the United States serve as excellent illustrations of the disparities of water wealth in the world. To the north, Canada and the U.S. share one of the longest, most peaceful, and most water-rich borders in the world. To the south, Mexico and the U.S. also share a lengthy border but it is fraught with security controversies and water scarcity. This paper aims to explore the diverse perceptions of water policy on both U.S. borders. While the two regions to be examined, the Great Lakes Basin and the El Paso/Ciudad Juarez region, are not necessarily indicative of the entire lengths of the borders, they do capture much of the diversity of perspectives to be found in water-rich and water-poor regions. This paper begins by laying out the theoretical foundation for comparing the differences and similarities between the two border regions. Next, the results of interview- and archival-based research on the differing perspectives of water are presented. Finally, the implications of these findings are discussed with special reference to the extent of congruity between the two regions.

Jennifer McKelvie, Ph.D., June, 2007; Geology/CFE ESP; supervisor: Barbara Sherwood Lollar, Geology. *Assessing Biodegradation Pathways and in situ Biodegradation of Gasoline Constituents Using Stable Isotopes and Metabolic Intermediates*. Condensed abstract:

FOR MORE INFORMATION:

See page 14 of this report or

Collaborative Graduate Programs:
www.environment.utoronto.ca
or contact Pavel Pripa, 416-978-3475,
pavel.pripa@utoronto.ca

M.Env.Sc. at U of T Scarborough:
<http://www.utsc.utoronto.ca/envsci/menvsci/>
or contact Julie Quenneville, 416-287-7357,
menvsc@utsc.utoronto.ca

This thesis integrates compound specific isotopic analysis (CSIA) and analysis of metabolic intermediates in order to: a) elucidate biodegradation pathways in laboratory experiments; and b) identify and quantify in situ biodegradation. Carbon isotopic values of methyl tert-butyl ether (MTBE) and its metabolite tert-butyl alcohol (TBA) were measured during aerobic MTBE biodegradation by the bacteria *Pseudonocardia* sp. K1 in a laboratory experiment. Isotopic measurements of TBA suggested that the tert-butyl group does not participate in the reaction and that biodegradation of MTBE by this strain likely proceeds via the oxidation pathway. At a MTBE contaminated field site in New York State, TBA was present in groundwater samples. Carbon and hydrogen isotopic values of MTBE were an important line of evidence suggesting that biodegradation of MTBE was only a minor contributor to natural attenuation at this site and that the TBA was likely a co-contaminant in earlier gasoline spills. At a contaminated Alaskan field site, toluene biodegradation was indicated by the presence of its unique metabolite benzylsuccinate (BS) in the wells with the highest toluene concentrations. Lastly, in a California field study, biodegradation of MTBE was documented but TBA isotopic values suggest that TBA biodegradation is not occurring. The results show that an integrated approach that draws on both measurements of metabolites and stable isotopes gives the best assessment of in situ biodegradation and biodegradation pathways.

Danielle Murray, M.Sc.Pl., June, 2007; Geography (Planning)/CFE ESP; supervisor: Virginia Maclaren, Geography. *Community Solar Energy Initiatives in Toronto: Potential for City Involvement. [Recipient of Langford Prize, 2006-07; see p. 28.]* In 2006, Toronto saw the emergence of three community-based solar energy initiatives aimed at reducing the cost of solar photovoltaic and water heating systems through bulk purchases. Given the environmental, health, and long-term economic benefits of solar energy, and in light of municipal energy goals and mandates, I argue the City should consider providing support to these community solar initiatives. In my analysis, I calculate and compare the projected costs and benefits of solar photovoltaics and solar thermal under the community initiative model to two other potential strategies to improve Toronto's energy situation: energy efficiency measures under a government incentive model, and local electricity generation from natural gas-fired power plants. The effects of various levels of financial incentives for solar, including grants for capital costs, low-interest financing, and changes in renewable electricity production credits, are analyzed, and recommendations made regarding City involvement. Ultimately, the City's energy goals and priorities will determine what policy strategies should be followed.

Franklin Suh, M.F.C. June, 2007; Forestry/CFE ESP; supervisor: Andy Kenney, Forestry. *Hidden Treasure of the Toronto District School Board: the Trees*. Currently the Toronto District School Board (TDSB)

Continued on page 24 ...

Continued from page 23 (Graduate Students' Research)

has insufficient amount of data regarding the trees on their school properties. The Toronto District School Board hopes the Tree Inventory Project which assesses each individual tree on the school boards property will help address this problem. The TDSB has completed three years of the ongoing Tree Inventory project. During the past three years the school board has completed 160 schools consisting of about 9,308 individual trees, with about 130 different species of trees. Although the full tree inventory is not complete, the data from the past three years using the Neighbourwoods© protocol helped generate this preliminary report which demonstrates how valuable and necessary the tree inventory is, and also provides a general overview of the Toronto District School Board's Urban Forest. Once the tree inventory is completed for the 600 TDSB properties, the TDSB will be able to use this valuable information to generate a Strategic Urban Forest Management Plan to enhance green space and the overall health of the urban forest.

New & Continuing

The following students were enrolled in 2006-07 and may continue or convocate in 2007-08.

Rachel Bryant, Ph.D., Philosophy/CFE ESP; supervisor: Wayne Sumner, Philosophy. *Normative foundations and ethical implications of conservation biology.*

Craig Butt, Ph.D., Chemistry/CFE ESP; supervisors: Scott Mabury, Chemistry and Derek Muir, NWRI. *Fate of neutral fluorinated surfactants in biological systems. (Recip. of Labatt Fellowship, p. 28.)*

Anna Chase, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/CFE-ESP; supervisor: Linda Cameron, OISE/UT (CTL). *Ocean immersion: an exploration of human relations with the aquatic world.*

Damien Cote, M.A., Economics/CFE ESP.

Jessica D'eon, Ph.D., Chemistry/CFE ESP; supervisor: Scott Mabury, Chemistry. *Linking sources and sinks: investigating the prevalence and transformation of fluorinated industrial materials to explain observed environmental contamination. (Recip. of Labatt Fellowship; see p. 28.)*

Gabriel Eidelman, M.A., Political Science/CFE ESP. Coursework program.

Judith Eigenbrod, M.Sc., Ecology and Evolutionary Biology, UT at Scarborough/CFE ESP; supervisor: Dudley Williams, Physical and Environmental Sciences, UT at Scarborough. *Effects of large scale manipulations on a major urban watershed.*

Annalisa Facin, M.Ed., OISE/UT (Sociology & Equity Studies in Education)/CFE ESP.

Catherine Febria, Ph.D., Ecology and Evolutionary Biology, UT at Scarborough/CFE ESP; supervisor: Dudley Williams, Physical and Environmental Sciences, UT at Scarborough. *Molecular and microbial community analyses of stream ecosystems under stress.*

Nilima Gandhi, Ph.D., Chemical Engineering/CFE ESP; supervisor: Miriam Diamond, Geography. *Improvement in characterization factors (i.e. contaminants' transport in the environment and their toxic effects) for metals in life cycle impact assessments. (Recipient of Brown Prize, Chant Award, and Labatt Fellowship; see page 28.)*

Chris Gore, Ph.D., Political Science/CFE ESP; supervisor: Richard Stren, Political Science. *Energy and electricity in Uganda: the politics and process of sector reform.*

Martin Kijazi, Ph.D., Forestry/CFE ESP; supervisor: Shashi Kant, Forestry. *Non-market evaluations of forest attributes and stakeholder welfare positions in Kilimanjaro, Tanzania.*

Anthony Kimaro, Ph.D., Forestry/CFE ESP; supervisor: Vic Timmer, Forestry. *Improving soil fertility, wood & maize yields in semi-arid areas of Tanzania by sequential agroforestry systems.*

Sarah King, Ph.D., Religion/CFE ESP; supervisor: Ingrid Stefanovic, Philosophy/CFE. *Place, religion and environment in Burnt Church, New Brunswick. (Recipient of Labatt Fellowship; see page 28.)*

Smita Kothari, Ph.D., Religion/CFE ESP; supervisor: Arti Dhand, Religion. *Yoga and ecology.*

Kara Lefevre, Ph.D., Ecology and Evolutionary Biology/CFE ESP;

supervisor: Helen Rodd, Ecology and Evolutionary Biology. *Dynamics of avian frugivory along a gradient of neotropical rainforest disturbance.*

Angela Loder, Ph.D., Geography/CFE ESP; supervisor: Ted Relp, Geography, UT at Scarborough and Sarah Wakefield, Geography. *Greening the city: exploring perceptions of health and well-being workplaces near green roofs. (Recipient of Labatt and Krause Fellowships; see page 28.)*

Terris Lutter, M.A., Geography/CFE ESP; supervisor: Michael Bunce, Geography, UT at Scarborough. *Biofuel and agriculture in Barbados.*

Corey MacIver, M.A., Political Science/CFE ESP. Coursework program.

Jennifer McDonald, M.Sc., Geology/CFE ESP; supervisor: Ken Howard, Physical and Environmental Sciences, UT at Scarborough. *Major ion hydrochemical indicators of elevated radionuclides in groundwater.*

Brenda Medjuck, M.A., Religion/CFE ESP.

Lisa Melymuk, M.Sc., Geography/CFE ESP; supervisor: Miriam Diamond, Geography. *Persistent organic pollutants in Toronto area streams, sediments and soils.*

Kate Moss, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/CFE ESP; supervisor: Ed O'Sullivan, OISE/UT (Adult Ed., Community Development & Counselling Psychology). *Role of education in ecological economics.*

Bridgette Murphy, M.S.W., Social Work/CFE ESP. Coursework program.

Renata Ramasra, M.A., Geography/CFE ESP; supervisor: André Sorensen, Social Sciences, UT at Scarborough. *Sustainable transportation.*

David Sider, Ph.D., Geography/CFE ESP; supervisor: Virginia Maclaren, Geography. *Community-Based Urban Environmental Management: a Case Study of Low-Income Settlements in Delhi, India. (Recipient of Labatt Fellowship; see page 28.)*

Naomi Szeben, M.I.St., Information Studies/CFE ESP; supervisor: Chun Wei Choo, Information Sciences. *Green roots in Toronto.*

Ling Xiao, M.I.St., Information Studies/CFE ESP.

Ana Zaknic-Catovic, M.Sc., Geology/CFE ESP. Coursework program.

Xianming Zhang, M.Sc., Geography/CFE ESP; supervisor: Miriam Diamond, Geography. *Using approaches of analytical chemistry and environmental modeling to investigate the behavior of polybrominated diphenyl ethers (PBDEs) in the indoor environment.*

ENVIRONMENT & HEALTH Collaborative Program 2006-07 Alumni

Joanna Angus, M.A., November, 2006; Geography/CFE EHP; supervisor: Sarah Wakefield, Geography. *An Evaluation of Toronto's Heat Watch Warning System.* Toronto implemented a synoptic based Heat Watch Warning system in 2001. The objectives of this system are to reduce and prevent heat related morbidity and mortality. In order to determine if this system is effective at reducing heat related mortality and morbidity, an evaluation of the system is required. Through this research an evaluation scheme for heat Watch Warning Systems was developed. Quantitative and qualitative methods were used to evaluate the two components of Heat Watch Warning Systems in the City of Toronto: the threshold levels at which point heat alerts are issued and the intervention measures that are implemented when heat alerts are issued. Results indicate that Toronto has implemented a system that uses appropriate threshold levels. However, there are some concerns surrounding the ability of the intervention measures to protect those who are most vulnerable to the threat of heat waves.

Jennifer English, M.A., November, 2006; Geography/CFE EHP; supervisor: Kathi Wilson, Geography, UT at Mississauga. *Health, Healing and Recovery - Therapeutic Landscapes and the Everyday Lives of Breast Cancer Survivors.* This qualitative research examines perspectives of the links among environment, health and healing for women living with breast cancer in the Greater Toronto Area. Semi-

structured, in-depth interviews are used to obtain information about ways in which breast cancer survivors access and create landscapes of healing within their day-to-day lives. Through this research, certain environments are considered to possess greater significance than others for contributing to physical, emotional and mental health and healing, especially when sick. Those landscapes with which women interact on a daily basis appear to be most important to recovery from illness. The research also demonstrates that while many women are successfully able to find landscapes that are conducive to recovery from breast cancer, others face multiple challenges related to social and economic barriers, and the impact of the illness itself. Further research exploring healing properties of landscapes for people with illness is needed to expand the understanding of connections between health and place.

Jane Gowland, M.H.Sc., June, 2007; Public Health Sciences/CFE EHP. Course work only program in Occupational and Environmental Health.

Elizabeth Noble, M.A., November, 2006; Geography (UT at Mississauga)/CFE EHP; supervisor: Kathi Wilson, Geography, UT at Mississauga. *A Place and Space for Change: Exploring Residents' Perceptions of Their Natural Environment and Health in Malton (Mississauga), Ontario*. Linkages between the environment and health are a growing area of research, particularly at the local and neighbourhood levels. Perceptions of the environment have also been shown to influence health. While geographic scale is salient for the study of the environment and health, few studies have examined perceptions of the environment and health across scales. This research responds to this gap, presenting a study of perceptions of the environment and health across scales, with a focus on the local scale. Surveys and focus group sessions were conducted with participants from community groups in Malton (City of Mississauga), Ontario, in order to explore participants' perceptions of the Mimico Creek environment and health. Participants identified links between perceptions of the environment and health at various scales. Participants indicated that perceptions of the environmental health of the Mimico Creek influences health in Malton at both individual and neighbourhood levels.

New & Continuing

The following students were enrolled in 2006-07 and may continue or convocate in 2007-08.

Ilan Alleson, Ph.D., Public Health Sciences/CFE EHP; supervisor: Anne-Emanuelle Birn, Public Health Sciences. *NGOs, organizational collaboration and social enterprise*.

Suzannah Bennett, M.H.Sc., Public Health Sciences/CFE EHP. Coursework program in Health Promotion.

Liana Del Gobbo, M.Sc., Geography/CFE EHP; supervisor: Miriam Diamond, Geography. *Contaminant and nutrient concentrations in raw and cooked specialty fish and shellfish*.

Robin Kortright, M.A., Geography/CFE EHP; supervisor: Sarah Wakefield, Geography. *Edible backyards: residential land use for food production in Toronto*.

Catherine Maule, Ph.D., Public Health Sciences/CFE EHP; supervisor: Blake Poland, Public Health Sci. *Role of health promoters/public health practitioners and decision-makers in addressing effects of climate change*.

Kate Parizeau, Ph.D., Geography/CFE EHP; supervisor: V. Maclaren, A.Daniere, Geog. *Environmental health of waste pickers in Argentina*.

Amanda Sheedy, M.H.Sc., Public Health Sciences/CFE EHP. Coursework program in Health Promotion.

Desheng Su, M.Sc., Public Health Sciences/CFE EHP.

Stephanie Suski, M.H.Sc., Public Health Sciences/CFE EHP; supervisor: Ann Fox, Nutritional Sci. Coursework program in community nutrition.

Iffath Syed, M.H.Sc., Public Health Sciences/CFE EHP; supervisor: Lynn Holness, Public Health Sciences. Coursework program in Occupational and Environmental Health.

Bruce Urch, Ph.D., Medical Science/CFE EHP; supervisor: Paul Corey, Public Health Sciences. *Controlled human exposures: cardiorespiratory responses to ozone and fine particles*.

M.ENV.SC. PROFESSIONAL PROGRAM

(Centre for Environment program at the Dept. of Physical and Environmental Sciences, U of T at Scarborough.)

2006-07 Alumni

Research Program:

Herb Maier, M.Env.Sc., June 2007; supervisor: Ken Howard. *Modeling the Transient Flow Behaviour in the Hyporheic Zone Resulting From Changes in Stream Stage*. Condensed abstract: The hyporheic zone describes the saturated pore space in sediments beneath and lateral to a stream channel strongly influenced by the interchange between ground and surface water. It is an ecologically important ecotone that defines the extent to which nutrient-rich surface waters penetrate the shallow subsurface in the immediate vicinity of a flowing body of surface water to provide essential life support for a community of invertebrates or "hyporheos". This is the first time that the size and extent of the hyporheic zone, as well as solute flow paths and residence times have been modeled in response to daily fluctuations in stream stage in regulated watersheds. The results indicate that fluctuations in stream stage produce oscillating solute flow paths, significantly reduce solute residence times, increase the depth to which solutes pervade the subsurface and cause the volume of the hyporheic zone to essentially double. Daily stream stage fluctuations were also found to enhance the amount of mixing between stream water and groundwater. These findings have important implications in the study of hyporheic communities that may survive gradual changes to their living conditions by migrating to more hospitable aquatic habits, but may be unable to respond to changes caused by extreme hydrological events.

Internship Program: The following students completed internships at Aspen Valley Wildlife Sanctuary, Earth Tech Canada Inc., Environment Canada, City of Toronto, IEG Environmental, or Industry Canada: **Marios Avgousti**, June 2007; **Andrea Berenkey**, June 2007; **Thea Dickinson**, June 2007; **Steve Dinka**, March 2007; **Joey Herrington**, March 2007; **Ana Jaramillo-Lopez**, June 2007; **Yui (Tommy) Ma**, June 2007; **Kathy Plachta**, March 2007; and **Jennifer Wang**, March 2007.

New & Continuing

The following students were enrolled in 2006-07 and may continue or convocate in 2007-08.

Research Program:

Dan Russell: *Subsurface imaging of a Holocene dune system using ground penetrating radar, Lake Erie, Ontario*. (Supervisor: Nick Eyles)
Madiha Saeed: *Determination of the global distribution of polycyclic aromatic hydrocarbons (PAHs) using passive air samplers and the relationship between population density and PAH concentration*. (Sup.: Frank Wania)
Lisa Sealock: *Summer circulation patterns and flushing rates in Frenchman's Bay, Lake Ontario*. (Supervisor: Matthew Wells)
Jingyang Zhao: *Application of mathematical modeling to the examination of plankton community patterns across a trophic gradient*. (Supervisor: George Arhonditsis).

Internship Program: The following students completed internships at Centre for the Built Environment, Seneca College of Applied Arts & Technology; Conestoga-Rovers & Associates Ltd.; Custom Data Imaging Corporation; Engineering & Public Works, Town of Richmond Hill; Environment Canada; Inco Ltd.; Innovest Strategic Value Advisors; International Development Research Centre; Office of Interprofessional Education, University Health Network; Ontario Ministry of the Environment; Novopharm; City of Toronto; Soil Engineers Ltd.; Sustainability Office, U of T at Scarborough; or Toronto and Region Conservation Authority. **Aamna Arora**, **Kristy Chow**, **Shaun DeSouza**, **Lisa Dumond**, **Jamila Elmir**, **Sherif Kinawy**, **Leanne Kresky**, **Esther Lee**, **Gladys Mok**, **May Quach**, **Nathalie Tauvette**, **Dhinesh Sivananthan**, **Allan Truong**, **Hiu Ching Elizabeth Tsui**, **Sheng Yang**, **Xiaohua Yang**, and **Dongming Zhang**.

Undergraduate Students' Research

FOR MORE INFORMATION:

Contact David Powell, Undergraduate Student Advisor:
416-946-8100, david.powell@utoronto.ca

International opportunities

By Karen Ing

The Centre for Environment has been working on a number of initiatives this past year to facilitate our undergraduate students going abroad. Such opportunities broaden students' horizons enabling them to gain perspectives around their own studies and increase awareness of their role in the global community.

ENV395Y Special Topics Field Course: Ecology & Conservation in Amazon & Galapagos

The summer of 2007 was the second of the Centre's successful partnership with the Summer Abroad Program of U of T's Woodsworth College to mount an interdisciplinary special topics field course investigating sustainable practices and approaches to topical local problems in Ecuador and Galapagos. This course provided an exciting opportunity for students to experience one of the most ecologically diverse countries in the world and to explore the pressures and challenges on its sensitive environments. It was hosted by the Universidad San Francisco de Quito and used two of its research centres. Professor **Anthony Davis** of the Department of Geography served as the academic coordinator for the course. **For more information, please contact David Powell (see box) or the Professional and International Programs Office, Woodsworth College, 416-978-8713, summer.abroad@utoronto.ca, www.summerabroad.utoronto.ca.**

ENV440Y Professional Experience Course

A group of five Centre for Environment students, led by **David Powell**, the Centre's Undergraduate Student Advisor and Placement Coordinator, spent three weeks in Costa Rica in the summer of 2007 as part of their work placement in the fourth year professional experience course. The students stayed at a family-owned organic, sustainable farm and engaged in activities such as harvesting and processing of cocoa, building a cob oven, constructing a composting toilet, and vegetable gardening. The students also combined this with another placement at one of three Toronto NGOs working in food security and production, enabling students to compare two different organizations doing related work in different cultures and circumstances. This opportunity was made possible by funding from the International Experience Fund of the Faculty of Arts and Science.

Exchanges with the National U. of Singapore

The Centre for Environment is also working in conjunction with U of T's International Student Exchange Office to pursue international exchange opportunities in parts of Asia. Funding was provided by this office to send one of our students to a summer biodiversity field course in Malaysia offered through the National University of Singapore (NUS). Other future opportunities being discussed with NUS include the offering of joint minor programs. **For more information, please contact David Powell (see box) or the International Student Exchange Office, 416-946-3138, student.exchange@utoronto.ca, www.utoronto.ca/student.exchange.**

Karen Ing is Undergraduate Coordinator and Senior Lecturer at the Centre for Environment.



Centre for Environment students in Costa Rica making a foundation for a cob oven (made of mud, sand, and straw), one of the activities of their work placement in the Professional Experience course. David Powell, work placement coordinator (centre), joins students, from left to right, Irme Chan, Dawn Strifler, Loretta Allen, Paw Wah and Elena Jusenislika.

Loretta Allen

Students evaluate sustainability of U of T

ENV421H Environment Research

By Douglas Macdonald and Karen Ing

Is the University of Toronto sustainable? How effectively is our university contributing to the ecological health of the city, the country and the planet with respect to ecosystems, human well-being, equity and knowledge? These were the questions examined, in part, by senior undergraduate Centre for Environment students in the ENV421H environmental research course in 2006-07. Their work was done in association with the U of T Sustainability Office, as part of a country-wide program to examine campus sustainability, co-ordinated by the Ottawa-based Sierra Youth Coalition (SYC).

Students examined four aspects of U of T: 1. land-use, in terms of green space management and building density; 2. health and well-being; 3. energy used by university vehicles, computers and lighting; and 4. university policies and governance regarding the environment. In keeping with the evolving definition of "sustainable development" as encompassing economy, environment and equity, universities world-wide are examining their physical impacts, as well as the place of sustainability in curriculum and research and their broader role in the transition to a sustainable society. The SYC methodology also takes as its subject this broad definition of a sustainable campus.

Selected findings are as follows. U of T has phased out pesticide use and maintains healthy natural areas, but does not meet the SYC criteria with respect to the portion of paved land or native plants and trees. In terms of health and well-being, the university is close to meeting all SYC criteria. Ninety-four university vehicles generate more than 200 tonnes of greenhouse gases each year, which could be reduced by 45 tonnes if approximately half the fleet were replaced by hybrid vehicles. Internal governance policies have started to move in the direction of sustainability, but on a fragmented basis. The U of T Environmental Protection Policy addresses only physical impacts and there is need for an over-arching sustainability policy.

The complete set of ENV421 student reports may be found at www.environment.utoronto.ca/Research/.

Karen Ing and Douglas Macdonald are Senior Lecturers and Instructors of ENV421H at the Centre for Environment.

Environmental Students' Groups

Environmental Students' Union

By *Jordan Dunlop*

The Environmental Students' Union (ENSU) is a student organization that aims to create and support initiatives to increase environmental awareness and sustainability both on and off the University of Toronto campus. It also functions as a resource for ENSU members to communicate with U of T and Centre for Environment administration. Membership is open to students at the university regardless of area of study or degree. The executive, however, is comprised of elected undergraduate representatives, and positions of academic concern are reserved for students in environmental programs affiliated with the Centre for Environment.

In previous years, ENSU has been successful in launching the environmental magazine *Green Perspective*, which provides a medium whereby the U of T community can express their perspective on environmental issues. It has also helped to create UTERN, the U of T Environmental Resource Network, with which it coordinates joint activities. UTERN is an umbrella organization that offers funding opportunities for student-run U of T environmental projects.

In 2006-07, ENSU initiated two main projects which will continue in 2007-08: the installation of a solar panel array on Sidney Smith Hall and a project aimed at improving the composting collections on the St. George campus. **For more information, please email kirakastner@gmail.com and lexzi.mac@gmail.com, respectively.** ENSU

also organized environmental socials and movie nights, an environmental retreat to Hart House Farm, and a graduate studies information session. It also continued to play a role in this year's Environmental Career Day [see below].

In 2007-08, under the leadership of the new Executive Coordinator and B.Sc. student, **Shannon Refvik**, ENSU is planning to improve the accessibility of the union for students in environmental programs.

Jordan Dunlop is a June 2007 B.A. Hons graduate and was the 2006-07 ENSU Executive Coordinator.

Graduate Environmental Students' Association

By *Craig Butt and Jessica D'eon*

The Graduate Environmental Students' Association (GESA) organizes initiatives and events designed to bring together graduate students from environmental disciplines across campus. All Centre for Environment graduate students are automatically GESA members with an executive committee elected in the early fall.

After a slow start to the 2006-07 year, GESA's activities included a "New Year" pub night in January, help in organizing the annual Environmental Career Day [see below] and a screening of the critically acclaimed film, "Who Killed the Electric Car?".

FOR MORE INFORMATION:

ENSU:

<http://ensu.sa.utoronto.ca>
email: studentaffairs.ensu@utoronto.ca
or shannon.refvik@gmail.com

Green Perspective magazine:

<http://greenperspective.sa.utoronto.ca>
email: greenperspective@gmail.com

GESA:

email: gesa@utoronto.ca

Career Day:

<http://www.environment.utoronto.ca>
email: centre.environment@utoronto.ca

GESA has many exciting activities planned for the 2007-08 year. We will start the year by helping to organize the Centre for Environment's annual September graduate orientation session and welcoming BBQ. A weekend retreat at the Hart House Farm is planned for the fall. A tour of "environmentally sustainable" buildings in the city is also planned. Finally, as in previous years, GESA will help to organize the annual Environmental Career Day.

In addition, GESA collaborates with other environmental campus organizations including the U of T Environmental Resource Network (UTERN) in order to participate in larger environmental projects on campus as well as play a part in the environmental decisions affecting the university.

Craig Butt and Jessica D'eon are Ph.D. candidates in the Department of Chemistry and the Centre for Environment's collaborative Environmental Studies Program. They were GESA President and Vice-President, respectively, in 2006-07.

Environmental Career Day

This successful annual event, usually held in the spring, is a collaborative effort by the Graduate Environmental Students Association (GESA), Toronto Undergraduate Geography Society (TUGS), Environmental Students' Union (ENSU) and the Centre for Environment.

The day-long event, open to all registered university and community college students, includes a career expo with usually over 20 exhibitors from government, consulting and environmental non-governmental organizations, providing students with many potential career and summer job and volunteer opportunities and advice. In addition to the career expo, presentations are made by speakers from various employment sectors.

At the Career Day expo, exhibitors provide students with advice and opportunities.



Imran Hassan

Environmental Students' Awards

Graduate Students' Awards

Congratulations to the recipients of the following graduate environmental awards presented at the Centre for Environment Research Day on May 1, 2007 (see page 4). Please visit the CFE website for other graduate awards available.

Arthur and Sonia Labatt

Graduate Fellowships: Through a generous donation by Arthur and Sonia Labatt, this Graduate Fellowship is awarded on an annual basis to support students enrolled in a graduate program of the Centre for Environment (CFE). Students were asked to submit a paper which explores practical solutions to environmental issues and/or examines the marketplace for solutions to environmental issues. This year, six recipients were awarded \$5000 each:

1. **Craig Butt**, Ph.D. candidate, Chemistry and CFE Environmental Studies Program;
2. **Jessica D'eon**, Ph.D. candidate, Chemistry and CFE Environmental Studies Program;
3. **Nilima Gandhi**, Ph.D. candidate, Chemical Engineering and CFE Environmental Studies Program;
4. **Sarah King**, Ph.D. candidate, Religion and CFE Environmental Studies Program;
5. **Angela Loder**, Ph.D. candidate, Geography and CFE Environmental Studies Program; and

6. **David Sider**, Ph.D. candidate, Geography and CFE Environmental Studies Program.

John Brown Prize

This prize is awarded for the best applied research project dedicated to the analysis and improvement of occupational or environmental health by a full-time graduate student in the Gage Occupational and Environmental Health Unit, the Department of Chemical Engineering and Applied Chemistry, the Department of Public Health Sciences, and/or the Centre for Environment. This year, the prize was awarded to **Nilima Gandhi**, Ph.D. candidate, Chemical Engineering/CFE Environmental Studies Program. She is researching improvement in characterization factors (environmental fate and toxic effects) for metals in life cycle impact assessments.

Sperrin Chant Masonic Award in Toxicology:

This award is given to students completing research in toxicology who demonstrate academic excellence and strength of character. This year, \$1500 was awarded to **Nilima Gandhi**, Ph.D. candidate, Chemical Engineering/CFE Environmental Studies Program (see above).

Eric David Baker Krause

Graduate Fellowship: This scholarship was established by the City of Toronto and U of T in memory of Eric Krause, who completed a B.A. and B.Sc. at U of T and

then an M.A. in Geography and the former Institute for Environmental Studies (now Centre for Environment) studying ecological footprints. He then worked at the City of Toronto as an environmental planner. This year, it was awarded to **Angela Loder**, Ph.D. candidate, Geography/CFE Environmental Studies, who's research is on greening the city and relationships between health, well-being, and perception of nature in the workplace.

In conjunction with this fellowship, the City of Toronto established a **summer internship** for CFE students. The summer 2007 recipient was **Kristen Courtney**, a student completing a Juris Doctor Certificate in Environmental Studies in Law with the Centre for Environment. The internship was held in the City of Toronto Environment Office. An **annual memorial lecture** is also held in Eric's honour. [See page 2.]

Graduate students were presented with awards at the Centre's Research Day held in May, 2007. **TOP RIGHT:** Danielle Murray, left, receives the Langford Prize from Hilary Cunningham, CFE Graduate Coordinator. **BOTTOM LEFT:** Recipients of the Arthur and Sonia Labatt Graduate Fellowships from left Sarah King, David Sider, Angela Loder, Nilima Gandhi, Jessica D'eon, and Craig Butt joined by Hilary Cunningham. **BOTTOM RIGHT:** Ph.D. candidate Angela Loder, left, is presented with the Eric Krause Graduate Fellowship by Ingrid Stefanovic, CFE Director.



George Burwash Langford Prize:

This prize provides support and encouragement for student service and research at the Centre for Environment. It is awarded to a Centre graduate student who best combines excellence in research and contribution to the work of the Centre. This year, the prize was awarded to **Danielle Murray**, M.Sc.Pl. candidate, Geography and Planning/CFE Environmental Studies Program. Her research topic is *Community Solar Energy Initiatives in Toronto: Potential for City Involvement*.

Undergraduate Students' Awards

Congratulations to the latest recipients of the following undergraduate awards.

Frances L. Allen Scholarship: This award is for an outstanding second or third-year student in a Specialist or double Major program in environmental studies at the Centre for Environment. The 2006-07 recipient was **David Berliner**, 2nd year, Environment and Health Specialist.

Centre for Environment Undergraduate Student Award: This is awarded to a student in the Centre for Environment and is based on financial need and academic achievement. The 2006-07 recipient was **Ruth Choi**, 4th year, Environment and Toxicology Specialist.

Chachra Family Scholarship in

Environment and Science: This is awarded to an undergraduate student enrolled in a B.Sc. specialist or major program, offered by the Centre for Environment, on the basis of financial need. Academic merit will also be considered. The 2006-07 recipients are **Cindy Chao**, 2nd year, Environment and Health Specialist; **Adrienne DeBond**, 3rd year, Environmental Geosciences Specialist; and **Felix Gunawan**, 3rd year, Environment and Health Specialist.

Dr. Stanley Allan Cord Scholarship in

Environmental Studies: This scholarship is to be awarded to undergraduate students in the third or fourth year at the Centre for Environment who have achieved academic excellence. All other things being equal, preference will be afforded to Innis College students, extending the tradition of the former Innis College Environmental Studies Program. This scholarship is awarded for the first time in 2006-07 to **Catherine Abreu**, 3rd year, Environmental Studies Major.

Robert Hunter Scholarship: This new scholarship was created by CHUM Limited in memory of Bob Hunter, Ecology Specialist Reporter at CITY TV in Toronto and co-founder of Greenpeace. It is awarded to outstanding undergraduate students enrolled in the Centre for Environment's environmental programs.

FOR MORE INFORMATION:

www.environment.utoronto.ca

Graduate Awards:

Pavel Pripa, 416-978-3475
pavel.pripa@utoronto.ca

Undergraduate Awards:

David Powell, 416-946-8100
david.powell@utoronto.ca

Preference is given to students who are focusing their environmental studies on climate. All other things being equal, preference is afforded to Innis College students, extending the tradition of the former Innis College Environmental Studies Program. *The 2006-07 recipient of the inaugural scholarship is to be determined.*

Kathryn S. Rolph Scholarship: This is awarded to an outstanding student in a program offered by the Centre for Environment who has achieved a high mark in a course on environmental issues (currently JIE221Y or ENV 321Y). The 2006-07 recipient is **Amy Hu**, 3rd year, Environmental Studies Major.

Sidney and Lucille Silver Scholarship: This is awarded to an outstanding third-year student in a Specialist or double Major program in environmental studies at the Centre for Environment or the Department of Geography. The 2006-07 recipient is **Jennifer Loo**, 3rd year, Environment and Health Specialist.

Douglas Pimlott Award and

Scholarships: These are awarded to Centre for Environment students with excellent levels of academic achievement and a demonstrated commitment to social involvement in environmental issues. All other things being equal, preference is afforded to Innis College students, extending the tradition of the former Innis College Environmental Studies Program. An **annual memorial lecture** is also held in Dr. Pimlott's honour. [See page 4.]

The 2006 recipients of the Pimlott Award are **Angela Cope**, 2nd year, Environment and Health Specialist; **Jenny Greenop**, 4th year, Environmental Studies Major; **Krista Gallagher**, 2nd year, Environment and Society Major; **Marlena Rogowska**, 4th year, Environmental Studies Major; and **Rachel Van Slightenhorst**, 4th year, Environmental Studies Major. The 2006 recipient of the Pimlott Entrance Scholarship is **Angela Cope** (see above). The 2006 recipient of the Pimlott Graduating Scholarship and the 2007 scholarship and award recipients are to be determined.

Jane Goodall Scholarship Fund

By Ingrid Leman Stefanovic, Director, Centre for Environment

In 2006, the Centre for Environment and the Jane Goodall Institute were pleased to jointly launch the **Jane Goodall Graduate Scholarship Fund** for graduate students enrolled in the Centre's collaborative and stand-alone programs. International students enrolled in the Centre's Distance Education certificate programs will be eligible for support, provided that certain conditions of academic excellence and financial need are met.

Recognizing the links between environment and international development, the Centre is delighted to be partnering with the Jane Goodall Institute, a major, international non-profit organization that is, itself, dedicated to wildlife research, environmental education and the conservation and welfare of all species while encouraging social change within the developing world. [Please see page 11 for more information.]

It is our hope that this scholarship will encourage Canadian students to better understand the challenges of sustainability that the developing world is facing. At the same time, the scholarship will provide support for students from other countries to come to Canada to jointly explore solutions to enhance environmental health and well-being.

Our goal is to raise \$50,000 to create an endowment that will benefit students for generations to come. Donations totaling \$50,000 will be matched through a special Graduate Student Endowment Fund established at U of T by the Province of Ontario. The annual payout endowment will then be augmented by the University to create The Jane Goodall Graduate Scholarship, valued at approximately \$6,000 annually, in perpetuity.

We invite readers to make a donation to the Jane Goodall Scholarship Fund or to obtain more information by contacting Christie Darville, Senior Development Officer, Faculty of Arts and Science, at cdarville@artsci.utoronto.ca or 416-946-5192.



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