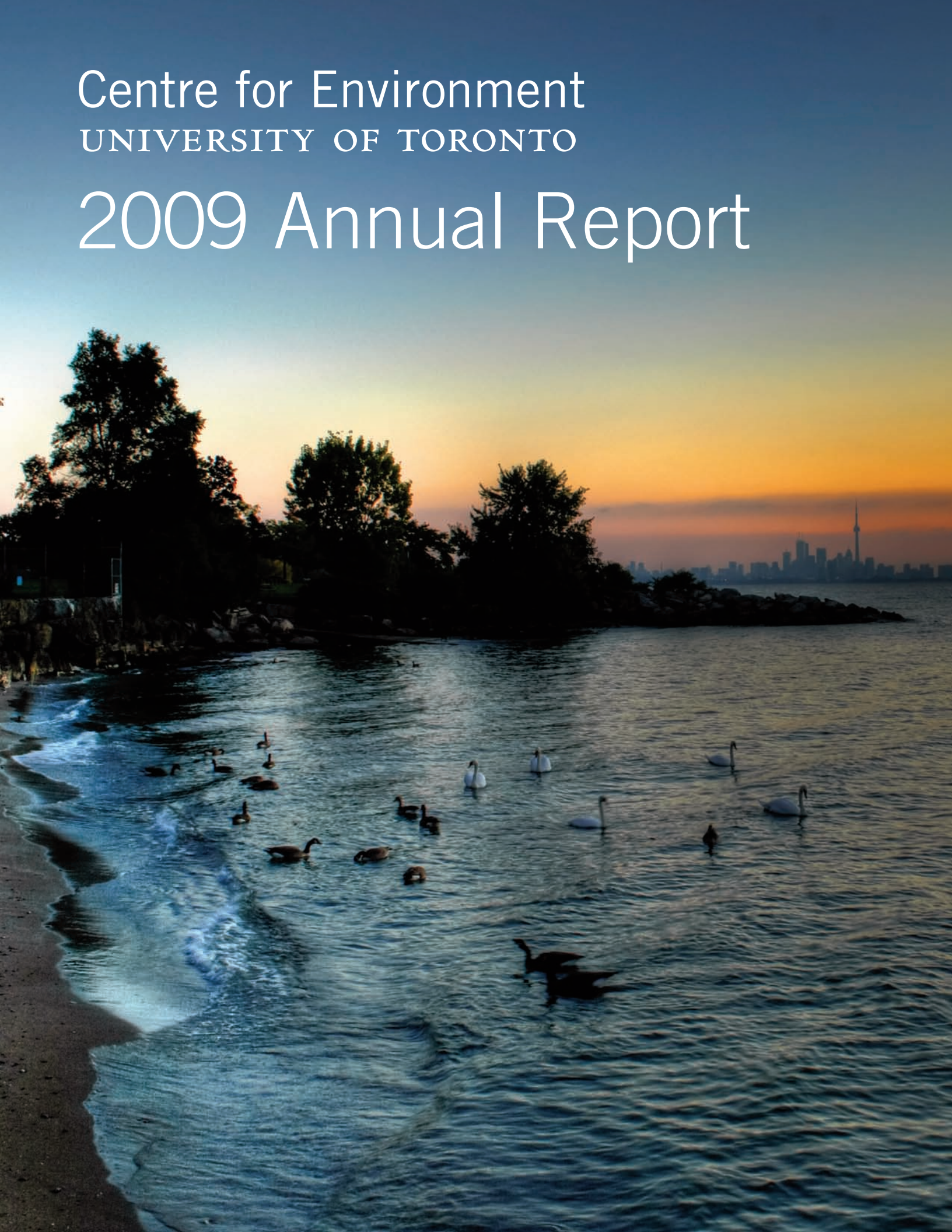
Centre for Environment
UNIVERSITY OF TORONTO

2009 Annual Report



2009 Annual Report Contents

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Beth Savan, Senior Lecturer, CFE
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Message from the Director

BY INGRID LEMAN STEFANOVIC,
Director, Centre for Environment, 2005-2010.

An anonymous writer tells the story of a weary traveler, who crossed a "chasm vast and deep and wide" and then turned back in order to build a bridge across the stream. When asked why he had bothered to take the time to return and build a bridge, he responded that it was for the youth who would follow.

As we enter our fifth year, I see the Centre for Environment's accomplishments in similar terms of bridge building for both present and future generations. Our unit itself is best characterized as a hub, bridging multiple spokes. With a small but committed core of faculty and staff, collaborations have been forged with over 25 units without whom, the Centre for Environment would not be what it is today.

In this Annual Report, you will read about our innovative, collaborative research projects, and also about a consummate bridge builder, **Professor Henry Regier**, a long-time friend and internationally renowned environmentalist from the University of Toronto who has been honoured with the Order of Canada award. Henry has forged connections not only in terms of the research partnerships that have defined his career but also in terms of how he thinks as an exemplary interdisciplinary scholar, speaking to scientists, philosophers and social scientists alike.

You will also read about another type of bridge-building, funded by the Provost's Student Experience Fund, that helps to bring students together across the university. **"Ecolink"** is the Centre's website, specifically designed to serve as a central electronic-information post for students to learn about environmental events, programs, green living tips and job opportunities. This coming year, we are hosting a multi-media contest, inviting entries around the theme of the natural city. We invite all students interested in environment to visit the site and benefit from this service. ***(See page 3.)***

Old bridges have been strengthened during this past year as we worked with Science Chairs to redesign our undergraduate environmental science program. By October 2009, the Centre will have collaborated with faculty, students, staff and Vice-Deans from the Faculty of Arts and Science (FAS) to propose new B.Sc. and B.A. programs in environment, closely aligned with the objectives of the curriculum review process initiated at FAS. ***(See page 12.)***

I must add that none of these initiatives will have been possible without the hard work of outgoing undergraduate coordinator, **Karen Ing**. Karen has not only directed our undergraduate curriculum planning but she has worked endlessly to ensure the smooth functioning of our core programs, while also building new collaborations with other departments and Faculties. I am so proud to have worked alongside Karen as she helped to develop some of the strongest undergraduate environmental programs in the country.

At the graduate level, our collaborative programs continue to attract students and build bridges across multiple departments and Faculties. We are honoured to have worked with the University of Toronto Scarborough campus, where the Centre's professional M.Env.Sc. program is housed. I am grateful to **Professor Don Cormack** who directs the program, and to his amazing staff for ensuring the high level of academic integrity of this unique, direct-entry environmental science program. ***(See page 17.)***

I am also especially grateful to **Professor Hilary Cunningham** from the Department of Anthropology, who completed her three-year term as Graduate Coordinator on June 30, 2009. Hilary's showed incredible dedication and leadership in refining the collaborative program's complex curriculum and in renewing memoranda of agreements with over twenty departments. In addition, she consulted with dozens of units across the university to design a new, direct-entry graduate environmental studies program. While that program has yet to be approved, I want to publicly acknowledge Hilary's hard work, uncompromising loyalty and broad-based collaborative skills in helping to develop this proposal which, hopefully, will find a place in the future environmental curriculum planning of the University of Toronto.

Those who know the Centre will agree that one of our most impressive set of accomplishments relate to the professional development programs, coordinated by retired **Professor Rodney White, Donna Workman** and her assistant, **Emma Thacker**. From Brazil to Vancouver, the Centre has worked closely with representatives from the corporate sector to deliver exemplary outreach and professional development programs. We are grateful to our collaborators, and especially to members of our Distance Education and Environmental Finance Advisory Committees, for helping us to expand all of these initiatives and take our environmental teaching to a global scale. ***(See pages 19-25.)***

Beyond our outreach, our Annual Report describes our continued research collaboration with units such as Environment Canada's AIRD offices (Adaptation and Impacts Research Division) and the Jane Goodall Institute – examples of research and outreach that relies upon the bridge-building that has been ongoing for the last several years. We were delighted to once again host Dr. Goodall herself here at U of T and we look forward to similar events in future. ***(See pages 6 and 27.)***

As we look forward, we are thrilled to welcome to the Centre two new Faculty members: **Professors Kundan Kumar** and **Christian Abizaid**, as well as two Post-doctoral Fellows, **Dr. Ellie Farahani** and **Dr. Tim Leduc**. We also welcome **Professors Jing Chen** and **Tony Davis**, both from the Department of Geography, who will respectively serve as Graduate and Undergraduate Coordinators for the Centre for Environment. ***(See pages 35-41.)*** I am so honoured to work with such wonderful people and I hope that they find a good home here at the Centre alongside some of the most insightful faculty and hard-working staff at this university.

Finally, let me take this opportunity to thank all the students, both undergraduate, graduate and in our professional development programs, who also help to enrich our programs and who motivate us to always look for better ways to advance environmental education at the University of Toronto. They are the ones for whom many of these bridges are truly being built and they are also the ones to whom we turn for help, as we jointly explore ways of building a more sustainable planet.

Henry Regier receives Order of Canada

Luncheon honours Professor Emeritus and former IES Director

BY TIM WELSH AND INGRID LEMAN STEFANOVIC

Dr. Henry Regier was a Director of the former Institute for Environmental Studies (1989-94) and Professor in the former Department of Zoology (1966-1995) at the University of Toronto. Those of us who have the honour to think of Dr. Regier as a friend also know him to be one of the most prolific and original thinkers emerging from U of T. It is always a thrill to receive to this day an email from him, because you know that your inbox suddenly has a new status: instead of simply sharing information, there are genuine insights to ponder! His reflections on topics ranging from ecology and ekistics, to ethics and ecogenics cause one to pause and he reminds us that we must always make time in our day to *think*!

So it was a special thrill for us when Her Excellency the Right Honourable Michaëlle Jean announced the appointment of **Professor Emeritus Henry Regier** to Membership in the Order of Canada on December 30 2008, the country's highest civilian honour. His appointment commemorates his "leadership in national and international organizations concerned with environmental conservation," and marks over 40 years of academic and community leadership in environmental issues, particularly those affecting the Great Lakes. His previous commendations include the Centenary Medal of the Royal Society of Canada, the Conservation Award of the Federation of Ontario Naturalists, the American Fisheries Society Award of Excellence, and the Lifetime Achievement Award from the International Association of Great Lakes Research.

The Centre for Environment and the Department of Ecology and Evolutionary Biology commemorated Dr. Regier's appointment to the Order of Canada with a special luncheon held at the Faculty Club on May 4, 2009. In attendance were those who were influenced, mentored or otherwise inspired by Dr. Regier. He spoke warmly of his long friendship with **Professor Emeritus Ursula Franklin**, Companion of the Order of Canada, whom he asked to help attach his snowflake lapel pin signifying his Membership in the Order. We were pleased to commemorate the event with a special gift donation of $1,000 to the Grand River Conservation Authority, so that a park bench inscribed with his name and Order of Canada appointment will be placed on GRCA property near his home in Elmira.

At a May 2009 luncheon in honour of his appointment to the Order of Canada, Professor Emeritus Henry Regier is presented with a gift from CFE Director Ingrid Stefanovic on behalf of CFE and Dept. of Ecology and Evolutionary Biology. RIGHT: Henry Regier asks friend Ursula Franklin, Professor Emeritus and Companion of the Order, to help attach his Member snowflake lapel pin.

Dr. Regier joined U of T in 1966 as an Assistant Professor in the former Department of Zoology. (Its reorganization with the Dept. of Botany formed the current Department of Ecology and Evolutionary Biology.) His graduate and post-doctoral work at Cornell University had focused on fish and fisheries in upstate New York. He also conducted research for the Ontario provincial government on the Lake Erie aquatic ecosystem. These concerns formed the basis of a career dedicated to education and advocacy around the human use of aquatic systems. Throughout his career, he maintained an expert role in policy discussions for international organizations such as the United Nations Environmental Program and the Intergovernmental Panel on Climate Change and was a Canadian delegation member at various international conferences such as two United Nations conferences on human population.

Dr. Regier has exemplified this leadership at home as well as abroad. In his role as Director of the Institute for Environmental Studies at U of T, he helped shape the Institute into a university-wide, interdisciplinary academic unit that would eventually become the graduate arm of the present Centre for Environment. Since his retirement in 1995, he has continued to mentor students and faculty in an Emeritus role, and as an Adjunct Professor at the University of Waterloo and Michigan State University.

Dr. Regier's research has aimed to balance both conceptual and practical concerns in what he calls an "ecogenic" focus, incorporating the work of scientists, philosophers, policy-makers and others into an interdisciplinary family of perspectives on emerging environmental phenomena. To this end, he has served as an advisor on environmental issues to senior politicians at all ends of the ideological spectrum, including former Liberal MP **Charles Caccia**, former Mayor of Toronto and Conservative MP **David Crombie**, and NDP leader **Jack Layton**. He sat on the Great Lakes Science Advisory Board of the International Joint Commission of Canada and the U.S. (1987-90) and was the Canadian Commissioner of the Great Lakes Science Advisory Board (1980-89).

We are honoured to celebrate the career of our friend and colleague Dr. Henry Regier. His interdisciplinary approach is a model for all students and researchers, and his appointment to the Order of Canada is merely an official confirmation of what we have witnessed over the past 40 years: a generous, dedicated teacher, with a commitment to ecological responsibility and progressive advocacy, whose impact is felt on both an individual level as well as in the larger sphere of policy-making that affects us all.

Tim Welsh is Research Coordinator and Ingrid Leman Stefanovic is Director, respectively, at the Centre for Environment.

New Ecolink website developed

A virtual meeting place for U of T students interested in the environment

BY TIM WELSH

The Centre for Environment's new Ecolink website (http://ecolink.environment.utoronto.ca) has been created to provide a resource and virtual meeting place for students interested in environmental and sustainability issues. RIGHT: Launched during U of T's Environment Week in 2008, students from left to right Angus Ni, Ibtissam Mustaq and Liam O'Doherty provide information on the website.

In August 2008, the Centre for Environment significantly expanded its online presence with the launch of its new Ecolink website: **http://ecolink.environment.utoronto.ca**. It was created to provide a virtual meeting place for students interested in environmental and sustainability issues. Information about academic programs, upcoming events, job and volunteer postings and green living tips can all be found on the site, which was created using a contribution from the Vice-President and Provost's Student Experience Fund (SEF). Over the past year and into the next, the Ecolink website has continued to expand its reach, with new features and new initiatives making it an increasingly vital environmental hub for students at the Centre and throughout the university.

Ecolink was officially launched on September 29, 2008 in the lobby of Sidney Smith Hall, as part of U of T's Environment Week. Students who stopped by were treated to organic, locally sourced snacks and giveaways including pens, tote bags, mugs and water bottles, all made of recycled materials. Computer workstations were set up to demonstrate the site's features and capabilities. Overall, the event was a successful launch for this new initiative, and the feedback from students who attended has helped shape the development and marketing of the website.

EcoSolutions Multimedia Contest

To coincide with the start of the 2009-10 academic year, Ecolink has announced the first annual EcoSolutions Multimedia Contest. This is a new initiative designed to increase traffic to the website, promote student engagement with environmental issues, and recognize the creative talents of our students. The contest is open to all U of T students, and accepts video, photography and graphic design entries. This inaugural contest asks students to address the concept of a *Natural City*. Entries will be judged by a panel of experts and winners will be announced in the spring of 2010; at stake are a number of prizes which may include laptop computers, netbooks, iPods and a bicycle. The *Natural City* is a recurring focus of research and events of faculty and graduate students at the Centre for Environment, with conferences in 2004 and 2006 focused around this theme. By asking students to respond to what they consider a natural city to be, and how Toronto can be more sustainable, the contest creates links between academic work and the academics and environmental stewards of tomorrow.

Over the course of the school year, the Ecolink website will be essential to promoting the contest. In this capacity, Ecolink will serve as a hub for discussion and dialogue; visitors to the website will be able to vote for a "people's choice" award and comment on entries. The goal of the website is to promote student engagement; by making this contest an interactive experience for both entrants and armchair judges, the website will get people talking about environmental issues, and advocating for progressive solutions to problems which affect us all.

In keeping with the Centre for Environment's interdisciplinary focus, each member of the Ecolink team brings to the table specific skills that contribute to the overall success of the project. **Tim Welsh**, Centre for Environment (CFE) Research Coordinator, has helped develop the multimedia contest; **Imran Hasan**, CFE IT Manager, has served as Project Manager for all aspects of the website and related initiatives. The development and promotion the website could not have happened without the energy and expertise of the following talented students: **Meccana Ali**, June 2009 Honours B.A. graduate, Sociology major, U of T Scarborough; **Haris Chowdhry**, June 2009 B.A.Sc. graduate in Electrical Engineering; **Victoria Chu**, second-year B.A. student, majors in Environmental Policy and Practice & Political Science; **Ibtissam Mustaq**, June 2008 Honours B.A. alumna, major in International Development Studies, U of T Scarborough; **Angus Ni**, 2009 Honours B.A. graduate, specialist in History; **Liam O'Doherty**, fourth-year Honours B.A. student, majors in Semiotics and Sociology; and **Areag Osman**, 2nd year B.A.Sc. student in Electrical Engineering.

Tim Welsh is Research Coordinator at the Centre for Environment.

Newly Funded Research Projects

SSHRC funds projects on emissions, oil and gas, and energy conservation

BY TIM WELSH AND INGRID LEMAN STEFANOVIC

The Centre for Environment is proud to announce three new faculty research projects which have recently received funding from the Canadian government's Social Sciences and Humanities Research Council (SSHRC). The success of our faculty in securing funding for their proposals contributes to the overall excellence of the Centre as a research and advocacy organ, and ensures that we will continue to provide an intellectually stimulating environment for students and colleagues for years to come.

Allocating Canadian Greenhouse Emission Reductions

Dr. Douglas Macdonald, Senior Lecturer at the Centre for Environment ***(see page 38)***, has received a three year funding commitment for his project titled ***Allocating Canadian Greenhouse Emission Reductions Amongst Sources and Provinces: Learning From the EU and Germany***. The project is in part a collaboration with researchers at the Technische Universität Darmstadt in Germany and Wageningen Universiteit in The Netherlands and addresses the weaknesses of the institutional framework behind the development of a Canadian climate change policy at the Federal and Provincial levels. In particular, what is being examined is the failure of these bodies to reach an agreement as to how the cost of implementing such policy will be borne between the two levels of government. Using as a model the successful implementation of climate change policy in similarly federated systems such as Germany and the European Union (EU), the project will produce a review of the academic literature on policy development in multi-tier, federated government systems and will examine the factors that have led to Canada's failure in this area through interviews and primary documents. At the same time, the project's European counterparts will perform case-study research on the EU and German processes. The findings of these initiatives will then be workshopped in three academic seminars, held in Ottawa, Halifax and Edmonton, and presented in a final report with recommendations to Federal and Provincial governments. This is a timely project which speaks to the Centre's focus on interdisciplinary collaboration between and among Canadian and international experts as a means of addressing problems and influencing public policy.

Oil and Gas Industry and Canada's Climate Change Policy

Dr. Macdonald has also received a second SSHRC-funded research grant examining ***The Oil and Gas Industry and Government of Canada Climate Change Policy: Objectives, Legitimacy and Organization***. The project examines the recent lobbying history of the oil and gas industry and the varying degree of influence it has had on public policy decisions. The industry's close engagement with the evolution of Canadian environmental policy has resulted in both wins and losses for the sector: the 1995 decision to rely solely on voluntary action was a boon to an industry in which policy mandating the regulation of greenhouse gas emissions is directly relevant to sector profitability. On the other hand, lobbyists for the oil and gas industries were powerless to prevent the 2002 ratification of the Kyoto Protocol. This research will look at these and other recent examples of the industry's varying political power. The project ultimately will contribute to the academic discussion about the influence of business on climate change policy.

Energy Conservation and Demand Management

One of the Centre for Environment's key research mandates is the development of innovative investigative methods. To that end, the SSHRC offers special Research Development Initiatives (RDI) grants to proposals that create "new ways of analyzing, structuring, integrating and transferring knowledge in the humanities and the social sciences." Co-investigators from the Centre for Environment and the Faculty of Applied Sciences and Engineering were recently awarded SSHRC RDI funding for a proposal to investigate ***Energy Conservation and Demand Management: Integrating Design, Behaviour and Technology***. Energy Conservation and Demand Management, or CDM, is a term adopted by the Ontario Government to encompass a number of programs and initiatives designed to influence energy use patterns and encourage long-term reductions in energy and resource usage. This project aims to bring together work that is underway in the fields of human factors engineering, behaviour modification and environmental ethics in order to identify new research opportunities emerging from the interface of these discrete methodologies and approaches to understanding energy use.

Dr. Beth Savan, Senior Lecturer at the Centre for Environment ***(see page 39)***, will bring to the project background data on community-based social marketing and energy use on campus that has emerged through the *Rewire* project at the Sustainability Office where she also serves as Director ***(see page 28)***. **Professor Greg Jamieson**, from the Department of Mechanical and Industrial Engineering (MIE), brings his background in ergonomics and human factors engineering to the project, and is supported by two graduate M.A.Sc. students, **Kevin Trinh** and **Adam Smith**. **Professor Ingrid Leman Stefanovic**, Director of the Centre for Environment ***(see page 40)***, brings the human dimension to the project and is supervising two graduate students: **Angela Loder** (Ph.D., Geography and Environment) will assist in the part of the research relating to environment and behaviour modification and **Luke Gelinas** (Ph.D., Philosophy) will assist in the questions relating to the ethics of behaviour change through technological innovation. Finally, Post-Doctoral Fellow **Dr. Ellie Farahani** ***(see page 41)***, is responsible for project management and coordination of the work of the graduate students. We look forward to identifying new research directions with this exciting interdisciplinary group of colleagues.

These three new projects complement a vital, well-funded stable of research initiatives underway at the Centre for Environment. Several other faculty members and another Post-Doctoral Fellow are working on projects which have previously received funding from SSHRC or other granting agencies. ***(For more information, please see individual faculty research profiles on pages 35-41 or this report.)***. Our senior lecturers, professors, and post-doctoral fellows are spearheading research projects which span a wide breadth of disciplinary perspectives but share as a common concern the human impact on the natural world and the social, philosophical, scientific and policy ramifications of environmental interventions.

Tim Welsh is Research Coordinator and Ingrid Leman Stefanovic is Director, respectively, at the Centre for Environment.

Research Day

Annual event showcases research of the Centre's faculty and students

The following research presentations were made at the Centre for Environment's (CFE) Research Day, held on Earth Day, April 22, 2009. The annual event showcases research done by some of the Centre's faculty and students. Condensed abstracts are included below.

BRAD BASS, Researcher, Adaptation and Impacts Research Division of Environment Canada (see page 6), at CFE; Adjunct Professor, CFE. ***Can the Green Roof Industry Succeed in Canada?*** Green roof infrastructure has been widely adopted in Europe and is growing in Japan due to government legislation supporting greening initiatives and high residential and commercial densities in cities that have made green roofs a favoured technology. An analysis of the green roof industry in Germany, which has seen the highest rates of adoption, suggests that there are other factors and trends contributing to its growth. Evidence for the absence of one of these trends in Canada suggests why adoption of green roof technology has been slow and how it might be increased.

RACHEL BRYANT, Ph.D. candidate, Dept. of Philosophy and CFE's Collaborative Program in Environmental Studies. ***Justifying Conservation: What Good is Biodiversity?*** Both conservation biology and policy are aimed primarily at the protection of biodiversity. Often, this is justified by reference to the intrinsic value of biodiversity. This presentation critiqued this approach, offering a justification for conservation based on the value of welfare of humans and other animals. It explored the multivocal concept of biodiversity and showed that an argument for its value would have to be for the values of nativeness, evolution and ecosystem function, and differences among kinds. An alternate justification for conservation was also presented, based on the value of welfare.

PHILIP BYER, Professor, Dept of Civil Engineering and CFE (see page 35). ***Addressing Uncertainties about Climate Change in Project-Level Environmental Impact Assessments.*** Using a hydroelectric project as a case study, this presentation discussed three basic analytical approaches – scenario, sensitivity, and probabilistic analyses – for understanding the implications of the uncertainties about climate change impacts and how they complicate decision-making in environmental assessments of many infra-structure projects. Suggestions were made for communicating this to decision-makers and stakeholders. Also discussed were the objectives of a new, follow-up research project looking at methodologies that can be used to help decide on the type and degree of adaptation that should be used to respond to uncertain future climate change.

TENLEY CONWAY, Assistant Professor, Dept. of Geography, U of T Mississauga; Full member, CFE graduate faculty. ***Patterns of Vegetation across the Greater Toronto Area: The Role of Urban Form, Policy & Neighbourhood Socio-Economics.*** A rural-urban gradient approach is often used in urban studies to understand the impacts of urbanization on various ecological features and explore differences between sites with varying densities of urban development. Results of a study exploring the drivers of vegetation patterns in the Greater Toronto Area suggest that distance to city center can only explain a small portion of the variation in vegetation, while other aspects of urban form and neighbourhood socioeconomic conditions are significantly related. Municipal tree planting programs also positively influence vegetation abundance.

RALUCA ELLIS, Ph.D. candidate, Dept. of Chemistry and CFE's Collaborative Program in Environmental Studies. ***Ammonia in the Environment: The Role it Plays in the Formation of Harmful Particulate Matter.*** Intensive field campaigns are central to assessing the importance of atmospheric ammonia in fine particulate matter (PM) formation, which has strong implications for human health, climate change and ecosystem diversity. An inter-disciplinary field campaign was done in Southwestern Ontario, where local emissions of ammonia can contribute to the formation of fine PM when sources of gaseous acids are encountered. Ammonia measurements were then compared with those made in Easter Bush, UK. This presentation also discussed the suitability of the QCL spectrometer to acquire ammonia measurements.

KRISTEN GAGESCH, B.Sc. (Hons.) student; DAVID PHOTIADIS, B.A. (Hons) student; CATHERINE MULÉ, B.Sc. (Hons) student; ALYSE RUNYAN, B.A. (Hons) student; and ALICJA WIERZBICKA, B.Sc. (Hons) student. ***Campus Sustainability: Lessons Learned from Leading Universities.*** Senior students in the Centre's environmental research course ENV421H examined sustainability practices in leading universities and made recommendations for changes at the University of Toronto. ***(Please see page 7 for an article.)***

MAY JEONG, B.A (Hons) student, majors in Environment and Society (CFE) and Political Science. ***Mining and Indigenous Peoples of Ecuador and Northern Ontario*****.** Senior students in the CFE's environmental research course ENV420Y examined aspects of the Canadian mining industry and the impact of its activities on aboriginal communities in developing countries and North America. Subjects addressed included financing of the industry and associated regulatory controls, documentation of alleged social and environmental impacts caused by mining, and the extent to which junior firms operating in Ontario show a concern for corporate social responsibility. ***(Please see page 7 for an article.)***

Johnny Guatto

Professor Tenley Conway speaks about urbanization and patterns of vegetation across the Greater Toronto Area, at the Centre for Environment's Research Day.

SARAH WAKEFIELD, Associate Professor, Dept. of Geography; Full member, CFE graduate faculty. ***Environmental Health Protection in a Multicultural City: A Case Study of Toronto's Pesticide Use Reduction Program.*** A research project was conducted with the goal of enhancing understanding of the environmental health information needs of Spanish and Cantonese speakers and exploring the ability of current initiatives to reach and protect these groups, using the City of Toronto's Pesticide By-law as a case example. Results indicate that participants were unlikely to encounter accessible environmental health messaging in their daily lives, the safety and legality of pesticide products available for sale in stores were overestimated, and most participants were unwilling to make formal complaints about neighbours not complying with the By-law.

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Adaptation & Impacts Research Division

Collaboration with Environment Canada researchers at the University of Toronto

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 a changing climate and developing impact models and tools on the risks and opportunities related to human and ecosystem health, human safety and Canada's long-term economic competitiveness. 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 AIRD has a co-operative research relationship with the Centre for Environment and the Department of Physical and Environmental Sciences at University of Toronto Scarborough.

Most of AIRD's collaborative research at U of T is focused at the Climate Lab in the Dept. of Physical and Environmental Sciences at the U of T Scarborough where many applied climate studies are conducted. Research focuses around regional climate reports (Greater Toronto Region, Niagara Region), development of new tools that facilitate climate impact studies (Canadian Climate Change Scenarios Network, CCCSN), Rapid Assessment of the Impacts of Climate Change (RAICC), applying existing tools for climate change adaptation studies (Cost-Effective Adaptation Options, CAO), Complexity and Organized Behaviour Within Environmental Bounds (COBWEB, visualization), and sectoral climate change impact and adaptation studies (energy, tourism, protected areas, engineering). The Ontario node of the Canadian Climate Change Scenarios Network (www.cccsn.ca) is also housed at AIRD in the Centre for Environment. This is the only place world-wide that provides readily available future climate projections from each of the 25 global climate models (GCMs) used in the Intergovernmental Panel on Climate Change's (IPCC) 4th Assessment Report.

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AIRD Researchers and Projects at U of T

BRAD BASS

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Research Interests: Simulating adaptation with anticipatory/emergent computing; ecological engineering adaptations to atmospheric change (green walls, green roofs); community energy systems planning and adaptations to climate change; adaptation accounting; organizational structure and adaptation capacity; climate change visualization.

Current and Recent Projects:

Simulating Adaptation with Anticipatory/Emergent Computing. Uses agent-based simulation platform known as COBWEB (Complexity and Organized Behaviour Within Environmental Bounds) to study vector-borne disease and residential energy consumption.

Ecological Engineering Adaptations to Atmospheric Change. Uses the Environmental Services Performance research model to simulate effectiveness of green roofs/walls in reducing energy consumption.

Energy Sector, Community Energy Systems Planning Adaptations to Climate Change. Uses Regional Energy and Analysis Model (REAM), developed at U of T, and second law thermodynamics.

Adaptation Accounting. Analyzes patents to assess whether invention in Canada is in those industrial sectors that will be required to adapt to climate change.

Organizational Structure and Adaptation. A review of case studies and theoretical discussions are used to explore the links between organization structure, size and the capacity to adapt to change.

Climate Change Visualization. Uses innovative images and software to represent the impacts of climate change and adaptations.

ADAM FENECH

Office: Dept. of Physical and Environmental Sciences, Room S-653, U of T Scarborough, 1265 Military Trail, Scarborough M1C 1A4; tel: 416-208-4873; fax: 416-287-7279; adam.fenech@utoronto.ca.

Research Interests: Rapid assessment of the impacts of climate change; projections of future climate change; climate extremes and protected areas; applying global climate models to local impact studies; climate change impacts on tourism; climate change in the Greater Toronto Region; climate change in the Niagara Region.

Current and Recent Projects:

Rapid Assessment of the Impacts of Climate Change. Applies rapid assessment techniques and cost-effective adaptations options to Ontario municipalities.

Opportunities, limitations, and challenges of oral histories versus scientific record in identifying climate trends at Biosphere Reserves in Canada, the USA and Mexico. Uses comparisons with data from nearby World Meteorological Organization climate stations to provide the rationale for, and value of, developing an indigenous/community-based observation program in global UNESCO system.

Climate extremes and protected areas. Assesses the past, present and future impacts of a changing climate in Canadian protected areas.

Climate Change in the Niagara Region. With significant upcoming economic transition, examines how climate change projections influence tourism and wine sectors of the Niagara Region.

MONIRUL MIRZA

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

Research Interests: Hydro-meteorological analyses, extremes and natural hazards, climate change and sea-level rise vulnerability, impacts and adaptation for water and energy sectors, climate change scenarios, environmental security and sustainable development, hydro-politics and transboundary water resources management, water resources modelling and assessment, application tools and GIS.

Current and Recent Projects:

Climate Change and the Canadian Energy Sector. Book co-authored with Brad Bass and Heather Auld of AIRD (forthcoming late 2009, Springer New York). Discusses the vulnerability and adaptation of the Canadian energy sector to future climate change.

Climate Change in the Greater Toronto Region.

Special Report on Renewable Energy of the Intergovernmental Panel on Climate Change (IPCC). Lead Author of report, forthcoming late 2010, that will provide more substantial information and broader coverage of questions regarding use of renewable energy sources.

Exploring Adaptation Baselines for Flood Hazards: Case Studies from Bangladesh and Canada. Quantifies the adaptive capacities in response to historic climate variability and potential climate change for extreme floods in Red River Basin, Manitoba and Bangladesh.

Undergraduate Research Courses

Research done by senior undergraduates in environmental research courses

BY DOUGLAS MACDONALD AND KAREN ING

Students presented the research findings of ENV420Y and ENV421H Environmental Research courses at the Centre for Environment's Research Day
LEFT: ENV420Y student May Jeong presents research on mining and indigeous peoples of Ecuador and Northern Ontario.
RIGHT: ENV421H students from left to right Alyse Runyan, Alicja Wierzbicka, David Photiadis, Kristen Gagesch, Catherine Mulé made a joint presentation on campus sustainability and the lessons learned from leading Universities.

Mining and Indigenous Peoples of Ecuador and Northern Ontario

ENV420Y Environmental Research course
2008-09 Instructor: Doug Macdonald, CFE Senior Lecturer

By Douglas Macdonald
During the past year, two groups of students in the Centre for Environment's ENV420Y course examined different aspects of the Canadian mining industry and the impact of its activities on aboriginal communities in developing countries and North America. The focus was upon "junior" mining firms – the companies which find mineral reserves and obtain governmental approvals and then sell those mining rights to the senior firms which actually do the mining. The purpose of the research was to find ways in which mining impacts might be reduced and the share of mining revenues going to aboriginal communities could be increased.

Subjects included financing of the industry, both through capital raised in stock markets and loans and in-kind assistance provided by governments and associated regulatory controls, such as the London Stock Exchange Rules for Companies, 2007. Another aspect involved compiling a list of allegations by NGOs and others, of social and environmental impacts caused by mining firms in developing countries. Thirdly, analysis was done of the extent to which junior firms operating in Ontario show a concern for corporate social responsibility, as indicated by company websites. Case study research included examination of the ability of the Ecuador legal system to provide redress for mining impacts, and six examples of successful impact-benefit agreements between mining firms and local communities in North America and Australia. Finally, study was made of the potential to apply lessons learned from those case studies to Northern Ontario.

The two related research studies were produced by two teams of students: (1) **Anne Campbell**, **Kirsten Cole**, **May Jeong** and **Michelle Shahoud**; and (2) **Brian Chang**, **Marco Covi**, **Willie Lo**, **Jennifer Taves** and **Sarry Zheng**.

Campus Sustainability: Lessons Learned from Leading Universities

ENV421H Environmental Research course
2008-09 Instructors: Karen Ing & Doug Macdonald, CFE Senior Lecturers

By Karen Ing
Building upon the work of students in the ENV421H Environment Research course from previous years, and using the text *Planet U: Sustaining the World, Re-inventing the University* (M'Gonigle and Stark, New Society Publishers, 2006) as inspiration, the 2008-09 cohort of ENV421H students sought to identify aspects of campus sustainability at other leading universities to bring lessons back to the University of Toronto.

Seven areas of campus sustainability were studied: governance, student engagement and mobilization, campus design and green spaces, green buildings, energy, transportation, and food. Leading universities in each area were identified using a combination of published sustainability score cards. Students conducted research using a variety of methods to identify the particulars of the leading practices, the challenges each institution faced, and how such challenges were overcome to earn the leading university rank.

Key findings identified common challenges faced by universities regardless of the sustainability practices investigated, including decentralization and the difficulty associated with communication and integration of sustainability efforts; resource and data limitation; and insufficient funding for sustainability initiatives.

Similarly, overall characteristics exhibited by leading universities identified the value of: strong leadership in the form of presidential commitments, strong administrative bodies and/or policies, established plans, synergy of sustainability efforts, sufficient and secure sources of funding, and transparency of decision making and sustainability efforts.

Full reports and recommendations are available at: http://www.environment.utoronto.ca/Research/UndergraduateResearch.aspx

Graduate Research: collaborative programs

Environmental Studies Collaborative Program

2008-09 Alumni

The following alumni convocated in 2008-09 from the Centre for Environment's (CFE) graduate Environmental Studies (ES) Collaborative Program. Condensed abstracts of research papers or theses are included below. Please see p. 15-16 for program info.

JOSHUA CORNFIELD, M.A., November 2008, Political Science/CFE ES; supervisor: David Pond, Political Science, UT Mississauga. ***Performance Measurement for Provincial Planning Policies.*** This paper focused on the Ontario provincial government's commitment to conducting a performance measurement for its 2005 Provincial Policy Statement. An evaluation was done of the measures needed for the government to best link community changes to policy directions. Constructing performance measurements that provide a causal link between policy and changes on the ground were found to be extremely difficult. The paper recommends that the government use measures that provide less causal significance (e.g., looking at municipal adoption of provincial policy vs. measuring whether policy adoption actually changed the community).

AMY DIDRIKSON, M.A., March 2009, Geography/CFE ES; supervisor: Alana Boland, *Geography.* ***Climate Change Adaptation in Toronto: Hazards Revealed Through Basement Flood Risk Underwriting.*** During a summer of record rainfall in the city of Toronto, widespread sewer flooding provided a window into the contested terrain of risk and responsibility surrounding 'new' urban flood risks. The paper illustrates the increasingly important role of the property and casualty insurance industry evolving behind the scenes, and how the individualization of responsibility is fostered by the key institutional players in both the public and private sphere. The pursuit of objectives in climate change adaptation under this neoliberal governmentality validates insurance expertise, and draws the definition of risks and responsibilities into an 'apolitical' and privatized domain.

JOSÉ ETCHEVERRY, Ph.D., November 2008, Geography/CFE ES; supervisor: Danny Harvey, Geography. ***Challenges and Opportunities for Implementing Sustainable Energy Strategies in Coastal Communities of Baja California Sur, Mexico.*** This dissertation explores the potential of renewable energy and efficiency strategies to solve the energy challenges faced by people living in El Vizcaino in Baja California Sur, Mexico. A review of electricity generation as well as residential and commercial electricity use in nine coastal communities was conducted. Qualitative and quantitative research methods used were aimed at enabling a gender-disaggregated analysis to describe more accurately local energy uses, needs, and barriers. The current plans of the state government are focused on expanding the state's diesel-powered electricity grids in the area. The potential for replacing diesel generators with a combination of renewable energy systems and efficiency measures were examined. Several international examples that for fostering renewable energy and efficiency initiatives were discussed.

ELISE HO, Ph.D., March 2009, Geography/CFE ES, supervisor: William Gough, Physical & Environmental Sciences, UT Scarborough. ***Children's Ideas About Climate Change.*** Seventh grade children (aged 11-12) in nine schools in Ontario were interviewed and submitted illustrated responses about climate change. This thesis explored whether there were commonalities or differences between children's and adults' responses (as gained from literature), and whether group differences exist among children in rural, urban, and suburban areas. Children's and adults' perceptions were found to be quite similar. No group differences were found to exist among rural, urban, and suburban children and children in all groups tended to have much more detailed knowledge of mitigation strategies than the effects and causes of climate change.

ANDREW MCKINLEY, M.A., November 2008, Geography/CFE ES; supervisor: Pierre Desrochers, Geography UT Mississauga. ***The Drivers and Performance of Corporate Environmental and Social Responsibility in the Canadian Mining Industry.*** In this paper, the underlying firm level drivers of Corporate Social Responsibility adoption are examined in order to develop a strong business case for social/environmental factor integration, built on the link between each individual driver and profitability. Next, the effect of profit-driven corporate initiatives is examined. The issues of greatest importance for the Canadian mining industry over the last thirty years were examined, namely the environment and the industry's relationship with indigenous peoples. It is argued that, due to a variety of drivers, a material link exists between firm level profitability and environmental/social performance in this industry. As a result, firms have undertaken initiatives which have led to a general improvement in their environmental and social performance.

BRIDGETTE MURPHY, M.S.W., June 2009, Social Work/CFE ES; supervisor: Clare Wiseman, Centre for Environment. ***Critical Perspectives on Vulnerability: Implications for Policy.*** Vulnerability science may provide a central theme around which to organize policy responses to environmental impacts on human populations. This paper explores vulnerability to environmental change from a critical social science perspective. The analysis is grounded in the belief that vulnerability is fundamentally concerned with issues of social justice and equity and that the social dimension of vulnerability is underused in policy development. The paper explores the ways in which vulnerability is characterized in the environmental change and climate change literatures and considers the policy implications of different approaches, paying attention to "starting-point" conceptualizations and their capacity to shape policies aimed at reducing social vulnerability.

RENATA RAMASRA, M.A., November 2008, Geography/CFE ES; supervisor: André Sorensen, Social Sciences, UT Scarborough. ***Carbon Commodification: Assessing Social and Environmental Implications of Assigning Property Rights to Carbon.*** This paper queries the use of market based approaches, such as carbon (credit) trading, to sustainability, with respect to air pollution management. In particular, it asks whether such strategies adequately take into account and create opportunities for social equity and distributional justice or whether these approaches favour a theory of economic efficiency as rationale for their implementation. The paper discusses whether there are social or environmental justice implications in assigning property rights which allow carbon to be traded. It is suggested that the credit creation system fictitiously creates capital in developed regions which may then be reinvested in polluting technologies for the purpose of wealth creation while concurrently neglecting the needs of developing regions.

JOANNA RANIERI, M.A., June 2009, Geography/CFE ES; supervisor: Virginia Maclaren, Geography. ***Waste and Value: Bottle Collecting and the Informal Waste Economy in Toronto, Canada.*** A significant number of people in North America depend on informal recycling for all or part of their livelihood. However, minimal scholarship has examined the varied circumstances that lead people in highly industrialized economies to engage in waste recovery as a source of income. This current research investigated a group of bottle collectors in Toronto, and their involvement in an expanded informal economy that emerged from the 2007 government policy that added a refundable deposit to empty alcohol bottles. Information was gathered through semi-structured interviews conducted outside of bottle return depots. Research findings show that in addition to income generation, there are a number of non-economic motivations for participating in this kind of work.

MAXIME ROY, M.A., November 2008, Economics/CFE ES; supervisor: Diego Restuccia, Economics. ***Economics of Climate Change: The DICE Model, Numerically Solving it in Matlab and Results.*** There is a trade-off between less production now and more later, or vice-versa, depending on the choice of the carbon tax: a higher tax now, leads to less production now, but it reduces future damages from climate change. The optimal schedule of carbon tax over the next two centuries was computed using the DICE model of William Nordhaus, using a code written in Matlab software. The optimal tax (in constant dollars without inflation) was found to increase from $30 U.S./metric ton of carbon in 2010, to $100 by 2050, $200 by 2100, and $750 by 2200, at which point it would stop to increase.

RACHEL STACK, M.A., November 2008, Political Science/CFE ES; supervisor: David Pond, Political Science, UT Mississauga. ***The Relationship Between Political and Partisan Interests and Environmental Issue Consideration in Public Policy.*** The purpose of this paper is to demonstrate that the role of the elected representative in the Legislative Assembly of Ontario is becoming increasingly irrelevant. It argues that the clearest indication of this is the Private Member's Bill. Government backbenchers are strongly directed to ensure that any legislation they choose to introduce complements what the government is already in the process of doing. As a consequence, Members are at risk of becoming nothing more than mouthpieces of government policy and becoming incapable and unwilling to challenge their party on behalf of their constituents. To be relevant and effective, an elected official must be willing and able to challenge the government and encourage policy changes that require major changes to government legislation and policy.

XIANMING ZHANG, M.Sc., November 2008, Geography/CFE ES; supervisor: Miriam Diamond, Geography. ***Measurement and Modeling of Polybrominated Biphenyl ethers (PBDEs) and Polychlorinated Bipheyls (PCBs) in the Indoor Environment.*** The primary goal of this thesis was to understand the concentrations, emissions and fate of polybrominated diphenyl ethers (PBDEs) and polychlorinated biphenyls (PCBs) in the indoor environment. Air levels of PBDEs and PCBs in 20 indoor environments in Toronto were sampled and measured, and an analysis on chemical profiles distinguished the chemical sources. A multimedia indoor environmental model was also applied on two test rooms. Particle movement (e.g., dust deposition and resuspension) dominates within-room transport processes, and dust removal (e.g. vacuuming) and air advection (e.g. ventilation) were the main chemical loss processes. Temperature, particle concentration and deposition velocity, and air exchange rate were the also most influential parameters.

GESA Student Group

By Nilima Gandhi, 2008-09 GESA President

GESA, the Graduate Environmental Students' Association, is aimed at bringing together graduate students from environmental disciplines across campus. GESA achieves this goal by organizing various events during the year. During 2008-09, GESA organized and participated in Environmental Career Day ***(see page 29)***, the Centre for Environment's graduate orientation session, as well as coffee hours and pub nights. For 2009-10, GESA is planning a summer barbeque, a welcome session for new students, environment-related film screenings, library research orientations, a holiday celebration party, and a weekend retreat at U of T's Hart House Farm.

In addition, GESA collaborates with other environmental campus organizations including the University of Toronto Environmental Resource Network (UTERN) in order to participate in larger environmental projects and decisions affecting the university.

All Centre for Environment graduate students are automatically members of GESA and are eligible to be on the elected executive committee.

For more information, please email gesa@utoronto.ca.

New & Continuing

The following graduate students were enrolled in the Centre's (CFE) Environmental Studies (ES) Collaborative Program in 2008-09 and may continue or convocate in 2009-10. Research topics are included.

Rachel Alexander, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psych.)/CFE ES; supervisor: Roxana Ng, AECDCP. *Connecting Canadian consumers with the globalized garment industry: learning about sustainable consumption.*

Simon Appolloni, Ph.D., Religion/CFE ES; supervisor: Stephen Scharper, Anthropology UTM/CFE. *The wisdom of science: the story of the universe.*

Julia Barnes, M.A., Geography/CFE ES; supervisor: Ken MacDonald, Social Sciences, UTSC. *Scalar politics of global biodiversity conservation, in particular the "scale-talk" of the Global Environment Facility (GEF).*

Cindy Bongard, Ph.D., Ecology & Evolutionary Biology/CFE ES; supervisor: Robert Fulthorpe, Physical & Environmental Sci., UTSC. *Does the invasive plant species Vincetoxicum rossicum alter or disrupt the arbuscular mycorrhizal fungi associations of native plant communities it invades?*

Rachel Bryant, Ph.D., Philosophy/CFE ES; supervisor: Wayne Sumner, Denis Walsh, Philosophy. *Justifying conservation: normative foundations and ethical implications of conservation biology.*

Craig Butt, Ph.D., Chemistry/CFE ES; sup: Scott Mabury, Derek Muir, Chem. *Understanding sources of perfluorinated acids to biological systems.*

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

Aurel Cristian Ches, Ph.D., Geography UTSC/CFE ES; supervisor: William Gough, Physical and Environmental Sciences, UTSC. *Kyoto and beyond: top-down and bottom-up approaches in Canadian climate change policy.*

Nyssa Clubine, M.Sc., Geography/CFE ES; supervisor: Joe Desloges, Geography. *Patterns of suspended sediment in S. Ontario & driving forces.*

Eric Courchesne, M.A., Political Science/CFE ES; supervisor: David Pond, Political Science. *German renewable energy legislation.*

Caroline Amy Cross, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psych.)/CFE ES; supervisor: J. Gary Knowles, AECDCP. *Community education's role in getting adults and youth connected to themselves and the environment.*

Sarah Da Silva, M.A., Geography/CFE ES; supervisor: Danny Harvey, Geography. *Beyond indicators and reporting: perceptions, trends and impacts of environmental indicators and reporting in the Great Lakes Basin.*

Jessica D'eon, Ph.D., Chemistry/CFE ES; supervisor: Scott Mabury, Chemistry. *Linking sources and sinks: investigating the prevalence and transformation of fluorinated industrial materials to explain observed environmental contamination.*

Nicole Desaulnier, M.I.St., Information/CFE ES; supervisor: Matt Ratto, Information. *Influence of increasing access to information on environmental education and the key players that influence curriculum development.*

Angela Doku, M.A., Economics/CFE ES; supervisor: Don Dewees, Economics. *How official development assistance is correlated with pollution, with Ghana as a case study.*

Gabriel Eidelman, Ph.D., Political Science/CFE ES; supervisor: Richard Stren, Political Science. *The politics of waterfront redevelopment in Toronto.*

Raluca Elllis, Ph.D., Chemistry/CFE ES; supervisor: Jennifer Murphy, Chemistry. *Measurements of ammonia concentrations and fluxes in urban and rural settings.*

Catherine Febria, Ph.D., Ecology and Evolutionary Biology/CFE ES; supervisor: Dudley Williams, Physical and Environmental Sciences, UTSC. *Characterization of dissolved organic carbon and microbial communities in the hyporheic zone of stream ecosystems.*

Nilima Gandhi, Ph.D., Chemical Engineering/CFE ES; supervisor: Miriam Diamond, Geography. *Development of a new method to assess hazard of metals: improvements in assessment of metal fate, speciation and ecotoxicity.*

Natalya Gomez, M.Sc., Physics/CFE ES; supervisor: Jerry Mitrovica, Physics. *Sea-level change resulting from changes in mass of the polar ice sheets.*

Emma Hemmingsen, M.A., Geography/CFE ES; supervisor: Scott Prudham, Geography/CFE. *Producing barrels from bitumen: political ecology of price in explaining the classification of Alberta oil sands as a proven oil reserve.*

David Houle, Ph.D., Political Science/CFE ES; supervisor: Grace Skogstad, Political Science. *Climate change policy in Canadian provinces.*

Tyler Hunt, M.Sc., Geography/CFE ES; supervisor: Danny Harvey, Geography. *Socio-political strategies for expanding renewable energies.*

Continued on page 10...

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Lisa Johannesen, M.Sc., Anthropology/CFE ES; supervisor: Gary Coupland, Anthro. *Archaeological survey and site analysis in Sechelt Territory, BC.*
Munya Kabba, Ph.D., OISE/UT (Sociology & Equity Studies in Education)/CFE ES; sup: George Dei, SESE. *Critical investigation of civilian conflict.*
Anthony Kimaro, Ph.D., Forestry/CFE ES; supervisor: Vic Timmer, Forestry. *Improving soil fertility, fuelwood and maize yields in semi-arid Tanzania by sequential agroforestry systems.*
Smita Kothari, Ph.D., Religion/CFE ES; supervisor: Christoph Emmrich; Stephen Scharper, Religion; Anthropology UTM/CFE. *Jain yoga and meditation (Terapanth reform movement), and social justice and ecology.*
Angela Loder, Ph.D., Geography/CFE ES; supervisors: Ted Relph, Social Sciences, UTSC & Sarah Wakefield, Geog. *Greening the city: exploring health, well-being, & perceptions of nature & green roofs in office workers in Chicago and Toronto.*
Carol Lue, M.Sc.Pl., Geography, Planning/CFE ES. *The role of ecosystem service markets in Caribbean tourism planning, using the carbon forestry market and Jamaica as a case study.*
Kate Moss, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/CFE ES; supervisor: Dennis Thiessen, CTL. *Comparative international education for sustainability: Canada, Lithuania and Sweden.*
Katharine Myrans, M.A., Geography/CFE ES; supervisors: Danny Harvey, Geography & Brad Bass, CFE. *Comparative energy life cycle assessment of three green technologies for rooftops in Toronto.*
Beverly Neapetung, M.A., OISE/UT (Adult Education, Community Development & Counselling Psych.)/CFE ES; supervisor: Jean-Paul Restoule, AECDCP. *Use of indigenous knowledge to examine fresh water sustainability and rights to this renewable resource.*
Mark Poos, Ph.D., Ecology and Evolutionary Biology/CFE ES; supervisor: Donald Jackson, EEB. *The importance of methodological choices for reducing uncertainty in modeling endangered species.*
Peter Ralevic, Ph.D., Forestry/CFE ES; supervisor: Tat Smith, Forestry. *Optimal supply chains for sourcing, transport and conversion of biomass into energy: cost competitiveness & greenhouse gas emission concerns.*
Catherine Robin, Ph.D., Physics/CFE ES; supervisor: Robert Bailey, Physics. *Applications of Navier-Stokes equation: case studies from planetary science; Thermo-mechanical modeling of deep geological nuclear waste disposal.*
Kathleen Romatowski, M.A., Geography/CFE ES; supervisor: Scott Prudham, Geog./CFE. *Small scale farming and globalization/urbanization.*
Andrea Sabelli, M.A., Geography/CFE ES; supervisor: Thembela Kepe, Geography. *Carbon market and its social and economic implications.*
Laina Smith, M.A., Geography/CFE ES; sup: Virginia Maclaren, Geog. *Green bin participation: a case study of multi-residential buildings in Toronto.*
Rachelle Soulliere, M.Ed., OISE/UT (Sociology & Equity Studies in Education)/CFE ES; supervisor: Margrit Eichler, SESE. *Case study on farmers' markets and an investigation of equity.*
Liviu Timotin, M.Sc.Pl., Geography/CFE ES; supervisor: Tenley Conway, Geography UTM. *Building greener and healthier neighborhoods: evaluating the LEED-ND pilot program.*
Eliana Trinaistic, M.I.St., Information/CFE ES; supervisor: Matt Ratto, Information. *The natural city, and citizenship and access to information in the context of environmental justice.*
Daniel Vandervoort, M.A., OISE/UT (Adult Education, Community Development & Counselling Psych.)/CFE ES; supervisor: Roxanna Ng, AECDCP. *The social organization of ecological agriculture knowledge.*
Brian Volz, M.F.C., Forestry/CFE ES; supervisor: Andy Kenney, Forestry. *Urban forestry, green roofs and renewable energy.*
Debbie Waung, M.A.Sc., Chemical Engineering/CFE ES; supervisors: Emma Master, Ramin Farnood, Chemical Engineering. *Application of enzymes for surface chemistry modification of pulp fibres.*
Jennifer Weaver, Ph.D., Geography UT Mississauga/CFE ES; supervisor: Tenley Conway, Geography, UT Mississauga. *The effects of disturbance on invasive species: distribution and range expansion in Ontario.*
Jenaya Webb, Ph.D., Anthropology/CFE ES; supervisor: Shiho Satsuka, Anthropology. *Environmental non-governmental organizations and conservation practice in Banff National Park, Alberta.*
Anne Marie Wetter, M.Ed., OISE/UT (Adult Education, Community Development & Counselling Psych.)/CFE ES. *Community capacity building that addresses environmental and social justice issues.*
Thomas Paul York, Ph.D., Religion/CFE ES; supervisor: Stephen Scharper, Anthropology UTM/CFE. *A Kantan interpretation of climate change issues.*
Xianming Zhang, Chemistry, Ph.D./CFE ES; supervisor: Frank Wania, Physical & Environmental Sciences, UTSC. *Validation of a passive air sampler and screening chemicals' potential to be contaminants.*

Environment and Health Collaborative Program

2008-09 Alumni

The following alumni convocated in 2008-09 from the Centre's (CFE) graduate Environment and Health (EH) Collaborative Program. Condensed abstracts of research papers or theses are included. Please see pages 15-16 for information on this program.

IAN ARNOLD, M.H.Sc., June 2009, Public Health/CFE EH; supervisor: Frances Silverman, Medicine. ***Effects of Ambient Particulate Matter Exposure in Outdoor Occupations.*** Exposure to concentrated ambient particles has been associated with an increase in diastolic blood pressure in controlled human exposures. The purpose of this pilot research project was to examine the feasibility of using a post–pre blood pressure measurement in field based studies, to examine the effects of exposure to fine particulate matter ($PM_{2.5}$) on outdoor workers. There were no significant associations found between $PM_{2.5}$ exposure and changes in either systolic or diastolic blood pressure in the nineteen participating landscapers. In the future, a larger sample size may be needed to detect a significant change.

BENITA TAM, M.Sc., November 2008, Geography/CFE EH; supervisor: William Gough, Physical and Environmental Sciences, UT Scarborough. ***Assessing the Impacts of Climate Change to the Spread of Furunculosis Found in Fish Species of Ouje-Bougoumou (Québec).*** A climate change impact assessment was conducted to examine the spread of furunculosis found in the fish species of Ouje-Bougoumou. In a past assessment using observed climate data and traditional ecological knowledge (TEK) data, findings show that the rise in air mean temperature coincides with the timeline of past incidences of furunculosis. To project future impacts of climate change, climate models, lake models and TEK were used. It is predicted that the disease will persist throughout the 21st century. It is argued that a combination of stress factors, i.e. past mining activities and warmer temperatures, put the fish species at a greater risk to furunculosis.

New & Continuing

The following graduate students were enrolled in the Centre's (CFE) Environment and Health (EH) Collaborative Program in 2008-09 and may continue or convocate in 2009-10. Research topics are included.

Ilan Alleson, Ph.D., Public Health/CFE EH; supervisor: Anne-Emanuelle Birn, Public Health. *Contested illness and environmental struggles surrounding Bedouin and Jewish communities: case studies of the Negev.*
Darren Correia, M.H.Sc., Public Health/CFE EH. *Course work program in Occupational and Environmental Health.*
Tracie Greenberg, M.Sc., Geography UT Mississauga/CFE EH; supervisor: Harvey Shear, Geography UTM. *Nutrient cycling and water pollution analysis of Lake Zapotlan, Mexico.*
Catherine Maule, Ph.D., Public Health/CFE EH; supervisor: Blake Poland, Public Health. *Social construction of "natural" places and their role in the protection of health.*
Michelle North, Ph.D., Medical Sci./CFE EH; supervisors: J. Scott, Public Health; F. Silverman, Medicine. *Airway responsivness in murine asthma model I linked to L-arginine metabolosm and exacerbated by air pollution.*
Balwinder Pandher, M.H.Sc., Public Health/CFE EH. *Course work program in Occupational and Environmental Health.*
Kate Parizeau, Ph.D., Geography/CFE EH; supervisor: Virginia Maclaren, Amrita Daniere, Geography. *Informal Recycling in Buenos Aires, Argentina.*
Kavita Singh, M.H.Sc., Public Health/CFE EH. *Epidemiology course prog.*
Iffath Syed, M.H.Sc., Public Health/CFE EH; supervisor: Lynn Holness, Public Health. *Course program in Occupational and Environmental Health.*
Benita Tam, Ph.D., Geography/CFE EH; supervisor: William Gough, Physical and Environmental Sciences, UT Scarborough. *Climate change, vulnerable populations and health issues.* ***(Also M.Sc. alumna, 2008-09; see above,)***
Bruce Urch, Ph.D., Medical Sci./CFE EH; supervisor: Paul Corey. *Controlled human exposures: cardiorespiratory responses to ozone and fine particles.*
Tara Zupancic, M.H.Sc., Public Health/CFE EH. *Course work program in Health Promotion.*

Graduate Research: M.Env.Sc. program

2008-09 Alumni

The following alumni convocated in 2008-09 from the M.Env.Sc. Professional Program, a Centre for Environment program at the Dept. of Physical and Environmental Sciences, U of T Scarborough. Condensed abstracts of theses are included for alumni of the Research Option. Please see p. 17 for information on this program.

Research Option:

VINCENT CHENG, M.Env.Sc., November 2008; supervisor: George Arhonditsis. ***A Revisit of Lake Phosphorus Loading Models Using a Bayesian Hierarchical Framework.*** When using this framework for datasets from multiple systems, the systems are assumed to be identical in behaviour and the models have a common set of parameters. The models are dissected into hierarchies that account for the role of significant sources of variability, thereby allowing intersystem parameter differences. Using critical values of mean lake depth and hydraulic residence time, it was found that this configuration led to a performance improvement of 6 out of 7 hypothesized relationships used to predict lake phosphorus. It was also shown how the framework can be used to assess exceedance frequency and confidence of compliance of water quality standards. The framework may be useful in the policy making process and can optimize environmental management actions.

ANNE GRIFFITH, M.Env.Sc., November 2008; supervisor: Ken Howard. ***Hydrogeological Modeling for Sustainable Water Management Practices on the Absheron Peninsula, Azerbaijan.*** This peninsula is faced with a severe imbalance of water resources. Throughout the last 50 years, surface and groundwater from other parts of the country have been imported to satisfy domestic, agricultural and industrial water needs. The lack of general planning has greatly impacted the hydrogeological regime and has led to damage of infrastructure and inducement of natural disasters. A groundwater modeling program was used to simulate the impacts of the imported water, as well as contaminant fluxes from industrial development, on groundwater.

TONY LAW, M.Env.Sc., November 2008; supervisor: George Arhonditsis. ***Structural Changes in Lake Functioning Induced from Nutrient Loading and Climate Variability.*** The relative importance of the ecological mechanisms underlying plankton seasonal variability in Lake Washington, Washington State, U.S. from 1964 to 1998 was examined using an intermediate complexity plankton model to reproduce limiting nutrient dynamics in the lake. A significant role of phosphorus recycling stemming from zooplankton excretion on the planktonic food web variability was found. A moderately significant signature of local climatic conditions was found on phytoplankton growth, herbivorous grazing, and detritus mineralization. The study underscores the uncertainty in ecological forecasts to the management of freshwater ecosystems under a changing global environment.

NICOLE RICKER, M.Env.Sc., November 2008; supervisor: Roberta Fulthorpe. ***Characterization of the tfd Gene Cluster in Burkholderia Isolates from Uncontaminated Soil Environments.*** This research examined the genes for degradation of chlorobenzoate (CBA) from the naturally occurring soil isolate *Burkholderia sp.* R172. Comparisons were made between sequenced portions of this organism and other known CBA degraders both at the nucleotide and protein level. It was found that the *tfd* genes in *Burkholderia sp.* R172 (*tfdC* and *tfdD*) more closely resembled the archetypal *Cuprividius necator* JMP134 pJP4 *tfd* genes (later named the module I genes) than the *tfd*II genes discovered later in the same organism. To the best of our knowledge, this is the first report of an organism possessing solely *tfd* genes related to module I. To investigate the possible role of a plasmid or transposon in unstable degraders, primers specific to genes common to the Inc-P1 class of plasmids, as well as primers for IS1071 and two separate genes found in Tn4371 were utilized to search for possible homologies.

SORINA MARINESCU, M.Env.Sc. June 2009; supervisor: Dudley Williams. ***Macroinvertebrate Communities in the Freshwater Springs of Central Romania: A Modern Interpretation.*** This study summarizes the findings of a 1962 study of Romanian macroinvertebrate species and analysed the communities in association with the measured environmental variables from a modern perspective. A Canonical Correspondence Analysis was conducted for six groups of data using temperature, altitude and pH. For 13 stations, temperature, pH, altitude, alkalinity, hardness, total dissolved solids, total suspended solids, and NaCl concentration were analysed. The majority of the observations regarding species preferences for certain habitat conditions were confirmed, showing the declining trend in habitat quality and species richness signaled by the original authors.

Internship Option: The following 2008-09 alumni completed internship program option. Convocated November 2008: **Sara Adamkowski**, **Shabnam Bagher**, **Amanda Baltimore**, **Steven Beecraft**, **Jennifer Bennett**, **Erin Caplan**, **Giselle Davidian**, **Heena Dhawan**, **Eric El Masri**, **Adam Griffiths**, **Kristina Hausmanis**, **Lilian Hoang**, **Chi-Wai Andy Lai**, **Melanie Langille**, **Mathieu Morin**, **Na Qu**, **Jessica Rando**, **Shaun Sharma**, **Serguei Stremilov**, **Pearl Vas**, **Michael Wallace**, **Xiaohui Wang**, **Kirk Wong**, **Wing-Shun Wu**, and **Xing Wu**. Convocated June 2009: **Daniel Gibson**, **Yvonne Henry**, **Ilir Liko**, **Eugent Toni**, **Christina Wright**, and **Dongming Zhang**.

New & Continuing

The following students were enrolled in the M.Env.Sc. program in 2008-09 and may continue or convocate in 2009-10. An additional 13 students were enrolled with undecided streams.

Research Option:

Shawkat Ahmed: *High resolution ground-penetrating radar (GPR) study of shallow depositional features in lacustrine environments, Ontario.* (Supervisor: Nick Eyles.)

Alexey Gudimov: *Eutrophication risk assessment in Hamilton Harbour: system analysis and evaluation of nutrient loading scenarios.* (George Arhonditsis.)

Bogdan Hlevca: *Man-made influences upon the water exchange driven by lake seiches in the coastal wetlands of the Great Lakes.* (Mathew Wells.)

Monir Hossain: *Elucidation of ecosystem structure using Ecopath with Ecosim (EwE) model: application to a temperate oligotrophic lake in Hokkaido, Japan.* (George Arhonditsis.)

Yuko Shimoda: *The effect of climate change on lake dynamics with respect to lake hydrodynamics, chemical factors and food web structure using different scenarios.* (George Arhonditsis.)

Shamsul Tarafder: *Mercury cycling through urban watershed.* (Carl Mitchell.)

Morgan Tidd: *Modelling wave transformation in the Great Lakes to determine near-bed velocities and bottom stress as an indicator of sediment resuspensison: a case study of Frenchman's Bay.* (Brian Greenwood.)

Rob Wiedemann: *Linking sulphate deposition to methylmercury production and carbon structure in an experimental peatland.* (Carl Mitchell.)

Internship Option: The following students are proposed to complete internships in 2009: **Krysta-Lee Anderson**, **Kiran Anwar**, **John Armour**, **Tom Bradley**, **Alan Burt**, **Edyta Chorostkowska**, **Theodora Geach**, **Laura Gail Hill**, **Farah Hirani**, **Raluca Georgiana Hlevca**, **Ann Marie Jesupillai**, **Mohammad Tarique Kamal**, **Jessica Cynthia Karpowicz**, **Sepideh Khairkhahi**, **Hugh Gregory Langley**, **Stephanie Maguire**, **Megan McLean**, **Claire Moura**, **Karen Esther Mrema**, **Jennifer Owen**, **Alana Michelle Phelps**, **Katherine Pieczora**, **Yue Qiao**, **Mathura Ragavan**, **Anina Sakaguchi**, **Haruka Shoji**, **Quentin Stossel**, **Christian Edward Tenaglia**, **Caitlin Anne Vanderkooy**, **Katherine Wallace**, **Yuan-Ling Wang**, **Rani-Lee Wiedemann, David Colin Young**, **Jue Yi Joyce Zhang**, **Maria Zintchenko.**

Message from the Undergraduate Coordinator

BY ANTHONY DAVIS

Although the report below is attributed to me, it was provided by **Karen Ing**, Senior Lecturer and former Undergraduate Coordinator at the Centre for Environment. At the time of writing I am still in the first month of my new job. That time has been absorbed by preparations for the upcoming school year; with the appointments of sessional instructors and teaching assistants. I am grateful to Karen for her help during this hectic stage and for her unstinting efforts in promoting undergraduate teaching at the Centre. As she notes, we are heading into a new phase in undergraduate affairs, prompted by a Faculty of Arts and Science curriculum review process.

The undergraduate programs and courses at the Centre for Environment continue to show steady growth as evidenced by increases in both our program and course enrolments. In its first year of offering in 2008-09, **the Environment & Behaviour science minor**, in collaboration with the Department of Psychology, saw a healthy enrolment of 11 students. And early indications are that our new **Environment & Health science major** (to start in the Fall of 2009) in collaboration with the Human Biology Program at New College, will surpass even this number. Last year, the Centre and the Human Biology program offered a new fourth-year course in this area, **JEH455H Current Issues in Environment & Health**, designed to explore the interface between environment and health from scientific, medical, political and policy perspectives.

In 2008-09, we also introduced a **new Environment and Energy science minor** for which three new courses were developed and offered. In collaboration with **Professor Danny Harvey** of the Department of Geography, two new joint courses, **JGE347H Efficient Use of Energy** and **JGE348H Carbon Free Energy**, were offered, and a third course, **ENV346H Terrestrial Energy Systems**, was developed by **Professor Bryan Karney**, Director of the Division of Environmental Engineering and Energy Systems.

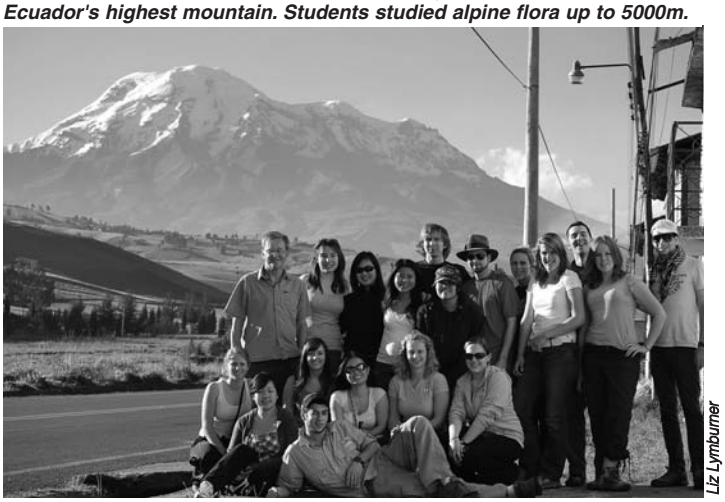
Course enrolments are generally up across the board and we continue to receive very positive student feedback on the two field courses offered through the Centre. Not least of all, **ENV395Y Special Topics Field Course** which I led again this summer, to the high Andes, the Ecuadorian Amazon and the Galapagos Islands. We are also building on the success of **ENV336H Ecology in Human-Dominated Environments**, which was first offered in August 2008 at the Koffler Scientific Reserve at Jokers Hill in King Township just north of Toronto. Led by **Professor Ivana Stehlik** of the Department of Ecology and Evolutionary Biology, this course was first conceptualized as an integral part of the joint **Environmental Biology minor program with the National University of Singapore**. The course introduces students, both international and domestic, to the many facets of the Southern Ontario landscape. Following the success of its first year, we anticipate six international students (five from Singapore and one from New Zealand) to be joining the course in August 2009 as part of their enrolment in the joint Environmental Biology minor program.

However, despite these many small tangible indicators of success, much of the efforts in the undergraduate office in 2008-09 were behind the scenes in meetings and consultations to envision curriculum changes which will allow us to better meet the needs and interests of our expanding student body. Towards this end, our plans for 2009-10 include submission of proposals to significantly modify our existing core programs in Environment and Science, Environment and Society, and Environment Policy and Practice. Much of this reflection is prompted by a Faculty of Arts and Science curriculum review and renewal process but equally driven to better make use of our existing resources and draw on the strengths of both our own faculty members and those of our collaborating departments. As part of this process, we are excited at our proposals to launch two new first year and two new fourth year undergraduate courses, two each for the science students and the social science and humanities students. A major goal in this reworking is to ensure that all students have within their program a strong interdisciplinary core from their first year to their fourth year, but with enough flexibility that they can explore the myriad of environmental courses offered both through the Centre and other academic units throughout this university.

Please stayed tuned for updates on these developments. I am optimistic that there will be many positive changes and reflections to share with you by next year. Until then, I wish you all a successful 2009-10 academic year.

Anthony (Tony) Davis is Associate Professor (retired) in the Department of Geography and Undergraduate Coordinator at the Centre for Environment.

ENV 395Y students at the foot of Chimborazo, an extinct volcano and Ecuador's highest mountain. Students studied alpine flora up to 5000m.



Liz Lymburner

FOR MORE INFORMATION
on undergraduate programs and courses:

www.environment.utoronto.ca
or David Powell, Undergraduate Student Advisor,
416-946-8100, david.powell@utoronto.ca

Undergraduate Programs

For more information, please visit www.environment.utoronto.ca

Core Programs:

The Centre for Environment offers three core interdisciplinary undergraduate program streams each with minor, major and specialist:

1. Environment and Science (B.Sc.)
2. Environment and Society (B.A.)
3. Environmental Policy and Practice (B.A.)

Collaborative Programs:

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

Specialist Programs:

1. Earth Systems: Physics and the Environment (B.Sc.): with Department of Physics
2. Environment and Health (B.Sc.): with Human Biology Program, New College
3. Environmental Chemistry (B.Sc.) with Department of Chemistry
4. Environmental Geosciences (B.Sc.): with Department of Geology
5. Past Environments (B.Sc.): with Archeology Program, Anthropology
6. Environment and Toxicology (B.Sc.): with Department of Pharmacology & Toxicology

Major Programs:

1. Environmental Ethics (B.A.): with Department of Philosophy
2. Environment and Health (B.Sc.) ***(new)*** with Human Biology Program, New College.

Minor Programs:

1. Environment and Behaviour (B.Sc.): with Department of Psychology
2. Environment and Energy (B.Sc.): with Department of Geography
3. Environmental Ethics (B.A.): with Department of Philosophy

Directed Minors:

These programs are for students interested in acquiring a limited body of knowledge in one specific 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.)
8. Physical and Environmental Geography (B.Sc.)

ENSU: Environmental Students' Union

By Mike Lawler, 2009-10 ENSU Executive Coorindator

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 U of T campus. 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.

ENSU has recently worked on environmental projects on campus such as the installation of a solar panel array on Sidney Smith Hall and a project aimed at improving the composting collections. It has also organized socials and environmentally themed film nights, a winter retreat to Hart House Farm, and a graduate studies information session, and has continued to play a role in the annual Environmental Career Day ***(see page 29)***. The upcoming year will be focused on increasing participation and cohesion among Centre for Environment students, as well as creating study resources for future years and strong social activities, such as an Environmental Formal and a speaker series. The most prominent goal is to increase the feeling of community among environmental students at the University of Toronto. The group will also seek to work in co-ordination with other prominent U of T groups, such as UTERN and TUGS. In addition, the aforementioned activities will continue in a similar fashion as previous years.

For more information,
please visit http://ensu.sa.utoronto.ca
or email studentaffairs.ensu@utoronto.ca.

Undergraduate Courses

2009-10 undergraduate offerings and instructors are subject to change.

ENV199Y Debating and Understanding Current Environmental Issues *(K.Ing, CFE; K.Kumar, Geog/CFE)*
ENV200Y Assessing Global Change: Science & the Environment *(A.Zimmerman, Ecology & Evol. Biology; K.Ing)*
ENV222Y Interdisciplinary Perspectives on Environment *(K.Ing, S.Scharper, CFE; C.Phillips, sessional)*
ENV223H Fundamental Environmental Skills *(C.Young, sessional)*
ENV234Y Environmental Biology *(I.Stehlik, et al., Ecology & Evolutionary Biology)*
ENV235Y Physics and Chemistry of Planet Earth *(J.Abbatt, Chemistry; C.Robin, Physics)*
ENV236Y Human Interactions with the Environment *(M.Diamond, Geog; M.Belmont, sessional)*
ENV299Y Research Opportunity Program *(B.Savan, CFE)*
ENV307Y Urban Sustainability *(C.Hostovsky, sessional)*
ENV315H Chemical Analysis of Environmental Samples *(M.Gorton, Geology)*
ENV320Y National and International Environmental Policy Making *(D.Macdonald, CFE)*
ENV321Y Approaches to Environmental Issues *(K.Kumar; S.Cohen, sessional)*
ENV332H Culture and Nature *(not offered)*
ENV333H Ecological Worldviews *(T.Leduc, sessional)*
ENV335H Environmental Design *(C.Waite-Chuah, sessional)*
ENV336H Ecology in Human Dominated Landscapes *(I.Stehlik)*
ENV340H Informed Environmental Practice *(C. Young)*
ENV341H Environment and Human Health *(A.Abelsohn, sessional)*
ENV346H Terrestrial Energy Systems *(B. Karney, Civil Engineering)*
JGE347H Efficient Use of Energy *(D.Harvey, Geography)*
JGE348H Carbon-Free Energy *(D. Harvey)*
ENV350H Energy Policy and Environment *(R.Houldin, sessional)*
ENV395Y Special Topics Field Course: Ecology and Conservation in the Amazon, Galápagos, and Andes *(A.Davis, Geography)*
ENV410H Environmental Research Skills *(D. Macdonald)*
ENV420Y Environmental Research *(Staff)*
ENV421H Environmental Research *(K.Ing)*
ENV422H Environmental Law *(P.Muldoon, sessional)*
ENV423H Public Policy and Environment *(R.Houldin)*
ENV440Y Professional Experience Course *(B.Savan; D. Sider, sessional)*
ENV447H The Power of Economic Ideas *(R.Houldin)*
JEH 455H Current Issues in Environment and Health *(R.Wilson, et al., Human Biology Program, New College)*
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)

Undergraduate Students' Awards

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

Congratulations to the latest recipients of the following Centre for Environment (CFE) undergraduate awards.

Frances L. Allen Scholarship: This award is for an outstanding second or third-year student in a CFE Specialist or double Major program. The 2008-09 recipient was **Ali Rizvi**, B.Sc. student, Environmental Chemistry specialist.

Chachra Family Scholarship in Environment and Science: This is awarded to a student enrolled in a CFE B.Sc. specialist or major program, on the basis of financial need. Academic merit is also considered. The 2008-09 recipient was **Alexandra Tevlin**, B.Sc. student, Environmental Chemistry specialist.

Dr. Stanley Allan Cord Scholarship in Environmental Studies: This scholarship is awarded to CFE students in the third or fourth year who have achieved academic excellence. All other things being equal, preference is afforded to Innis College students, extending the tradition of its former Environmental Studies Program. The 2008-09 recipient was **David Berliner**, June 2009 B.Sc. alumnus, Environment and Health specialist.

Peter John Hare Memorial Scholarship in Environment: This is awarded to a specialist or major in environmental studies on the basis of academic merit and financial need. Preference is given to students taking courses in Environment and Science. Demonstrated commitment to social involvement in environmental issues is also considered. The 2008-09 recipient was **Adrienne Nicole DeBond**, June 2009 B.Sc. alumna, Environmental Geosciences specialist.

Robert Hunter Scholarship: This is awarded to outstanding undergraduate students enrolled in CFE programs. All other things being equal, preference is afforded to Innis College students, extending the tradition of its former Environmental Studies Program. The 2007-08 recipients, presented at the 2009 Robert Hunter Memorial Lecture ***(see page 30)***, were: **Joanna Jack**, June 2009 B.A. alumna, majors in Environmental Policy and Practice & Biology; **David Berliner**, June 2009 B.Sc. alumnus, Environment and Health specialist; **Cindy Chao**, June 2009 B.Sc. alumna, Environment and Health specialist; and **David Photiadis**, June 2009 B.A. alumnus, majors in Environment and Society & Environment and Resource Management.

RIGHT: From left to right Joanna Jack, David Berliner, David Photiadis are presented with Robert Hunter scholarships by Karen Ing, then CFE Undergraduate Coordinator, at the Hunter Memorial Lecture in Feb 2009. BOTTOM: Monte Hummel, former Innis College Environmental Studies program coordinator and founding President of the World Wildlife Fund, presents the Pimlott award to Alexandra Tevlin (far left) with the Douglas Pimlott entrance scholarship, Krista Gallagher (centre) and May Jeong (far right), at the Pimlott Lecture in March 2009.

Douglas Pimlott Award and Scholarships: These are awarded to CFE students with excellent levels of academic achievement combined with 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 its former Environmental Studies Program. The 2007-08 recipients, presented at the 2009 Douglas Pimlott Memorial Lecture ***(see page 30)***, were:
Pimlott Award: Samantha Azzarello, B.Sc. student, majors in Environment and Science & Environment and Resource Management; **Emma Heath-Engel**, B.A. student, majors in Environmental Policy and Practice & Anthropology; **Krista Gallagher**, June 2009 B.A. alumna, majors in Environment and Society & Political Science; **May Jeong**, B.A. student, majors in Environment and Society & Political Science; and **Julia Paillé**, B.A. student, majors in Environmental Policy and Practice & Physical and Environmental Geography.
Pimlott Entrance Scholarship: Alexandra Tevlin, B.Sc. student, Environmental Chemistry specialist.
Pimlott Graduating Scholarship: Jennifer Loo, 2008 B.Sc. alumna, Environment and Health specialist; and **Emily Van Halem**, 2008 B.A. alumna, majors in Environmental Policy and Practice & International Development Studies.

Kathryn S. Rolph Scholarship: This is awarded to an outstanding student in a CFE program who has achieved a high mark in a course on environmental issues (currently JGE221Y or ENV321Y). The 2008-09 recipients were **Isabelle Eckler**, B.A. student, majors in Environment and Society, Urban Studies, and English.

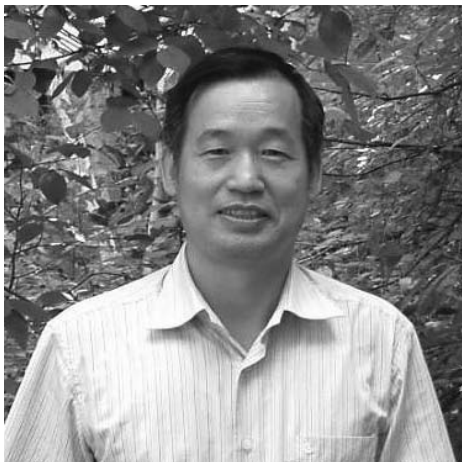
Sidney and Lucille Silver Scholarship: This is awarded to an outstanding third-year student in a Specialist or double Major program in environmental studies at CFE or the Department of Geography. The 2008-09 recipient was **Madison Van West**, B.A. student, majors in Environment and Society & Environmental Ethics.

Centre for Environment Undergraduate Student Award: This is awarded to a CFE student and is based on financial need and academic achievement. The 2008-09 recipient was **Stephanie Banh**, B.Sc. student, majors in Environment and Science & Physiology.

David Powell

Jackie Vanderpool

Message from the Graduate Coordinator



BY JING CHEN

The Centre for Environment offers two major collaborative programs of study at the Masters and Doctoral level: 1) Environmental Studies, and 2) Environment and Health ***(see article below)***. Students admitted to a "home" department apply to the collaborative program and pursue course work and research in environmental areas. Through these programs, students have the opportunity to pursue interdisciplinary, graduate education while building on their own disciplinary grounding. By utilizing the university's extensive resources, the Centre offers one of North America's most engaging and interdisciplinary programs in the environment.

Environmental Studies Collaborative Program

The Centre's Environmental Studies Collaborative Program (ES) currently has graduate students from across the disciplinary spectrum. Collaborating units are: Adult Education, Community Development and Counselling Psychology (OISE/UT); Anthropology; Chemical Engineering and Applied Chemistry; Chemistry; Ecology and Evolutionary Biology; Economics; Forestry; Geography and Planning; Geology; Information; Management; Philosophy; Physics; Political Science; Religion; Sociology; Sociology and Equity Studies in Education (OISE/UT); and Women and Gender Studies. Students may also be admitted from other graduate units on an individual basis; for example, we have had students enrolled from the Faculty of Social Work and the Department of South Asian Studies.

In 2008-09, the Centre was pleased to have 11 alumni of the Environmental Studies collaborative program (2 Ph.D. and 9 Masters); ***see pages 8-9 for abstracts of their research theses or papers***. In this past academic year, the Centre also welcomed six new Ph.D. and 15 new Masters students in the Environmental Studies collaborative program, bringing the total of new and continuing students to 24 Ph.D. and 25 Masters. ***(See pages 9-10 for a list of their research topics.)*** The new and continuing students are enrolled in a variety of disciplines as their home unit, such as Anthropology, Chemical Engineering and Applied Chemistry, Chemistry, Ecology and Evolutionary Biology, Economics, Forestry, Geography and Program in Planning, Information, OISE/UT (Adult Education, Community Development and Counselling Psychology, and Sociology and Equity Studies in Education), Philosophy, Physics, Political Science, and Religion.

This is the first time I am serving as Graduate Coordinator for the Centre for Environment. Many thanks to **Hilary Cunningham**, Associate Professor in the Department of Anthropology, who served as the Centre's Graduate Coordinator from 2006 to 2009. Our Graduate Student Advisor **Pavel Priva** and I will work closely with the various home departments to continue to run these programs smoothly. I am looking forward to meeting students individually to help with any of your needs.

Jing Chen is Professor and Canada Research Chair in Geography and Graduate Coordinator at the Centre.

FOR MORE INFORMATION
on collaborative graduate programs:

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

Environment and Health Collaborative Program

BY CLARE WISEMAN

The collaborative graduate program in Environment and Health is offered by the Centre for Environment, in conjunction with the graduate degree programs of Geography and Planning, Medical Science, Public Health, and Women and Gender Studies. It provides an interdisciplinary perspective to the field of environment and health for students interested in studying how various chemical, biological and radiological exposures in the indoor and outdoor environments can affect the health of individuals and communities.

The public **Environment and Health Seminar Series** and core course in the program (ENV 4001H) seeks to bring in top academics and experts from a wide range of fields, backgrounds and affiliations to present their research and introduce students to a variety of interdisciplinary perspectives, methods and concepts. ***(See page 31 for this year's past seminars.)*** In addition to this course, students can choose an elective from a diverse range of environment and health-related disciplines, to design a program of study which specifically suits their academic interests and needs. In this respect, the program is intended for students who are interested in the linkages between environmental factors and health as they relate to the etiology and pathophysiology of human disease and pathways of contaminants in the environment, as well as the social, policy and ethical dimensions of environment and health issues.

Current and past students of the program have contributed greatly to the field of environment and health, researching a broad range of highly pertinent and interesting topics. ***(See page 10.)***

I am pleased to be teaching **ENV4002H The Environment and Health of Vulnerable Populations** again in the Fall 2009 term, a course that was successfully developed and offered for the first time in 2008. This course explores how and why certain populations may be especially vulnerable to environmental hazards and will address not only the role of various biological, neurodevelopmental and physiological factors in determining vulnerability but also related sociocultural, equity and justice issues.

Dr. Clare Wiseman is Assistant Professor and Coordinator of the Environment and Health Program, Centre for Environment.

Grad Courses

(collaborative programs)

The following Centre for Environment and joint graduate courses are offered as part of the Collaborative Programs in Environmental Studies & Environment and Health. 2009-10 offerings and instructors indicated are subject to change.

For more information, please contact Pavel Pripa, Graduate Student Advisor, 416-978-3475, pavel.pripa@utoronto.ca.

Core Courses

ENV 1001H	Environmental Decision Making *(P. Byer, Civil Eng/CFE; I. Stefanovic, Philosophy/CFE)*
ENV 4001H	Seminars in Environment and Health *(C. Wiseman, CFE)*

Other Courses

ENV 1002H	Environmental Policy *(D. Macdonald, CFE)*
ENV 1004H	Urban Sustainability *(B. Bass, sessional)*
ENV 1005H	Business and Environmental Politics*
ENV 1008H	Worldviews and Ecology *(S. Scharper)*
ENV 1444H	Capitalist Nature *(W.S. Prudham, Geog/CFE)*
ENV 1701H	Environmental Law (*P. Muldoon, sessional)*
ENV 1703H	Water Resources Management *(A.P. Grima, sessional)*
ENV 1704H	Environmental Risk Analysis and Management *(A.P. Grima, sessional)*
ENV 1707H	Environmental Finance and Sustainable Investing *(J. Ambachtsheer, S. McGeachie, sessionals)*
JEI 1901H	Technology, Society & Environment (*W. Vanderburg, Civil Eng/CFE)*
JEI 1902H	Technology, Society & Environment II (*W. Vanderburg, Civil Eng/CFE)*
JGE 1212H	Fate of Contaminants in the Environment *(M. Diamond, Geography)*
JPV 1201H	Politics, Bureaucracy and the Environment*
JGE 1413H	Environmental Assessment *(V. Maclaren, Geography)*
JGE 1420H	Urban Waste Management: An International Perspective*
JGE 1609H	Cities, Industry and the Environment*
ENV 2000H	Independent Study
ENV 2002H	Special Topics: Environmental Studies
JVP 2147H	Environmental Philosophy*
JNC 2503H	Environmental Pathways *(TBA)*
ENV 3000H	Special Topics: Environment and Health
ENV 4002H	The Environment and Health of Vulnerable Populations *(C. Wiseman)*

* Not offered in 2009-10.

Graduate Faculty

The following individuals currently have graduate faculty appointments at the Centre for Environment. Membership is subject to change. For information on graduate appointments and student supervision, please contact Pavel Pripa, 416-978-3475, pavel.pripa@utoronto.ca.

Full Members

Jonathan Abbatt, *Chemistry*
Barry Adams, *Civil Engineering*
Grant Allen, *Chemical Eng. & Applied Chemistry*
Robert Andrews, *Civil Engineering*
George Arhonditsis, *Physical & Environmental Sciences, UT Scarborough (UTSC)*
Spencer Barrett, *Ecology & Evolutionary Biology*
Steven Bernstein, *Political Science*
Alana Boland, *Geography*
Brian Branfireun, *Geography, UT Mississauga*
Michael Bunce, *Social Sciences, UT Scarborough*
Philip Byer, *Civil Engineering/CFE*
Jing Chen, *Geography*
Donald Cole, *Public Health*
Tenley Conway, *Geography, UT Mississauga*
Paul Cooper, *Forestry*
Paul Corey, *Public Health*
Donald Cormack, *Physical & Environ. Sci., UTSC*
Sharon Cowling, *Geography*
Hilary Cunningham, *Anthropology*
Amrita Daniere, *Geography*
George Dei, *OISE/UT Sociology & Equity Studies*
Donald Dewees, *Economics*
Miriam Diamond, *Geography*
Elizabeth Edwards, *Chem. Eng. & Applied Chem.*
Margrit Eichler, *OISE/UT SESE*
Mark Engstom, *Ecology & Evol. Biology/ROM*
Greg Evans, *Chemical Eng. & Applied Chemistry*
Nick Eyles, *Physical & Environmental Sci., UTSC*
Roberta Fulthorpe, *Physical & Environ. Sci., UTSC*
William Gough, *Physical & Environ. Sci., UTSC*
Mart Gross, *Ecology & Evolutionary Biology*
L. Danny Harvey, *Geography*
D. Linn Holness, *Public Health Sciences*
Ken Howard, *Physical & Environmental Sci., UTSC*
Charles Jia, *Chemical Eng. & Applied Chemistry*
Shashi Kant, *Forestry*
Bryan Karney, *Civil Engineering*
Chris Kennedy, *Civil Engineering*
J. Gary Knowles, *OISE/UT Adult Education, Community Development & Counselling Psych.*
Scott Mabury, *Chemistry*
Laurel MacDowell, *History, UT Mississauga*
Virginia Maclaren, *Geography*
Heather MacLean, *Civil Engineering*
Jay Malcolm, *Forestry*
David Martell, *Forestry*
Patricia McCarney, *Political Science*
Andrew Miall, *Geology*
Eric Miller, *Civil Engineering*
Carl Mitchell, *Physical & Environ. Sciences, UTSC*
G.W. Kent Moore, *Physics, UT Mississauga*
D. Scott Munro, *Geography, UT Mississauga*
Jennifer Murphy, *Chemistry*
Michelle Murphy, *History*
Blake Poland, *Public Health*
Anthony Price, *Physical & Environ. Sci., UTSC*
W. Scott Prudham, *Geography/CFE*
Douglas Reeve, *Chemical Eng. & 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*
Lawrence Sawchuk, *Social Sciences, UTSC*
Stephen Scharper, *Anthropology, UT Mississ./CFE*
Barbara Sherwood Lollar, *Geology*
Krystyna Sieciechowicz, *Anthropology*
Frances Silverman, *Medicine*
André Simpson, *Physical & Environ. Sci., UTSC*
Myrna Simpson, *Physical & Environ. Sci., UTSC*
Grace Skogstad, *Social Sciences, UT Scarborough*
C. Tattersall Smith, *Forestry*
Sandy Smith, *Forestry*
Mark Stabile, *Management; Public Policy & Gov.*
Ingrid Stefanovic, *Philosophy/CFE*
Kimberly Strong, *Physics*
Susan Tarlo, *Public Health Sciences*
Ross Upshur, *Family & Comm. Medicine; Public Health*
Willem Vanderburg, *Civil Engineering/CFE*
Sarah Wakefield, *Geography*
Denis Walsh, *Philosophy*
Frank Wania, *Physical & Environ. Sci., UTSC*
Mathew Wells, *Physical & Environ. Sci., UTSC*
Peter Wells, *Pharmacy*
Dudley Williams, *Physical & Environ. Sci., UTSC*
Kathi Wilson, *Geography, UT Mississauga*

Associate Members

Nathan Basiliko, *Geography, UT Mississauga*
Kerry Bowman, *Joint Centre for Bioethics*
Quentin Chiotti, *Pollution Probe*
Anthony Davis, *Geography*
James Dooley
Andrew Green, *Law*
A.P. (Lino) Grima
H. Roland Hosein, *GE Canada Inc.*
Marney Isaac, *Physical & Environ. Sci., UTSC*
Andy Kenney, *Forestry*
Douglas Macdonald, *Centre for Environment*
Monirul Mirza, *Environment Canada*
Barbara Murck, *Geography, UT Mississauga*
Dennis O'Hara, *St. Michael's College*
Matthew Ratto, *Information*
Beth Savan, *Centre for Environment*
Lesbia Smith, *Public Health Sciences*
Clare Wiseman, *Centre for Environment*
Cindy Woodland, *Pharmacology*

Members Emeriti

Paul Aird, *Forestry*
Terry Blake, *Forestry*
Frances Burton, *Social Sciences, UT Scarborough*
Catherine Chalin, *Public Health*
Frank Cunningham, *Philosophy*
Brian Greenwood, *Physical & Environ. Sci., UTSC*
William Michelson, *Sociology*
R.E. (Ted) Munn
Edmund O'Sullivan, *OISE/UT Adult Education*
Henry Regier
D.N. Roy, *Forestry*
Richard Stren, *Political Science*
Wayne Sumner, *Philosophy*
Vic Timmer, *Forestry*
Rodney R. White, *Geography*
Joseph Whitney, *Geography*
G. Ronald Williams

Message from the M.Env.Sc. Program Director

BY DONALD CORMACK

The Centre for Environment's Master of Environmental Science professional program, located at the Department of Physical and Environmental Sciences (PES) at U of T Scarborough, is a unique interdisciplinary program in the field of biophysical interactions in terrestrial and aquatic systems, focusing on the transport and fate of contaminants in natural and degraded environments. The objective is to enable students to become skilled practitioners of environmental science, well-trained in field and laboratory techniques, with opportunities to develop skills in site assessment, project management and environmental law. This 12-month program, includes coursework and an internship or a research paper, and can be completed full-time or part-time.

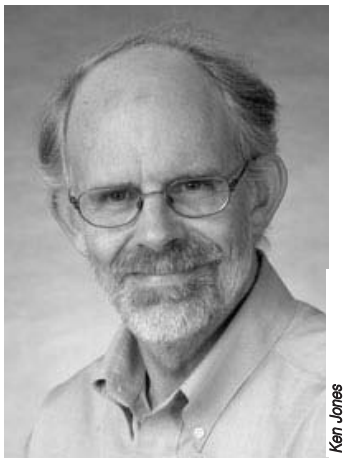
FOR MORE INFORMATION:

www.utsc.utoronto.ca/envsci/menvsci/ or Julie Quenneville, Program Assistant, 416-287-7357, menvsc@utsc.utoronto.ca

The program is entering its fourth year of operation and we expect to have more than 50 full-time students registering in September 2009 drawn from a pool of more than 150 applicants. To date there have been 71 graduates of the program and we expect to have another 40 students graduate in fall 2009. **(See page 10.)**

Three new faculty members have been added to the program in the past year: 1) **Carl Mitchell** joined the Department in 2008; his area of expertise is the transport and fate of mercury in the environment; 2) **Maria Dittrich** joined us in April 2009; her area of research is freshwater biogeochemistry; and 3) **Marney Isaac** who joined us in July 2009; her area of research is the optimization of ecological and social interactions for sustainable agroforestry.

Also new to the program this year is **Anna Maria Russo**, our Internship Coordinator, who has worked diligently with our current students and employers to find productive internship placements for all of our students in the internship stream.



Ken Jones

Ph.D. Program Proposed

We are currently in the final stages of a proposal to establish a Ph.D. in environmental science. **Professor Emeritus Brian Greenwood** is heading up this project. The core graduate faculty in the program would be members of PES. In addition, approximately thirty faculty members from graduate departments across U of T have also signed on to participate as graduate faculty. If approved by the University governance and by the Ontario Council on Graduate Studies, we hope to admit students as early as September 2010.

Donald Cormack is Director of the M.Env.Sc. Program and Chair of PES.

M.Env.Sc. Faculty

The following faculty members at the Department of Physical and Environmental Sciences, U of T Scarborough, are involved with M.Env.Sc. program teaching and student supervision.

George Arhonditsis, Assistant Professor
Donald Cormack, Professor
(Chair; Director, M.Env.Sc. program)
Maria Dittrich, Assistant Professor
Nick Eyles, Professor
Roberta Fulthorpe, Associate Professor
William Gough, Associate Professor
(Associate Chair)
Brian Greenwood, Professor Emeritus
Ken Howard, Professor
Marney Isaac, Assistant Professor
Carl Mitchell, Assistant Professor
Monirul Mirza, Researcher, Environment Canada
Anthony Price, Associate Professor (retired)
André Simpson, Assistant Professor
Myrna Simpson, Associate Professor
Frank Wania, Professor
Mathew Wells, Assistant Professor
Dudley Williams, Professor

M.Env.Sc. Courses

The following graduate courses are offered by the Department of Physical and Environmental Studies, U of T Scarborough, as part of the M.Env.Sc. program. 2009-10 course offerings and instructors indicated are subject to change.

ENV 1100H	Advanced Seminar in Environmental Science *(D. Cormack)*
ENV 1101Y	Research Paper in Environmental Science *(D. Cormack)*
ENV 1102H	Analytical Chemistry for Geoscientists *(Not offered)*
ENV 1103H	Air and Water Quality Sampling and Monitoring *(Faculty)*
ENV 1104H	Methods for the Detection of Pathogens *(R. Fulthorpe)*
ENV 1105H	Soil Contamination Chemistry *(Not offered)*
ENV 1106H	Geology and Geophysics of the Shallow Subsurface *(N. Eyles)*
ENV 1107H	Remediation Methods *(Not offered)*
ENV 1108H	Environmental Science Field Camp *(N. Eyles)*
ENV 1109H	Advanced Techniques in Geographic Information Systems *(Faculty)*
ENV 1110H	Sediment and Contaminant Transport in Aquatic Systems *(Not offered)*
ENV 1111H	Freshwater Ecology and Biomonitoring *(Faculty)*
ENV 1112H	Boundary Layer Climates and Contaminant Fate *(Not offered)*
ENV 1113H	Groundwater Hydrochemistry and Contaminant Transport *(K. Howard)*
ENV 1114H	Directed Readings in Environmental Science I *(Faculty)*
ENV 1115H	Directed Readings in Environmental Science II *(Faculty)*
ENV 1116H	Internship Placement *(D. Cormack)*
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 the Fate of Organic Chemicals in the Environment *(F. Wania)*
ENV 1122H	Global Environmental Security and Sustainable Development *(M. Mirza)*
ENV 1123H	Environmental Regulations *(D. Cormack)*
ENV 1124H	Environmental Project Management *(D. Cormack)*
ENV 1125H	Contaminated Site Remediation *(D. Cormack)*
ENV 1701H	Environmental Law *(Faculty)*
ENV 1704H	Environmental Risk Assessment *(Faculty)*

Graduate Students' Awards

The Centre for Environment wishes to congratulate the recipients of the following graduate awards, most of which were presented at Research Day on April 22, 2009 (see page 5).

Arthur and Sonia Labatt Graduate Fellowships:

These fellowships are awarded on an annual basis to support students enrolled in a Centre for Environment (CFE) graduate program or the Juris Doctor Certificate in Environmental Studies (Law and CFE). Students were asked to submit a paper on practical solutions to environmental issues and/or marketplace for solutions to environmental issues. This year, seven recipients were awarded $5000 each: **Simon Appolloni**, Ph.D. candidate, Religion and Centre for Environment's collaborative program in Environmental Studies (CFE-ES); **Craig Butt**, Ph.D. candidate, Chemistry/CFE-ES; **Sarah DaSilva**, M.A. candidate, Geography/CFE-ES; **Nilima Gandhi**, Ph.D. candidate, Chemical Engineering/CFE-ES; **Angela Loder**, Ph.D. candidate, Geography/CFE-ES; **Andrea Sabelli**, M.A. candidate, Geography/CFE-ES; and **Rachelle Soulliere**, M.Ed. candidate, Sociology and Equity Studies in Education (OISE/UT)/CFE-ES.

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 Dept. of Chemical Engineering and Applied Chemistry, and/or the Centre for Environment. This year, the recipient was **Michelle North**, Ph.D. candidate, Institute of Medical Science and the Centre for Environment's Collaborative Program in Environment and Health. Her research is on airway responsiveness in murine asthma model I linked to L-arginine metabolosm and exacerbated by air pollution.

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, the recipient was **Craig Butt**, Ph.D. candidate, Dept. of Chemistry and the Centre's Collaborative Program in Environmental Studies. His research is on the fate of neutral fluorinated surfactants in biological systems.

Students were presented with the Arthur and Sonia Labatt Graduate Fellowship by Hilary Cunningham, then CFE Graduate Coordinator (far right), at the Centre's Research Day. From left to right: Rachelle Soulliere, Andrea Sabelli, Angela Loder, Craig Butt, and Simon Appolloni.

Tony Ferguson Book Prize

This new annual book prize is awarded to an outstanding graduate student registered in a Centre for Environment graduate program. Preference is given to a student whose area of study encompasses environmental health, ecological zoology or psychology. This year, the $500 book prize was awarded to **Katherine Pieczora**, M.Env.Sc. candidate in the Centre for Environment's M.Env.Sc. professional program.

Eric David Baker Krause Graduate Fellowship

This fellowship established by the City of Toronto and U of T is awarded to a student enrolled in a Centre for Environment (CFE) graduate program or the Juris Doctor Certificate in Environmental Studies (Law and CFE). This year, the award was presented to **Simon Appolloni** at the Eric Krause Memorial Lecture held in March 2009 ***(see page 26)***.

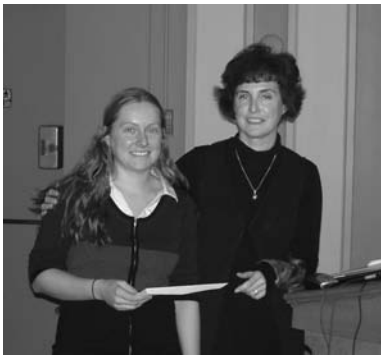
Simon is a Ph.D. candidate in the Centre for the Study of Religion and the Centre for Environment's Collaborative Program in Environmental Studies.

A summer internship was also established at the City of Toronto Environment Office in Eric Krause's name. In 2009, it was awarded to **Emma Hemmingsen**, an M.A. student in Geography and the Centre for Environment.

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 CFE graduate student who best combines excellence in research and contribution to the work of the Centre. This year, the prize was awarded to **Michelle North**, Ph.D. student, Institute of Medical Science and the Centre for Environment's Collaborative Program in Environment and Health (see John Brown prize above).

LEFT: Michelle North, winner of the Langford and Brown prizes and presenter Hilary Cunningham. RIGHT: Stephen Scharper (award presenter), Rodney White (Eric Krause lecture presenter), Simon Appolloni (Eric Krause fellowship recipient) join Wendy, Arnold and Katy Krause (far right) at the Eric Krause Memorial Lecture in March 2009.



Right: Jackie Vanderpool

FOR MORE INFORMATION:

www.environment.utoronto.ca
Pavel Pripa, Graduate Student Advisor,
416-978-3475, pavel.pripa@utoronto.ca

Message from the Prof. Development Advisor

BY RODNEY WHITE

The nature of their field means that environmental practitioners at the university should provide an outreach program for the local community while remaining in close contact with professionals in both the public and private sectors of the economy. For many years the Centre for Environment (and its antecedent Institute for Environmental Studies) has supported **two seminar series in Environmental Studies and in Environment and Health** and its annual **Research Day** which are open to the community. ***(See pages 5, 30-31.)*** These events continue to be well attended, as they cater to an audience with academic as well as a general interest in environmental issues.

We were aware that beyond this audience there was a growing demand for **online environmental education** from people in the workforce who wanted to pursue re-training but could not afford the time required by a traditional on-campus master's degree. In response, we began to develop a suite of certificates in environmental management and have since expanded the program offerings to include certificates in Geographic Information Systems, Renewable Energy, and recently Environmental Health (new in 2008-09). In the Fall of 2009, we will offer our fifth online certificate – in Carbon Finance. ***(See section below.)***

In 2003, we also realized that the university educational environment may not quickly respond to global environmental problems like climate change, other than adding courses to existing degrees. On the other hand, the emerging carbon finance community in the business world needed to begin to deal with the new issues right away. We decided to reach out to Canadian CEOs and CFOs by mounting a 2-day workshop on emerging issues in environmental finance. Unfortunately, the response was low. We went back to our advisory committee, which is comprised of members from the business community *(see p. 21-22)* who got on the phone to find out why their colleagues had not responded. The answer was very simple. At that time, no senior officer was ready to show up for two days of education on the climate change issue. The committee proposed a simpler approach – workshops in the mornings only, open to all.

So we began our **Environmental Finance Workshop Series**. Currently we offer two or three workshops each year on topics such as investing in wind power (in 2005), responsible investing (in 2006), green real estate (in 2007), infrastructure (in 2007), the value of water (in 2008), investing in water (2009; ***see p. 25***), and corporate disclosure of climate-related risks (2009; ***see p. 24***).

In 2008, we also began to offer more intensive two-day **Carbon Finance workshops**. These are followed by an exam allowing successful participants to obtain a "Certificate of Achievement" (continued in 2009; ***see page 23***).

Rodney White is Professor Emeritus in the Department of Geography and Academic Advisor for Professional Development Programs at the Centre for Environment.

Web-based Distance Education

The Centre for Environment has had great success with its distance education certificate programs and courses with increasing enrollment each year. Since our first offerings in 2003-04, we have had over 400 students enrolled. Through its internet-based courses, the programs have accommodated environmental practitioners and professionals, as well as individuals new to the field of environment who wish to pursue professional and educational development while continuing their careers. With the use of discussion forums, conferencing, and live chats, students from all over the world are able to interact with each other, the instructors and guest experts. With the recent registration by a student in Australia, we now have had students from every inhabited continent.

Graduates of the Certificate Programs may be eligible to apply for the Canadian Certified Environmental Practitioner in Training designation, CEPIT, under CECA's (The Canadian Environmental Certification Approvals Board) national certification program for Canadian environmental practitioners. Individual courses from the Certificate program also may meet the professional development criteria required to maintain your environmental certification.

In 2008-09, a new **Certificate in Environmental Health** was added to our offerings. In the Fall of 2009, we will offer our fifth online certificate – in **Carbon Finance**.

FOR MORE INFORMATION on Distance Education:

http://learn.environment.utoronto.ca
or contact Donna Workman, Manager, Program and Partnership Development, 416-978-7077, d.workman@utoronto.ca

Programs and Course Offerings

2009-10 course offerings and instructors indicated are subject to change.

Certificate in Environmental Management

Environmental management includes impact assessment, but also involves other strategies and tools, such as adaptive management, risk assessment, environmental site audits, assessments, remediation and conflict resolution. The objectives of this certificate program are to develop an understanding of the basic premises, theories and practices associated with environmental management and to provide an insight into the systems approach which can be employed to mitigate a wide range of environmental problems. The certificate is designed to bridge the gap between theoretical knowledge and methodologies of environmental management with a detailed

Continued on page 20...

Continued from page 19.

deconstruction of Canadian issues. Grounded in a holistic approach to sustainable development, it aims to develop strategic, consensual, and inclusive solutions to resource and environmental management case studies which may include globalization, climate change, water security, fisheries, agriculture, forestry, wildlife, parks, minerals, and/or waste management. The program also raises awareness of the complexity of risk management in addressing health, economics and environmental conservation.

CEM 400 Fundamentals of Environmental Management *(L.Newman)*
CEM 401 Environmental Case Management: Water *(K.Snarr)*
CEM 402 Strategies in Environmental Management *(L.Sportza)*
CEM 403 Environmental Risk Assessment (*TBA)*

Certificate in Renewable Energy

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. With the Renewable Energy certificate, students will 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 challenges the student to pursue an interdiscipilnary view of the impact of renewable energy on the current global energy picture. The incorporation of renewable energy into the foundation of Environmental Management certificate program provides the student with the necessary strategies and basic premises to place the various forms of renewable energy into a broad systems approach of environmental management. Grounded in an interdisciplinary approach to sustainable development, the program aims to develop strategic, consensual, and inclusive solutions to the renewable energy and environmental management case studies.

CRE 400 Principles in Renewable Energies (*L.Sportza)*
CRE 401 Case Studies in Renewable Energies *(K.Snarr)*
CRE 402 Wind Energy *(A.Moser; **new Fall 2009**)*
CEM 400 Fundamentals of Environmental Management*
CEM 402 Strategies in Environmental Management*
CEM 403 Environmental Risk Assessment*
*also part of Certificate in Environmental Management above.

Certificate in GIS for Environmental Management

Environmental Geographic Information System (GIS) describes the use of geo-spatial management methodology and tools in order to assist in developing an environmental management strategy. As GIS applications reach a broader audience, and the utilization of GIS spreads into new industries every day, the demand within the private and public sectors continues to grow. GIS has become a primary means of communicating spatial information in a multitude of settings in environmental applications. The objectives of the Certificate in GIS for Environmental Management program are to build a foundation for understanding of the GIS and Remote Sensing theory and techniques, and develop GIS software skills to solve practical tasks related to environmental management.

GEM 400 Introduction to GIS for Environmental Management *(M.Govorov)*
GEM 401 Advanced GIS for Environmental Management *(M.Govorov)*
GEM 402 Geospatial Technologies for Environmental Mapping with GIS *(M.Govorov; **New Fall 2009**)*
GEM 403 Environmental Remote Sensing *(G.Gienko; **New Fall 2009**)*
GEM 404 GIS Modeling for Environmental Applications *(G.Gienko; **New Winter 2010**)*

Certificate in Environmental Health (*new in 2008-09*)

In this program, an interdisciplinary approach is taken to the study of Environmental Health. In the foundation course (ENH400), students are exposed to the key elements of Environmental Health. Students will then intimately examine these elements in complementary courses which provide breadth and depth to this area of study. The scope of such courses includes risk assessment, the impact of health policy, vulnerable populations, global environmental change, and climate change impacts on human health. The courses will cover both the natural and built environments, including occupational or personal environments, and will engage local, national, and global environments scales. Drawing upon historical and recent research in decision-making processes, policy development, and the multiple arenas of Environmental Health, it is anticipated that students will develop a strong ability to critically evaluate this subject area.

ENH 400 Environment and Human Health *(L.Frisch)*
ENH 401 Health Policy *(K.Khatter; **new Winter 2010**)*
ENH 402 Environmental Health of Vulnerable Populations *(M.Bienefeld, **new Fall 2009**)*
ENH 403 Human Risk Assessment *(L.Sportza; **new Fall 2009**)*
ENH 404 Global Environmental Change and Human Health *(D.Sider, **new Fall 2009**)*
ENH 405 Climate Change and Human Health (***new Winter 2010**)*

Certificate in Carbon Finance (*new in 2009-10*)

The Centre for Environment's Certificate in Carbon Finance provides a thorough grounding in a new field which aims to help society meet its need to reduce greenhouses gases (GHGs) as rapidly as possible. "Carbon" is the short form used to refer to all the GHGs targeted by the Kyoto Protocol. Carbon Finance is a subfield within the broader subject of Environmental Finance which itself is the assessment of the ability of market instruments to achieve various environmental objectives such as clean air and water, effective solid waste management, the remediation of contaminated land, the preservation of biodiversity, and the stabilization of the climate through GHG reduction. The field of Carbon Finance has been described by *Carbon Finance* magazine as encompassing "market solutions to climate change".

ECF 400 Environmental Finance *(E.Opoku-Boateng, **new Fall 2009**)*
ECF 401 Carbon Finance *(A.Hall; **new Fall 2009**)*
ECF 402 Environmental Finance Case Study: The Kyoto Protocol *(K.Snarr; **new Winter 2010**)*
CRE 400 Principles of Renewable Energies**
CRE 402 Wind Energy** ***(new Fall 2009)***
**also part of Certificate in Renewable Energy above.

J.D. Certificate in Environmental Studies

This certificate program is offered collaboratively 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. In addition to receiving 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.

After completing one year of all first year courses in the Faculty of Law, students will complete a minimum of 48 law school credits, including LAW 239H Environmental Law, in their second and third years. They will also take ENV 1001H Environmental Decision Making, plus one half-course elective offered by the Centre for Environment, write a research paper (ENV 5555Y) and complete an internship (ENV 4444Y).

FOR MORE INFORMATION:
Faculty of Law:
www.law.utoronto.ca; 416-978-3716 law.admissions@utoronto.ca

Centre for Environment:
www.environment.utoronto.ca
416-978-3475; pavel.pripa@utoronto.ca

Environmental Finance Advisory Committee

The Centre for Environment is pleased to have members of the business and U of T communities as part of an Environmental Finance Advisory Committee. Chaired by CFE Director Ingrid Leman Stefanovic, it meets regularly to plan Environmental Finance and Carbon Finance workshops (see pages 23-25) which are designed to promote dialogue on leading edge initiatives relating to sustainable investment opportunities and the growing materiality of carbon factors with a Canadian and international outlook.


www.mercer.com

Jane Ambachtsheer

Principal, Mercer Investment Consulting

Ms. Ambachtsheer leads Mercer's global responsible investment business, and consults to North American and international investors. She is Adjunct Professor at the Centre for Environment where she co-teaches (with Sue McGeachie) a graduate course on Environmental Finance and Sustainable Investing. She is a global advisor to the Carbon Disclosure Project.


Bennett Jones LLP

Michael R. Barrett

Partner, Corporate, Bennett Jones LLP

Mr. Barrett is a corporate lawyer, specializing in private corporate transactions, renewable power development and climate change related matters. He works with domestic and international clients, including leading renewable power developers and participants in the carbon market, to help them deal with the convergence of environmental concerns and business realities.


Investico Capital

Alex Chamberlain

Managing Partner, Investeco Capital

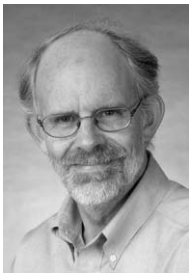
Investeco Capital Corporation is a private equity investment firm that invests in companies specializing in alternative power, water technologies, organic and natural foods, and environmental technologies. Prior to joining Investeco, Mr. Chamberlain has practiced law at Smith Lyons (now Gowlings) and worked at PricewaterhouseCoopers Securities Inc.


Deloitte

Valerie Chort

Partner, Deloitte Enterprise Risk Services

Ms. Chort is also the National Leader of Deloitte's Corporate Responsibility and Sustainability Practice. She provides direction, coordination and expertise in the areas of environment, health and safety, corporate responsibility, and climate change. She advises clients on how to plan and manage sustainability and corporate responsibility issues.


Ken Jones

Donald E. Cormack

Chair, Dept. of Physical and Environmental Sciences, U of Toronto Scarborough

Dr. Cormack is Program Director of the Centre for Environment's Master of Environmental Science professional program, a unique interdisciplinary program housed at the University of Toronto Scarborough ***(see p. 17)***. He is also a Professor in the Dept. of Chemical Engineering and Applied Chemistryat U of T.


www.macleoddixon.com

Elisabeth (Lisa) DeMarco

Partner, Macleod Dixon LLP

Ms. DeMarco is a leading expert in the law relating to emissions trading, the Kyoto Protocol and environmental finance. As head of Macleod Dixon's Toronto energy practice, she has experience in the Ontario electricity and natural gas sector including assisting clients with electricity policy development and regulatory matters before the Ontario Energy Board.


Julie M. Desjardins

Julie M. Desjardins

Chartered Accountant and Consultant

Ms. Desjardins is a chartered accountant and an independent consultant in the area of performance measurement and reporting. She has been actively engaged in accounting, measurement, reporting and verification aspects of climate change. She is a member of Canadian and international advisory panels and has co-authored climate change publications.


McMillan LLP

Barbara Hendrickson

Partner, McMillan LLP

Ms. Hendrickson is a securities partner and Co-Chair and founder of Emissions Trading and Climate Change Group at McMillan LLP. She provides corporate and securities advice to participants in the climate change industry, focussing on energy companies (including renewable energy), mining companies and capital market participants.


Jantzi Research Inc.

Michael Jantzi

President, Jantzi Research Inc.

Mr. Jantzi is one of Canada's leading spokespersons on social investment and corporate social responsibility issues. He is the co-author of *The 50 Best Ethical Stocks for Canadians: High Value Investing* (MacMillan Canada). He was the recipient of an Ethics in Action Award in recognition of his contribution to corporate social responsibility in Canada.


Torys LLP

Patricia A. Koval

Partner, Torys LLP

Ms. Koval's practice focuses on corporate and securities law, with emphasis on corporate finance (including investment funds) and mergers and acquisitions. She regularly acts for issuers and investment dealers in structuring international, cross-border and domestic public and private financings, and in the design of enhanced or new financial products and services.

Continued on page 22…

Environmental Finance Advisory Committee

Continued from page 21.

Sonia Labatt
Adjunct Professor,
Centre for Environment, U of Toronto
For her doctoral research at the University of Toronto, Dr. Labatt examined corporate response patterns to environmental issues. She has co-authored (with Rodney White) two books *Environmental Finance* and *Carbon Finance: The Financial Implications of Climate Change* (John Wiley & Sons, 2002 and 2007).

http://actualmedia.ca

Todd Latham
President, Actual Media Inc.
Mr. Latham is a media entrepreneur with two decades of experience in business publishing, marketing and communications, with broad industry knowledge and an extensive network in the environment, infrastructure and government sectors. Actual Media is a publishing, research and creative design company that publishes *ReNew Canada* and *Canadian Water Treatment.*

Michelle J. McCulloch
Senior Manager, Corporate Environmental Affairs, TD Bank Financial Group
Ms. McCulloch is responsible for environmental risk management in the context of asset management, securities, and lending. She also manages external stakeholder relations and reporting commitments. Prior to joining TDBFG, she was a senior director with the former Innovest Strategic Value Advisors.

PricewaterhouseCoopers

Sue McGeachie
Manager, Sustainable Business Solutions, PricewaterhouseCoopers
Ms. McGeachie manages several projects for which she is developing sustainability-related governance and management models for global companies and not-for-profit organizations. She is Adjunct Professor at the Centre for Environment where she co-teaches a graduate course on Environmental Finance.

Alan Polak

Alan Polak
Principal, Diversified Industries, Genuity Capital Markets
Dr. Polak heads Genuity Capital Markets' Alternative Energy and Cleantech initiatives. He is a Chartered Financial Analyst charterholder and has a Ph.D. from the University of Oxford. He has extensive investment banking experience and has worked on advisory assignments and financings for a range of companies.

Patricia A. Koval

Stefan Reichenbach
Global Head of Environmental Markets, Thomson Reuters
Mr. Reichenbach has built a profitable carbon information business for Thomson Reuters, including the leading information portal for the global carbon market. He also leads the strategy function for the global Thomson Reuters Commodities business, a unit that has more than doubled its revenues over the last five years.

Bennett Jones LLP

Gray Taylor
Partner, Corporate, Bennett Jones LLP
Mr. Taylor is the leader of Bennett Jones' climate change and emission trading group. His practice focuses on climate change and environmental issues affecting businesses in Canada and abroad. This includes emissions trading transactions, corporate governance and climate change business planning issues, commercial transactions and remediation projects.

CCI

William (Bill) Tharp
CEO, The Climate Change Infrastructure Corporation (CCI)
CCI is a company committed to investing in companies that embrace the energy trends that have been created by a shift to a low-carbon, higher efficiency economy. Mr. Tharp has experience in merchant banking in Canada and the UK, and as an entrepreneur working within the alternative energy and efficiency marketplace.

Rodney White
Professor Emeritus, Dept. of Geography, U of T
Dr. White is a geographer and infrastructure planner and co-author (with Sonia Labatt) of *Environmental Finance* and *Carbon Finance: the Financial Implications of Climate Change.*
He serves on the Technical Advisory Board of the Carbon Reduction Fund and is Academic Advisor for Professional Development Programs at the Centre for Environment.

www.canadianwaterteatment.ca

Errick (Skip) Willis
Principal, Willis Climate Group
Mr. Willis helps a range of private sector clients develop and implement strategic solutions to the challenges presented by global warming and has prepared greenhouse gas emissions baselines. He has over 25 years of consulting experience in strategic planning, issues management, regulatory affairs, strategic communications and international market development.

Carbon Finance workshop series

Ongoing successful series offered in Canada and internationally

BY RODNEY WHITE

Angus Ni

Patricia A. Koval

LEFT: Bill Tharp, CEO of the Climate Change Infrastructure Corporation speaks at a Carbon Finance workshop in Toronto.
RIGHT: In São Paulo, Brazil, Canadian team members join Brazilian colleagues at a dinner at the first international workshop in the Carbon Finance series. From left to right: Rodney and Sue White, William Tharp, Julie Desjardins, Barbara Henrickson, Donna Workman, Stefan Reichenbach join Consuelo Yoshida, Mayra Motto Torres and Bruno Sabag (far right) of the Pontifícia Universidade Católica de São Paulo.

Carbon Finance Workshop Series – Canada:

TORONTO: Nov 13-14, 2008; Apr 15-17, 2009; Oct 28-30, 2009; CALGARY: June 22-23, 2009; VANCOUVER: Nov 23-25, 2009.

The Centre for Environment's Carbon Finance Workshop Series evolved from the its ongoing Environmental Finance Series as a more specialized activity dealing purely with the application of market mechanisms to the reduction of greenhouse gases. We anticipate a steadily growing need for training in this field as the global carbon market develops. We offered our first two-day workshop in February 2008. Designed as a an intensive training experience limited to 30 people, they have offered approximately 15 hours of instruction, followed by a take-home exam. If successfully completed, participants may obtain a "Certificate of Achievement".

Since then, we have offered two more workshops in Toronto (in November 2008 and April 2009) in which we repackaged the modules, with a stand-alone introductory day to precede a more advanced two-day workshop. The core presentation team consisted of **Julie Desjardins** (Advisor, Canadian Institute of Chartered Accountants), **Barbara Hendrickson** (Partner, McMillan LLP), **Patricia Koval** (Partner, Torys LLP), **Sonia Labatt** (CFE Adjunct Professor), **Sue McGeachie** (Manager, Sustainable Business Solutions, PricewaterhouseCoopers), **Stefan Reichenbach** (Global Head of Environmental Markets, Thomson Reuters), **William Tharp** (CEO, The Climate Change Infrastructure Corp.) and **Rodney White** (CFE). Led by Patricia Koval, the team also began the development of a study of a Carbon Credit Transaction using Alberta as a case study.

The final two-day workshop of the 2008-09 year took place in Calgary in June 2009, where the team was joined by **Christine Schuh**, Climate Change Services Leader at PricewaterhouseCoopers. The Alberta case study was further elaborated by Pat Koval, Barbara Hendrickson and Bill Tharp.

Workshops for Toronto and Vancouver are planned for October and November 2009, respectively. Proposals for workshops in other Canadian cities are also under discussion.

Carbon Finance Workshop Series – International:

SÃO PAULO, BRAZIL: March 30-31, 2009

Ultimately the idea of carbon finance is global. For this reason, it is our intention to develop a global capability to develop the field in partnership with like-minded institutions. We ran our first international workshop in carbon finance in São Paulo, Brazil in March 2009, in partnership with the Pontifícia Universidade Católica de São Paulo, the Association of Brazilian Companies in the Carbon Sector, and PricewaterhouseCoopers.

Canadian members of the team included **Julie Desjardins Barbara Hendrickson**, **Patricia Koval**, **Sue McGeachie**, **Stefan Reichenbach**, **William Tharp**, **Rodney White**, and **Donna Workman** (CFE Manager of Program & Partnership Development).

Attendees numbered about 70 people who displayed a lively interest in the development of carbon finance, a field which is well known in Brazil, largely because of the many projects that have been developed under the Clean Development Mechanism of the Kyoto Protocol. We found a number of important issues in common between Brazil and Canada, especially in the linkage between preserving biodiversity and forests and the unresolved nature of many of the rights of indigenous people directly affected by the loss of forest habitat. We hope there will be further opportunities to build on this partnership after a very successful first event together.

Other proposals are under discussion for workshops in Shanghai, Dubai, London, New York and Phoenix.

Rodney White is Professor Emeritus in the Department of Geography and Academic Advisor for Professional Development Programs at the Centre for Environment.

FOR MORE INFORMATION:
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or contact Donna Workman, Manager, Program and Partnership Development, 416-978-7077, d.workman@utoronto.ca

Corporate Reporting workshop

In collaboration with PricewaterhouseCoopers

BY RODNEY WHITE

Imran Hasan

LEFT: At the Corporate Reporting workshop, Julie Desjardins (Advisor to the Canadian Institute of Chartered Accountants) addresses the topic of climate change as a financial reporting issue and the disclosers about climate change wanted by stakeholders.
RIGHT: Wishart Robson (Senior Advisor for Safety and Climate Change at Nexen Inc) speaks about the challenges of environmental reporting as panel members (left to right) Brigid Barnett, Mike Harris, Julie Desjardins, Barbara Hendrickson, and Stefan Reichenbach look on.

***Corporate Reporting: Climate Change & Related Environmental Disclosures*, January 28, 2009**
Environmental Finance Workshop Series

In the last 15 years, it has become increasingly clear that major environmental issues travel directly to the bottom line where they may have a material effect on a company's performance. We saw this with asbestos, contaminated land, acid deposition, stratospheric ozone depletion, industrial accidents, and water contamination. For several years, some companies have been attempting to understand what climate change might mean for their bottom line, spurred on by the annual surveys conducted by the Carbon Disclosure Project (www.cdproject.net).

On the morning of January 28, 2009, the Centre for Environment – in collaboration with PricewaterhouseCoopers – held a workshop on this topic at Toronto Design Exchange for an audience of approximately 70 people from government, academia and the business community. The panel of speakers and some topics covered included **Julie Desjardins** (Advisor to the Canadian Institute of Chartered Accountants) on the disclosers about climate change wanted by stakeholders; **Mike Harris** (Partner & National Practice Leader, Sustainable Business Solutions, PricewaterhouseCoopers) on objectifying subjective information and pressures from regulators, customers, lenders and investors; **Wishart Robson** (Senior Advisor for Safety and Climate Change, Nexen Inc) on the challenges of environmental reporting including carbon accounting, data sources and certainty issues; **Brigid Barnett** (Manager, Responsible Investment, Canada Pension Plan Investment Board) on engagement regarding climate change related risks and opportunities, and **Barbara Hendrickson** (Partner, McMillan LLP) on the legal requirements for disclosure and the securities and regulatory structure for public companies. The event was organized by **Sue McGeachie** (Manager, Sustainable Business Solutions, PricewaterhouseCoopers) and moderated by **Stefan Reichenbach** (Global Head of Environmental Markets, Thomson Reuters).

Reporting on climate change takes many forms, including Corporate Sustainability Reporting, voluntary responses to surveys like the Carbon Disclosure Project, internal assessments using a system such as the Greenhouse Gas (GHG) Protocol (www.ghgprotocol.org), and mandatory reporting required by government regulation. For publicly-quoted companies in Canada, it is now mandatory to include climate change as a material component of the quarterly Management's Discussion and Analysis (MD&A) which is verified by the CFO and CEO. The specific implications of this development are outlined in an online publication, *Building a Better MD & A – Climate Change Disclosures,* by the Chartered Accountants of Canada, available at www.cica.ca/climatechange.

Despite keen interest in the issue, we are still a very long way from having a standardized approach to corporate climate change disclosure in Canada, let alone globally. There are issues even beyond agreement on the physical measurement of a company's GHG footprint, because different tax treatments of carbon as an asset and as a liability mean that the same footprint could have very different financial implications from one jurisdiction to the next. At least at this point, we can assume that the issue will become steadily more salient in Canada in response to growing pressure to respond to the development of a GHG cap-and-trade system in the U.S.A.

Rodney White is Professor Emeritus in the Department of Geography and Academic Advisor for Professional Development Programs at the Centre for Environment.

FOR MORE INFORMATION
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http://learn.environment.utoronto.ca
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Investing in Water Treatment workshop

In collaboration with Canadian Water Treatment

BY KERRY FREEK

***Investing in Water*, May 26, 2009, Environmental Finance Workshop Series**

As part of its Environmental Finance series, the Centre for Environment hosted a workshop on water, a day-long event held on May 26, 2009 in collaboration with *Canadian Water Treatment* magazine (CWT). **Todd Latham**, CWT's publisher and President of Actual Media Inc, served as moderator for the day of talks and lively discussion.

John Coburn (Chairman of Board of Directors, EnviroTower, XPV Capital Corp.) discussed structural market changes that are creating investment opportunities in water technologies and treatments. Areas for investment include water reuse and recycling, energy from wastewater, and repairing distribution networks, said **Faisal Mirza** (Senior Associate, The Climate Change Infrastructure Corporation). **Ian McPherson** (President, Criterion Investments) also cited supply/demand imbalance, infrastructure spending, health concerns and the changing climate impact as four "undeniable" trends driving the investment opportunity.

Kerry Freek/Canadian Water Treatment

Zoltan Tompa, Director of Applications at Sustainable Development Technology Canada, speaks at the Investing in Water workshop.

Tony Maas (Director, Freshwater Program, WWF-Canada) tackled the problems of defining and quantifying our "water footprint". **Bruce Pardy** (Assoc. Professor, Faculty of Law, Queen's University) caused some debate with his talk on water policy myths, charging that current themes in public debate do not reflect the real challenges.

During the afternoon session, **Zoltan Tompa** (Director of Applications, Sustainable Development Technology Canada) talked about water technology innovation as an "untapped" commercial opportunity. Capping off the event, **Trevor Freeman** (Member, Engineers Without Borders) went back to basics, relaying his experiences in Zambian communities with real water shortage and quality problems.

Kerry Freek is the Managing Editor of Canadian Water Treatment magazine (http://watertreatment.ca). This is an edited version of an article appearing in the July/August 2009 issue of the magazine.

Demand Response seminar

In collaboration with the Assoc. of Energy Engineers South Ontario Chapter

BY MOHAMMAD WATHAIFI

***Economical and Sustainable Electricity Solutions for Ontario through Demand Response*, October 24, 2008**

In collaboration with the Centre for Environment, the Southern Ontario Chapter for the Association of Energy Engineers (AEE) organized a seminar on Demand Response on October 24, 2008. The event was sponsored by Rodan Energy & Metering Solutions Inc., a leading North American provider of energy monitoring and management solutions and led by **Dan MacDougall**, Managing Director of Demand Response Solutions at Rodan.

Demand Response (DR) is an organized program to dynamically reduce electricity consumption when the generation transmission-distribution system is approaching peak capacity. Mr. MacDougall explained how Ontario Power Authority (OPA) "buys" demand response capacity from energy consumers, and how DR contributors "sell" electricity capacity to OPA. He highlighted the benefits of implementing DR programs such as increasing electrical grid reliability, moderating electricity prices, generating energy savings, and improving business profitability. One favourable impact on the environment is that one megawatt curtailment correspondents to a reduction of one tonne of CO_2 emissions.

The AEE (www.aeecenter.org), consisting of 67 international chapters, is a non-profit organization dedicated to furthering education in energy and management and fostering action for sustainable development. It offers a full array of outreach programs and materials, and offers certification programs in Canada through the Canadian Institute for Energy Training.

Mohammad Wathaifi

Dan MacDougall of Rodan Energy & Metering Solutions leads a seminar on Demand Response, a program to reduce electricity consumption.

AEE Southern Ontario Chapter Board Member Mohammad Wathaifi is an Energy Engineer at Siemens Building Technologies. Email: mohamad.alwathaifi@siemens.com; tel: 416-548-4112.

Persistent Organic Pollutants workshop

Offered for visiting Chinese senior scientists

BY CRAIG BUTT

Emma Thacker

LEFT: Clare Wiseman, Assistant Professor in the Centre for Environment, gives a background introduction on persistent organic pollutants to visiting Chinese senior scientists from the Dalian Municipal Design and Research Institute of Environmental Science.
RIGHT: Standing from left: Craig Butt (Ph.D. candidate in Chemistry and Environment), the designated translator, and Terry Bidleman (Senior Research Scientist, Environment Canada) greet members of the visiting group (standing far right and seated).

Persistent Organic Pollutants training workshop,
February 13, 2009

On February 13, 2009, the Centre for Environment (CFE) hosted a workshop for six visiting senior scientists from the **Dalian Municipal Design and Research Institute of Environmental Science** (Dalian, China) for a workshop on persistent organic pollutants (POPs). The purpose of the workshop was to highlight the diversity of POPs research conducted at the University of Toronto. Held at the Munk Centre for International Studies, the workshop was jointly organized by **Sam Chiu**, Associate Director of Asia Programs at the Rotman School of Management and **Craig Butt**, Ph.D. candidate in the Department of Chemistry and the Centre for Environment.

The workshop was opened by an official welcome from the Centre for Environment by **Rodney White**, Professor Emeritus in the Department of Geography and CFE Academic Advisor of Professional Development Programs. **Clare Wiseman** (CFE Assistant Professor) began the morning of scientific presentations with a background introduction on POPs, including a discussion of international treaties related to POPs. **Terry Bidleman** (Senior Research Scientist, Environment Canada and Adjunct Professor in Chemistry and Chemical Engineering, U of T) then described the range of POPs studies being conducted at Environment Canada's Centre for Atmospheric Research Experiments in Egbert, Ontario.

Ph.D. candidates **Fiona Wong** and **Trevor Brown** (Department of Chemistry, U of T), and **Xianming Zhang** (Chemistry and CFE) each gave presentations on their doctoral research. Fiona Wong presented her research on understanding the sources and fate of organochlorines pesticides in the air and soil of Mexico. Trevor Brown described how mathematical models can be used to screen chemicals for the potential to be POPs, focussing on the potential for chemicals to be contaminants in the Arctic. The morning session was closed by Xianming Zhang who presented research on the behaviour and fate of POPs in the indoor environment. This topic is of particular relevance considering that humans spend the vast majority of their lives indoors.

After the lunch break, **Pablo Tseng** (M.Sc. candidate, Chemistry, U of T) presented an overview of the environmental chemistry of perfluorinated chemicals. These chemicals are widely used in commercial products for their stain repellency properties, and have been the subject of recent regulatory interest. **Craig Butt** expanded on the theme of perfluorinated compounds when describing his research on the biotransformation of fluorinated chemicals in rainbow trout. During the mid-afternoon, members of the delegation stretched their legs during a tour of the environmental chemistry research laboratories in the Department of Chemistry. Laboratory Manager **Dan Mathers** led the tour of the Analytical Laboratory for Environmental Science Research and Training facility which is used for research and undergraduate and graduate teaching in Chemistry and by other environmental researchers at U of T. **Derek Jackson** (Ph.D. candidate, Chemistry) gave the delegation a tour of the newly constructed nuclear magnetic resonance (NMR) facility.

The workshop was concluded with two presentations describing the potential health effects of POPs exposure. **Loren Vanderlinden** (Supervisor, Environmental Protection and Public Health, Toronto Public Health) presented an overview of POPs that behave as endocrine disrupters, specifically with regards to their impact on children's health. Finally, **Dave Riddick** (Associate Professor, Department of Pharmacology and Toxicology, U of T) described how a specific class of POPs – aromatic hydrocarbons – can influence the activity of cytochrome P450, a large and diverse class of enzymes responsible for metabolism, including anthropogenic contaminants.

Craig Butt is a Ph.D. candidate in the Department of Chemistry and the Centre for Environment's collaborative Environmental Studies Program. Email: craig.butt@utoronto.ca.

Jane Goodall Institute

Partnership provides various learning opportunities for students

BY JANE LAWTON

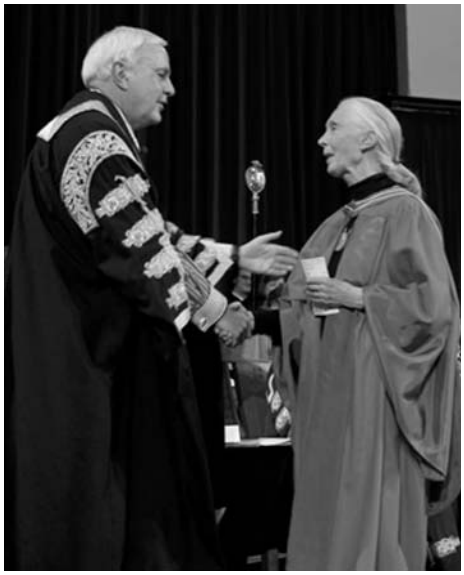
The ongoing partnership between the Centre for Environment (CFE) and the Jane Goodall Institute (JGI) has resulted in a diverse range of activities taking place on campus over the past year that have engaged students and faculty in the wildlife research, environmental education and conservation efforts of the Institute. In December 2008, the Institute moved into new office space at CFE in the Earth Sciences building at the University of Toronto, greatly increasing the organization's visibility on campus and ability to identify partnerships and areas of interaction.

This was a special year that was marked not by one, but by two personal visits from Dr. Jane Goodall to the University of Toronto during which she had the opportunity to interact with students, faculty, researchers and the top leadership of the University. On November 13, 2008, more than 1,500 students and guests enjoyed the special privilege of joining Dr. Goodall at Convocation Hall as she received an honorary Doctorate of Science from **President David Naylor** and **Chancellor David Peterson**. **Professor Ingrid Leman Stefanovic**, CFE Director, had nominated Dr. Goodall for the degree, introduced her to the audience, with **Professor Tat Smith**, Dean of Forestry and co-nominator, undertaking the hooding. In attendance were graduate students receiving Masters and Ph.D. degrees, including Centre for Environment and other students who had studied in such areas as forestry, conservation and environmental science. They had the honour of being addressed by Dr. Goodall whose impassioned words underlined their key role in making a difference in the world.

Dr. Goodall was back on the U of T campus in April 2009 for two further events – speaking first as part of a panel at the inaugural Environment and Development seminar, and then giving the keynote presentation to more than 150 high school students at a **Youth 4 Action** workshop that was jointly hosted by JGI's Roots & Shoots global youth action program and the Centre for Environment ***(see page 34)***. The first annual **Environment and Development seminar** was launched in the Great Hall at Hart House on the afternoon of April 17, 2009 with more than 400 people in attendance. Jointly presented by JGI and CFE, it focused on the myriad ways in which environmental issues and human development issues intersect, and the urgent need to find ways to protect the environment and conserve habitat without diminishing human livelihoods. It included presentations by **Saul Cohen** (Ph.D. candidate, Department of Anthropology, U of T) and **Dr. Ernest Opoku-Boateng** (M.A. and Ph.D. alumnus of U of T's Dept. of Geography and CFE) on their research in community-centred conservation in Africa, and featured commentary by a distinguished panel which included Dr. Goodall, **Professor Kerry Bowman** (Joint Centre for Bioethics, U of T and President and founder of the Canadian Ape Alliance), **Professor Stephen Scharper** (Department of Anthropology UTM and Centre for Environment) and moderator Ingrid Leman Stefanovic. The next Environment and Development seminar will be is slated for spring 2010.

There have also been a number of other joint presentations throughout the year. At the end of January 2009, **Dr. Lilian Pintea**, Director of Conservation Science for JGI in the US, delivered a seminar on the ways in which Geographic Information Systems (GIS) and new remote sensing tools are being applied to the challenges of conserving habitat for chimpanzees in Africa. His presentation highlighted the critical role that satellite imagery and GIS have to play in developing the Institute's conservation programs and in protecting chimpanzees from genetic isolation and ultimately extinction. JGI Board member Kerry Bowman, delivered a seminar on changing perspectives on the ethics of environmental responsibility as part of the Centre for Environment's ongoing Environment Seminar Series in November 2008. In addition, **John Wall**, Ph.D. candidate in Geography and SSHRC Doctoral Fellow at Carleton University and JGI board member, gave a special lecture in in February 2009 to U of T Scarborough Anthropology students on the future for humans and chimpanzees focussing on JGI and community-centred conservation.

Student interaction with the work of JGI has included volunteering in the JGI office throughout the year and in summer placements, assisting staff with administration, research and outreach.



Lisa Sakulensky

University of Toronto Chancellor David Peterson presents renowned primatologist Jane Goodall with an honorary degree at a convocation ceremony on November 13, 2008.

Students have also been directly engaged in JGI's Roots & Shoots global youth action program, with several events taking place on campus. ***(See page 34.)***

Additionally, JGI and the University of Toronto have created a **new Jane Goodall Undergraduate Scholarship Fund** for outstanding undergraduate students enrolled at the Centre for Environment who are studying environment and development. The inaugural award will be in 2010.

We are looking forward to the continued growth and development of this highly rewarding partnership over the year ahead, drawing on the respective expertise and skills of both organizations to present new and exciting teaching, learning and research opportunities.

Jane Lawton is the Executive Director of the Jane Goodall Institute.

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U of T Sustainability Office

Creating a culture of sustainability through research and engagement

BY JP DAVIDSON

Under the leadership of Sustainability Director **Dr. Beth Savan** (also Senior Lecturer at the Centre for Environment), the University of Toronto Sustainability Office and campus community are engaged in creating a culture of sustainability by bridging the gap between sustainability research and institutional practice. In the longer term, the Office is working towards integrating environmental, social and economic sustainability into the policies, practices and culture of U of T, ultimately reducing the consumption of all resources. The Centre for Environment has been a key partner in the growth and success of the Office over the past five years and continues to play an important role in our research and student engagement activities.

During the academic year, more than thirty coursework students, part-time employees and volunteers boost the Office's workforce by over 60%. In 2008-09, students worked closely with office staff to reduce wasteful behaviours in science labs, residences and offices. Students also took part in hands-on baseline energy, solid waste and water auditing which enabled the Office to measure program effectiveness. Significant contributions to research on paperless office initiatives, sustainable purchasing policies, green computing, laboratory energy consumption and office lighting were also made by ROP 299 (Research Opportunity Program) students.

The ***Just Shut It*** fume hood energy conservation campaign also involved students from the initial research and design stages through implementation. With financial support from the Ontario Ministry of Energy and Infrastructure's Community Conservation Initiatives program, the campaign resulted in improved fume hood sash (glass covering panel) closing practices. The Office is currently evaluating the campaign's greenhouse gas impact.

In the fall of 2008, the Sustainability Office moved from the Earth Sciences building into a refurbished space in the South Borden building (Room 208 at 487 Spadina Crescent). The open concept space in the turn-of-the-century building, formerly the City Dairy, is entirely furnished with reused items from around campus. The long awaited space was provided by the Faculty of Arts and Science (FAS) with considerable support from **Ron Swail** (Assistant VP of Facilities and Services), **Elizabeth Sisam** (Assistant VP of Campus and Facilities Planning), and **Adrienne De Francesco** (Assistant Dean and Director of FAS Infrastructure Planning) and her staff. The new space was celebrated with the opening reception for NVRNMNT, a show featuring multi-media works by local artists depicting environmental issues such as climate change, forest management, and urban density. The Office continues to display many of the art pieces and recently hosted **Bruce Livingston**'s photography show as part of the Contact Photography Festival.

Sustainability Office

Sustainability Office's 2008-09 and current employees from left to right: Former ReSource Project Coordinator Vig Krishnamurthy, Sustainability Coordinator Stuart Chan, Project Coordinator Leah Sumnauth McIntosh, Project Coordinator JP Davidson, former Workshop Reseacher Leo Mui, Sustainability Coordinator Ashley Taylor, Project Coordinator Elah Feder, former Project Support Specialist Luke Raftis and Sustainability Director Dr. Beth Savan.

The Sustainability Office website (sustainability.utoronto.ca) also received a major overhaul in 2008-09. The new site includes information on all our current projects, downloadable research reports, news updates and instructions for students, and a new Frequently Asked Questions section. One of the most compelling new features is the revamped interactive **St. George Greenhouse Gas Inventory** which quantifies resource consumption of U of T's main campus in terms of GHG emissions.

The Office looks forward to continued success working together with Centre for Environment's students and faculty on valuable campus sustainability initiatives. We expect continued growth of our student engagement program in the coming year, thanks in part to a capacity building grant from The EJLB Foundation. Students will have the opportunity to conduct hands-on research while others will work alongside Office staff to deliver ***Rewire*** workshops to stakeholders within the university as well as externally. *Rewire*, the energy conservation program implemented by the Office in St. George campus residences and some offices, recently won third prize in the 2009 national category of the Canadian Association of University Business Officer's Quality and Productivity awards.

A grant from the Ivey Foundation will provide further student opportunities to engage with a forthcoming paper reduction and reuse initiative. This is one component of a larger Sustainability Office program aimed at supporting sustainability planning in all U of T departments. Information and preliminary steps for departments seeking to partner with the Office can be found on its website. Students interested in working on our projects should visit the website in the early fall for Work-Study positions and throughout the year for other opportunities.

JP Davidson is Project Coordinator, Communications & Development at the Sustainability Office.

FOR MORE INFORMATION:

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Environmental Career Day

An annual spring event for all university and community college students

BY DAVID POWELL

David Powell

LEFT: The career expo of the Environmental Career Day includes approximately 30 exhibitors from government, consulting and non-governmental organizations, providing students with useful information, career advice and many potential career, job and volunteer opportunities.
RIGHT: Josephine Archbold, Research Consultant with the Environmental Protection Office at City of Toronto Public Health, was amongst the group of speakers at the 2009 event who provided useful career advice.

The Centre for Environment is pleased to co-present Environmental Career Day, an annual day-long spring event, open to all registered university and community college students, at U of T and elsewhere. This successful event is a collaborative effort by the Centre, the Graduate Environmental Students Association (GESA, ***see page 9***), the Toronto Undergraduate Geography Society (TUGS), and the Environmental Students' Union (ENSU, ***see page 13***).

In 2009, the event was held on March 6 in the Hart House Great Hall with 350 students in attendance, an increase of over 100 from last year. It included a career expo with approximately 30 exhibitors from government, consulting and non-governmental organizations, that provide students with useful information, career advice and many potential career, job and volunteer opportunities.

In addition to the career expo, the day also included presentations by speakers from various sectors in the environmental field. They discussed and answered questions from students about their present job and how they got there and the key next steps after graduation for advancing one's career, following completion of both the undergraduate and graduate programs. They also spoke about what students should be doing before and after graduation to prepare for future opportunities and possibilities, such as volunteering and seeking training courses and programs to obtain specific skills.

University of Toronto alumna **Josephine Archbold** was amongst the engaging group of speakers. She is a Research Consultant with the Environmental Protection Office at City of Toronto Public Health. She told attendees that her organization looks for core scientific skills and knowledge; strong writing and interpretive skills; good time management; and the ability to go beyond science to address policy issues, project management and public relations. Key success factors also include a passion for environmental health, and a commitment to professional development,

Karen Clarke-Whistler, Chief Environmental Officer at TD Bank, reached her current position through extensive understanding of the environment, global experience, knowledge of best practices in the banking sector, and knowledge of best practices in key clients' sectors. She advised students that they will need a level of concentrated expertise within an environmental area, as well as a broad understanding of environmental issues.

Dr. Ray Clement, Senior Research Scientist at the Laboratory Services Branch of the Ontario Ministry of the Environment, spoke about the importance of good communication skills, and developing strong job search and interview skills by networking, creating polished job applications, doing background research on potential employers, and developing good interpersonal and listening skills.

Annie Macleod, Project Coordinator at the Evergreen Brick Works Project, spoke about the importance of balancing academic preparation with experience in the environmental field through volunteering and networking and also finding a mentor both while still in school, and after joining the work force.

Glen Matadeen, Career Educator at the U of T Career Centre, discussed the importance of defining one's career options through career assessments, learning about one's fields of interest through interviews with people in those fields, and utilizing resources such as the Career Centre to provide support.

Lastly, **Sean Salvatori**, Hydrogeologist and Project Manager at Dillon Consulting Ltd, stressed the importance of defining a focus in one's academic programs that fits one's career interests, having a commitment to excellence, developing strong writing skills, and researching the work of potential employers and organizations.

The Centre for Environment looks forward to continuing to offer this event that assists our students as they plan their future.

David Powell is Undergraduate Student Advisor and Placement Coordinator at the Centre for Environment.

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Environment Seminar Series

Held Wednesdays, 4:10 p.m.

FOR MORE INFORMATION
on past and upcoming seminars:
www.environment.utoronto.ca
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The following seminars were presented in this series in 2008-09. Condensed abstracts are included below.

IAIN BLACK, Senior Lecturer, Faculty of Economics and Business, University of Sydney, Australia. ***On the Challenges we Face: Some Insights into Consumers Responses to Sustainability,*** **October 1, 2008.** This presentation addressed some of the challenges in trying to promote sustainable consumption. It discussed different types of consumers such as those who are doing something and those who talk a lot but do very little. Why is it that they say one thing and do another? Also discussed was research done on making consumers do something they do not want to do and the struggle of consumer identity and real life getting in the way of doing the "right" thing.

KERRY BOWMAN, Clinical Ethicist, Mount Sinai Hospital; Bioethicist, Joint Centre for Bioethics, University of Toronto. ***Changing Perspectives on the Ethics of Environmental Responsibility,*** **November 19, 2009.** Although the field of ethics itself in the traditions of philosophy is thousands of years old, the focus on environmental ethics did not emerge until the late 20th century. In recent years, concepts and models of environmental ethics have begun to emerge, which are much more closely aligned with the environmental realities that we now face. This presentation reviewed such concepts and models and their potential for application.

BRYAN KARNEY, Professor, Dept. of Civil Engineering; Chair, Division of Environmental Engineering and Energy Systems, U. of Toronto. ***The Environment – as Imagined, as Conceived, as Modelled, as Final Reality with the Process of Human Decision Making,*** **October 8, 2008.** This talk considered the role of environmental awareness and knowledge in decision making. The context of this conceptualization starts with the idea that human actions have consequences which should be anticipated. Yet, the outcomes of complex decisions sometimes reflect and contradict our intentions. Ideally, conceived actions should be fed through a sensible process of evaluation to predict possible consequences, in turn influencing our actions.

JUDITH LIPP, Executive Director, Toronto Renewable Energy Co-operative. ***Greening the Ontario Grid: Considerations for a Renewable Energy Future,*** **October 22, 2009.** Given the commitment to sustainability, the growing electricity demand and ageing infrastructure in Ontario gives rise to many questions about how to move forward. Renewable energy has been identified as an important component of our future energy supply, but development is not yet happening at the pace and scale needed to achieve the benefits. This presentation compared renewable energy development and policy in Ontario with other jurisdictions (in Canada and beyond). Lessons were discussed and suggestions made about the institutional and policy changes needed.

LILIAN PINTEA, Director of Conservation Science, Africa Programs, Jane Goodall Institute. ***New Remote Sensing Tools for Great Ape Conservation: The Case of Chimpanzees in Africa,*** **Jan. 28, 2009.** Satellite-based remote sensing technologies can be powerful tools for supporting great ape conservation efforts. New satellite sensors are capable of imaging areas as small as 0.5 metres or revisiting large regions more than 700x700 km daily, greatly improving the ability to map and monitor great ape habitats and threats at the local, landscape and regional scales. However, the transition from data to information actually used in conservation is not straightforward. This talk discussed applications of satellite imagery used to support conservation planning in Tanzania.

Memorial Lectures

Robert Hunter Lecture, Feb. 25, 2009

STEFAN REICHENBACH, Global Head of Environmental Markets, Thomson Reuters. ***Climate Change Through the Media Lens: An Assessment of the Role of Mainstream Media in Forming Public Opinion On Climate Change.*** Most media organizations are, above all else, businesses. In some cases, they are businesses preoccupied with making payroll and creating shareholder value. They are organizations accountable through the (often daily) choice of consumers and advertisers, operating on ever-shrinking budgets. Indeed, resource constraints and the commercial realities of reader preference define today's media environment and can lead to lapses in journalistic standards and a tendency to sensationalist reporting. As the economic downturn bites, this lecture examined how these intensifying pressures on media organizations affect reporting on climate change issues, and in turn how the traits of modern media define public opinion on climate change and the implication for policy making. Specifically, the talk covered trends in news reporting, fact checking for climate science, personality culture in climate change reporting, climate change sensationalism, conflict, opinion and balanced reporting on climate change.

Eric Krause Lecture, March 11, 2009

RODNEY WHITE, Professor Emeritus, Department of Geography; Academic Advisor, Professional Development, Centre for Environment, University of Toronto. ***Carbon Finance and Canada's Kyoto Predicament.*** The Government of Canada signed and ratified the Kyoto Protocol to the United Nations Framework Convention on Climate Change, thereby committing the country to a 6% reduction in greenhouse gas emissions (GHG) below the 1990 baseline by 2012. The Conservative minority government indicated that it will ignore this commitment and, instead, aim for softer targets based on GHG emissions intensity per unit of product for selected sectors of the economy. Canada now stands to forfeit whatever remaining claims it might have for environmental credibility in the global community. With a new, more environmentally-oriented government in the U.S., and the provinces having outlined their own GHG reduction policies (two maintaining the original Kyoto goal), Canada's federal position on climate change is increasingly untenable. This presentation also addressed the options still open to Canada before the end of the First Commitment Period of the Protocol in 2012.

Douglas Pimlott Lecture, Mar. 25, 2009

MYRNA SIMPSON, Associate Professor, Department of Physical and Environmental Sciences, University of Toronto Scarborough. ***Climate Change Impacts on Soil Organic Matter: New Insights from Molecular-Level Studies.*** Natural organic matter is ubiquitously found in the environment and plays a critical role in several biogeochemical processes such as the regulation of atmospheric CO_2, agricultural sustainability, and the fate and transport of problematic organic chemicals in the environment. There is, however, a lack of organic matter structural information mostly due to its complex nature and uniqueness but also due to the lack of specifically designed analytical strategies. Organic geochemists have long used biomarker methods which only extract a small fraction of the total organic matter composition. Also, nuclear magnetic resonance (NMR), namely solid-state 13C NMR spectroscopy, suffers from poor spectral resolution. This presentation highlighted the development and utility of molecular-level analytical methods. The use of biomarker methods with conventional and innovative NMR methods in tandem provides an unprecedented insight into the dynamics of organic matter in the environment.

Environment & Health Seminar Series

The following seminars were presented in this series in 2008-09. Condensed abstracts are included below.

PETER BERRY, Senior Policy Advisor, Climate Change and Health Office, Safe Environments Program, Health Canada. ***Climate Change and Extreme Heat Events: Protecting the Health of Vulnerable Populations in Canada,*** **March 5, 2009.** Health Canada has documented the many climate-related health risks Canadians and communities face across the country, as well as how these are expected to evolve as the climate changes. This lecture discussed the current activities at Health Canada to reduce health risks from extreme heat events and how results from the recently released HC report *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity* are informing these projects.

MIRIAM DIAMOND, Professor, Dept of Geography, Research Director, Centre for Environment. ***The Simpsons, Toxic Chemicals and Our Future,*** **October 23, 2008.** We are currently experiencing an epidemic of subclinical nuerodevelopmental disorders amongst our children speculated to be caused by widespread exposure to low levels of neurotoxicants such as mercury, lead and PCBs. This presentation argued that the development of chemical management plans fail to address the increasing chemical production and use which allows for our widespread exposure of myriad chemicals. To address the exposure, we need to squarely deal with our growing and unsustainable consumption of synthetic chemicals.

DAVID FISMAN, Scientist, Child Health Evaluative Sciences Program, Hospital for Sick Children, Toronto. ***How Climate Change will Affect Infectious Diseases in Canada, and the Challenge to Our Health-Care System,*** **November 20, 2008.** The Fourth Assessment Report of IPCC suggests that North America will experience marked changes in weather patterns in coming decades. These events are likely to cause important changes in the incidence and distribution of infectious diseases. This talk addressed the expected nature and direction of changes in infectious disease epidemiology that may be expected in Canada (and elsewhere), as well as potential policy options that may blunt the impact of climate change on infectious diseases.

WARREN FOSTER, Professor, Dept. of Obstetrics and Gynecology and Director, Centre for Reproductive Care, McMaster University Health Sciences Centre. ***Breast Cancer and Environmental Toxicants: New Approaches to Animal Studies in Research,*** **January 29, 2009.** Studies have shown that environmental toxicants have the capacity to act like the ovarian steroid estrogen and stimulate estrogen dependent signalling in breast cancer cells. In recent studies, concentrations representative of human exposure to the pesticide dieldrin were found to increase the number of tumors in mice predisposed to developing mammary cancer. Results suggest that estrogenic toxicants have the potential to modify tumor formation and may be more aggressive and potentially less responsive to treatment.

JAMES HELLER, Associate Professor, Dalla Lana School of Public Health, U of T. ***Monitoring the Social Impacts of*** **Diamond** ***Mining on Northwest Territories Aboriginal Communities,*** **Sept. 25, 2008.** Although the first diamond mine in the Northwest Territories (NWT) opened in 1996 and despite qualitative assessments, it has only been recently that a methodology was successfully demonstrated for measuring the quantitative impacts of these operations on key social variables in the predominantly aboriginal communities neighbouring the mines. This lecture described the context in which NWT monitoring studies are conducted, the methodology framework, and some preliminary results using the estimated models.

ROLAND HOSEIN, Associate Professor, Dalla Lana School of Public Health, U of T; Vice President, Environment Health and Safety GE Canada. ***Nanomaterials: Emerging Environment and Public Health Impacts,*** **Nov. 27, 2008.** Nanotechnology is a rapidly expanding field, yet research into the human and environmental effects of nano-materials have not kept pace. In this presentation, the various uses of nanomaterials, physico-chemical properties, and toxicity known to date were discussed, as well as their occurrence, behaviour, and their potential interactions with the ecosystem. Some thoughts on current knowledge gaps in the field, as well as challenges and future needs were also discussed.

THERESA McCLENAGHAN, Executive Director and Counsel, Canadian Environmental Law Association. ***Toxics Use Reduction in Ontario: The Challenges and Opportunities,*** **February 26, 2009.** From the perspective of the Canadian Environmental Law Association which has long advocated toxic use reduction materials use accounting and safer substitution, this talk addressed why Ontario needs a toxic use reduction act, what will change and what is not already being done in federal and provincial law, what opportunities the new law will bring and what the essential components of effective toxic use reduction are. It also discussed how this law will position Ontario in challenging times compared to other jurisdictions.

GORD MILLER, Environmental Commissioner of Ontario. ***Air Quality Monitoring and Reporting in Ontario: Fostering a False Sense of Security,*** **February 12, 2009.** The Ontario Ministry of the Environment (MOE) monitors and provides regular updates to the public on regional ambient air quality through its on-line Air Quality Index (AQI). The monitoring stations are located away from local sources of pollutants in order to provide information about regional average exposure and do not provide information about local, street-level air quality, where particulate matter has been found to be consistently higher. It is recommended that the outdated and inadequate monitoring and reporting program be overhauled.

MICHELLE NORTH, Ph.D. candidate, Institute of Medical Science and Centre for Environment, U of T. ***Airway Responsiveness in a Murine Asthma Model Linked to L-Arginine Metabolism and Exacerbated by Air Pollution,*** **February 5, 2009.** The enzyme arginase 1 has been shown to be increased in human asthma, and to have a functional role in the development of airways hyperresponsiveness (AHR), an important characteristic of asthma. Significantly increased expression of arginase has been reported in the airways of asthmatic subjects who smoke, however its role in air pollution-induced asthma had not been explored. This talk discussed a study revealing increased activity of arginase and increased AHR in a murine model of asthma and urban air pollution exposure.

Held Thursdays, 4:10 p.m.

FOR MORE INFORMATION
on past and upcoming seminars:
www.environment.utoronto.ca
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DENNIS O'HARA, Assistant Professor and Director, Elliott Allen Institute for Theology and Ecology, St. Michael's College, U of T. ***Awakening Environmental and Health Ethics to the Post-Copernican Universe,*** **March 26, 2009.** Although we are live in a post-Darwinian world in which we understand humans to be dependent upon Earth's systems, ethics tends to favour a pre-Copernican understanding of humanity – as if humans were separate and of primary importance to all else. While it might be obvious that it is not possible to have healthy humans on a sick planet, why hasn't ethics taken this maxim seriously? If we adopted a more ecocentric approach to ethics, how might this alter the decisions we make concerning environmental and health issues?

JOANNE PARROTT, Research Scientist, Aquatic Ecosystem Protection Division, Science and Technology Branch, Environment Canada. ***Effects of Pharmaceuticals in the Environment,*** **Mar 19, 2009.** Pharmaceuticals and personal care products (PPCPs) have been detected at very low concentrations in municipal wastewater effluents (MWWEs) and rivers in North America and Europe. Studies indicate that some PPCPs cause effects in aquatic organisms exposed in the lab at low concentrations. There is also evidence for effects on fish with lab exposure to MWWEs, and feminization of fish in U.S. rivers. More Canadian field studies of fish in waters downstream of MWWEs are recommended.

DAYNA SCOTT, Assistant Professor, Osgoode Hall Law School and Faculty of Environmental Studies, York University. ***Confronting Chronic Pollution: Environmental Justice for the Aamjiwnaang First Nation,*** **January 22, 2009.** This talk highlighted research with the aim of demonstrating a socio-legal approach to risk and precaution regarding chronic pollution. Drawing on work with the Aamjiwnaang First Nation, in the shadow of Sarnia, Ontario's "Chemical Valley", it aimed to influence how we understand and confront the risks of chronic pollution. It argued that the prevailing regulatory approach is incapable of capturing the essence of contemporary pollution harms linked to continuous low-dose exposures to contaminants within legally sanctioned limits.

Urban Issues in the Federal Election panel

In collaboration with U of T's Cities Centre & School for Public Policy & Governance

BY ERIC MILLER, MARK STABILE AND INGRID STEFANOVIC

***Urban Issues in the Federal Election: Why the Feds Matter to Cities and Why Cities Should Matter to the Feds,* Sept 30, 2008**

Despite having at least 80% of Canadians living in urban areas and urban areas constituting the economic and cultural engines for the nation, federal policy is typically formed without consideration of urban regions, and municipalities have very limited direct influence upon these federal policies. In an effort to promote the visibility and role of urban concerns within the October 2008 federal election, the U of T Cities Centre, School of Public Policy and Governance, and Centre for Environment hosted a panel session featuring prominent University and community urbanists to discuss the key issues.

Focusing on the issue of economic development, **Richard Florida** (Professor and Director of the Martin Prosperity Institute, U of T Rotman School of Management) outlined the importance of mega-regions that our cities occupy to the prosperity of nations and how the influence of these regions doesn't stop at national borders. **John Fraser** (Master of Massey College, U of T) and **James Bradshaw** (Arts Reporter a *The Globe and Mail*) spoke about the changing nature of the arts and culture scene in Toronto and the central role that art plays in our lives. Speaking on the issue of environmental sustainability, **Ingrid Stefanovic** (Professor and Director, Centre for Environment) urged the audience to move beyond compartmentalizing activity and recognize that urban dwelling is intimately linked to the natural environment. Former Toronto Chief City Planner and current Board Member of Metrolinx **Paul Bedford** focused on the importance of transit and urban infrastructure, outlining how urban centers need expanded transit infrastructure to continue to grow.

Angus Ni

Panel members discuss the importance of urban issues in the 2008 federal election, from left to right: Mark Stabile, Eric Miller, Richard Florida, Paul Bedford, Ingrid Stefanovic, James Bradshaw, John Fraser.

Eric Miller is Director, Cities Centre (www.citiescentre.utoronto.ca); Mark Stabile is Director, School of Public Policy and Governance (www.publicpolicy.utoronto.ca); and Ingrid Stefanovic is Professor and Director of the Centre for Environment.

Special Joint Lectures

CHRISTOPHER KEY CHAPPLE, Doshi Professor of Indic and Comparative Theology, Loyola Marymount University, Los Angeles.
***Protecting Ice, Trees, Air, and Rivers: Challenges of Environmental Protection in the Land of the Hindu Goddess,* January 22, 2009**
(Presented with the Dept. and Centre for Study of Religion, U of T.)

From the inception of civilization in the region of South Asia, artifacts can be found that speak to a perduring interest in the adoration of animals, the veneration of the feminine, and respect for the life-giving powers of water. During the Vedic era, there were abundant hymns in praise of the earth, the flowing of rivers, and bounteous agriculture. The classical period articulated various philosophies that honor both the elements and the senses; these categories serve as the foundation for the pursuit of self-understanding and one's relationships with others. The medieval texts of classical Hinduism include stunning tributes to the beauty of the earth, particularly in the Yogavasistha.

The pressures of post-colonialism, the rise of industrialization and urbanization, and a neglect of Gandhi's core precept of self-raj or self-sufficiency, has left contemporary India in a serious state of environmental ravage. Some heroic figures, such as M.C. Mehta, have attempted to turn the tide, working for legislation to improve the air, the water, and the overall quality of life. Though operating within a secular context, many contemporary activists draw inspiration from their love of the land, instilled by the culture and supported by an outlook that honors the rhythm (rta) of life. This presentation explored the land, water, energy, breath, and space of India in light of the emerging field of environmental ethics.

MARK JACCARD, Professor, School of Resource and Environmental Management, Simon Fraser University, Vancouver.
***Getting Climate Policy Right*, January 23, 2009**
(Presented with the School of Public Policy & Governance, U of T.)

Canadian policies to reduce greenhouse gas emissions for two decades have failed to achieve reduction targets. Is the present mix of policies also going to fail? Or do we finally have it right? Mark Jaccard, one of Canada's leading climate policy analysts, explained that while we have made some improvements, our policies still have a long way to go. He discussed the rise of carbon dioxide emissions; the projected impacts of climate change on food, water, ecosystems, and extreme weather events; the risk responsibility by country in cumulative carbon emissions and the estimated mortality rate attributable to climate change. With regards to climate policy, competitiveness is often presented as an excuse for not acting. In the long run, there are no competitiveness issues because all countries must have policies that apply similar carbon costs on all industries. In the short run, sectoral differentiation and/or border adjustments can exempt exporters and charge importers. He discussed the Canadian federal and provincial efforts since 1988, which have focused on increasing energy efficiency, as well as the micro-economic and macro-economic costs of energy efficiency. He explained how the carbon tax is an efficient approach to emissions pricing and how emission caps can serve as an alternative pricing policy. The differences between taxes and caps were also covered. Canadian federal policies were compared with EU emissions trading system and the U.S. federal and state policy development.

Greening the Neighbourhood lecture

In collaboration with U of T's Hart House

BY ALEXIS CHAPMAN

Greening the Neighbourhood … & How Much It Won't Cost Us: **Lecture by Majora Carter & Panel Session, March 13, 2009**

On her first Canadian visit, *New York Post*'s 2008 Liberty Medal for Lifetime Achievement recipient **Majora Carter** spoke to a sold out audience on exploring sustainability and renewal issues. This special event was presented by the U of T's Hart House in sponsorship and collaboration with the Metcalf Foundation and the U of T Cities Centre, Environmental Resource Network (UTERN), Centre for Environment, and Environmental Health Justice in the City Research Interest Group of the Centre for Urban Health Initiatives. A dynamic and passionate speaker, Ms. Carter explored how sustainability, economic community building, and social and environmental justice converge to improve and renew neighbourhoods in innovative ways. She spoke about her compelling personal story of activism emerging from her experiences growing up in the South Bronx.

Also included was commentary from panelists **Joe Pantalone** (Deputy Mayor of Toronto) well known for his dedication to creating a beautiful and safe city, efforts in greening the city; **Ben Powless** (Co-founder of Canadian Youth Climate Coalition and a Mohawk from the Six Nations); **Blake Poland** (Assoc. Professor, Dalla Lana School of Public Health; Co-Director of the Environmental Health Justice in the City Research Interest Group, U of T); and moderator **Eric Miller** (Professor and Director of the Cities Centre, U of T).

Sara Herron

American environmental activist Majora Carter speaks to a sold out audience about social and environmental justics and her experiences in transforming the neighbourhoods of South Bronx, New York.

A webcast of the lecture and panel session is available at http://mediacast.ic.utoronto.ca/20090313-HH/index.htm. For more info on Majora Carter, visit www.majoracartergroup.com.

Alexis Chapman is Senior Communications Officer, Hart House (alexis.chapman@utoronto.ca; www.harthouse.utoronto.ca).

Pollution and Poverty forum

In collaboration with U of T's Centre for Urban Health Initiatives & Cities Centre

BY BRENDA ROSS

***Links between Pollution and Poverty in Toronto Neighbourhoods*, March 26, 2009**

People living in poverty in the Great Lakes basin may be experiencing an increased burden of high air pollution from industrial facilities in their neighbourhoods. A recent study done by the Canadian Environmental Law Association (CELA) and Environmental Defence found that seventeen neighbourhoods in Toronto had a poverty rate at or higher than the national average as well as high amounts of toxic air pollutants and air contaminants. The report, *An Examination of Pollution and Poverty in the Great Lakes Basin*, is available at www.pollutionwatch.org.

A forum was presented by U of T's Centre for Urban Health Initiatives in collaboration with the Cities Centre and the Centre for Environment with the goal of bringing together a panel to engage in dialogue about poverty and pollution and was moderated by **Frank Cunningham**, Professor of Philosophy and Senior Advisor at the Cities Centre, U of T. Authors of the above study **Fe de Leon** (Researcher, CELA) and **Jennifer Foulds** (Communications Director, Environmental Defence) presented the major findings focusing on Toronto neighbourhoods, with comparisons to other Great Lakes regions and national averages. Panelists talked about the implications and actions needed and included **Loren Vanderlinden**, Supervisor of Environmental Health Assessment and Policy and

Helen Hao Wen Huang

From left to right panelist Rich Whate (Toronto Public Health), moderator Frank Cunningham (Cities Centre, U of T), panelists Loren Vanderlinden (Toronto Public Health), and Fe de Leon (Researcher, Canadian Environmental Law Association) at a Pollution and Poverty forum.

Rich Whate, Health Promotion Consultant from the Environmental Protection Office of Toronto Public Health; and **Lina Cino**, Toxics Campaigner at Toronto Environmental Alliance.

Brenda Ross is Director of Research, Centre for Urban Health Initiatives, U of T; brenda.ross@utoronto.ca, www.cuhi.utoronto.ca.

Engaging our youth

In collaboration with Jane Goodall Institute & AIRD of Environment Canada

BY NAOMI RESNICK AND BRAD BASS

Through its partnerships with the Jane Goodall Institute's Roots & Shoots program (see page 24) and Environment Canada's Adaptation and Impacts Research Division (see page 5), their members and the Centre for Environment are able to provide learning opportunities to elementary and high school students, our environmental leaders and stewards of tomorrow.

With members in more than 100 countries, **Jane Goodall Institute's Roots & Shoots** global youth network connects and supports youth around the world to effect positive change for people, animals and the environment. It has recently hosted numerous events across Canada and several at the University of Toronto. In September 2008, with support from students at University of Toronto Schools (a private secondary school located at U of T), giant peace doves were flown on campus to celebrate the *United Nations International Day of Peace*. In March 2009, the film *Blue Gold* was premiered at U of T to commemorate *World Water Day*. And in April 2009, a *Youth 4 Action Workshop* was held in partnership with the Centre for Environment for over 150 high school aged students and teachers and included a keynote address by Dr. Goodall and 13 workshops.

Members of the **Adaptation & Impacts Research Division (AIRD) of Environment Canada** have also engaged elementary school children through their research. Researcher **Dr. Brad Bass** led a group of his staff and students to participate in the *Kids World of Energy Festival* in May 2009, an event run by the Toronto Regional Energy Cooperative to teach students in grades 4 to 6 about energy conservation and clean energy. Dr. Bass and his group led activities showing how easy it is to waste energy, the impact transportation choices have on air quality, and how green walls can reduce the urban heat island and aid in reducing energy consumption.

Tzazna Miranda Leal

Brad Bass of AIRD leads a demonstration of a green wall to elementary students at the Kids World of Energy Festival in Toronto.

Naomi Resnick is Roots & Shoots Coordinator at the Jane Goodall Institute. Brad Bass is a Researcher at AIRD of Environment Canada.

Education Alliance for a Sustainable Toronto

Part of the United Nations University's network of Regional Centres of Expertise

BY TIM WELSH AND INGRID LEMAN STEFANOVIC

The Education Alliance for Sustainable Toronto (EAST) began in 2006 as a joint initiative between the Centre for Environment, the United Nations University, the City of Toronto, and several other local organizations. This unique partnership was created to further the mandate of the United Nations' Decade for Education for Sustainable Development. One of the key resolutions put forth by the UN was the establishment of a worldwide network of Regional Centres of Expertise (RCEs) to promote local sustainability education. The EAST partnership was created to address this need, and to "empower students, the general public, and professionals to transform the Toronto region into a sustainability-oriented society" and was co-chaired by **Ingrid Leman Stefanovic** (Director, Centre for Environment) and **Roy Paluoja** (Chair, Centre for the Built Environment, Seneca College).

EAST has been engaged in a number of projects including:

- A comprehensive survey of over 400 local organizations offering Education for Sustainable Development (ESD) programs, which identified areas of concern: a general lack of focus on the links between ESD and environmental justice/poverty alleviation issues, a specific lack of training directed towards the social services sectors, a need for more online training modules.
- Best Practices Case Studies. A Centre for Environment undergraduate student compiled several case studies identifying ESD initiatives within the Toronto area.
- An online "Sustainability Map" (www.toronto.ca/livegreen). Some work began under the auspices of RCE; it has been completed through the Toronto's "Live Green" initiative.
- The Toronto RCE website (www.unurce-toronto.org). **Imran Hasan**, IT Manager at the Centre for Environment, led the design and development of this comprehensive website detailing the RCE's activities. It continues to be a useful hub for links to local green organizations and initiatives, and for information about the UN Decade for Education for Sustainable Development project in general.

As the Co-Chairs' term wound up this year and the formal Memorandum of Understanding expired, there was a general consensus among the Steering Committee members that a formal RCE designation was not bringing significant added value to the collaborative relationships already in existence amongst participants. We decided to draw the initiative to a close, while recognizing the need to maintain the website for communication and networking purposes for the time being. The working relationships that developed out of this project continue to be vital, and individual stakeholders are currently in the process of re-assessing how their shared expertise can best serve the community.

Tim Welsh is Research Coordinator and Ingrid Leman Stefanovic is Director, respectively, at the Centre for Environment.

Christian Abizaid

To June 30, 2010: Post-Doctoral Researcher, Department of Geography, McGill University.
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From July 1, 2010: Assistant Professor, Dept. of Geography and Centre for Environment.
Licenciatura (International Relations), Iberoamericana, Mexico; M.A. and Ph.D. (Geography), McGill.

Research Interests: Human-environment interactions, environmental conservation and development, cultural and political ecology, peasant livelihoods, environmental change, human responses to natural hazards and vulnerability, human-induced environmental change, land use and cover change, neotropical rainforests, Latin America; Amazon, Mexico.

Featured Research Projects:
Floodplain dynamics and traditional livelihoods in the Upper Amazon. This project examines the prospects for economic livelihood within the context of rapid environmental change. For my dissertation, I studied the origins and the ecological and socioeconomic consequences of a recent meander cutoff along a major Amazon tributary. Building on this, I plan to document long-term livelihood responses to the cutoff and their implications for vulnerability.

Life and livelihoods on Amazonian floodplains (with O. Coomes, McGill University). Research on Amazonian floodplain use and economic livelihoods of riverine people points to the development potential (i.e., fertile soils, ease of transportation, and protein availability), but also the constraints (i.e., particularly flooding) presented by the floodplain. This research draws on insights from field studies among riverine dwellers in the Peruvian Amazon to challenge some of the common assumptions about life and resource use on the floodplain in the Upper Amazon.

Fishing specialization and fisheries as insurance among forest dweller households along the rivers of the Upper Amazon (with O. Coomes and Y. Takasaki, see above). This research examines the role of fisheries in the livelihoods of forest dweller households along the rivers of the Upper Amazon. We are currently analyzing data from villages along two major Amazon tributaries to assess the importance of fisheries for income and in the provision of insurance against shocks.

Cooperative labor exchanges in peasant agriculture (with O. Coomes and Y. Takasaki, see above). This project examines the nature and structure of cooperative labor exchanges among forest dweller households in the Peruvian Amazon and explores whether access to cooperative labor influences the prospects for land acquisition and holding inequality in traditional agrarian societies.

Recent Publications:
Coomes, O.T., C. Abizaidand M. Lapointe. 2009. Human modification of a large meandering Amazonian river: genesis, ecological and economic consequences of the Masisea cutoff on the central Ucayali, Peru. *Ambio* 38(3): 130-34.
Abizaid, C. 2005. An anthropogenic meander cutoff along the Ucayali River, Peruvian Amazon. *The Geographical Review* 95(1): 122-135.
Abizaid C. and O. T. Coomes. 2004. Land use and forest fallowing dynamics in seasonally dry tropical forests of the southern Yucatán Peninsula, Mexico. *Land Use Policy* 21(1): 71-84.

Philip Byer

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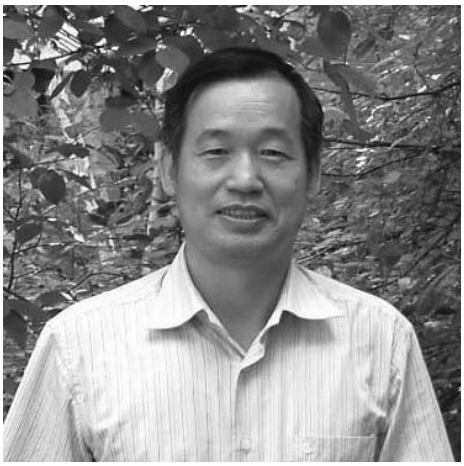
S.M. (Civil Eng.), S.B. (Electrical Eng.), Ph.D. (Civil Eng.), Mass. Inst. Technology
2009-10 CFE Co-Instructor of ENV1001H Environmental Decision-Making.

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

Featured Research Project:
Decision Making Under Uncertainties for Adapting to Climate Change in Project Environmental Assessments, Research contract from the Canadian Environmental Assessment Agency, 2009-11. The purpose of this project is to present, evaluate and recommend methodologies that can be used in project environmental assessments (EAs) to help decide on the type and degree of adaptation that should be used to respond to uncertainties about the degree of future climate change. The research includes: a review of recent EA comprehensive studies and panel reports and other literature to identify the types of adaptation that has or could be used to respond to climate change for a variety of project types undergoing EAs in Canada; a review of available decision-making criteria and approaches, such as minimax regret and real options analysis, for making decisions under conditions of uncertainty; and an analysis of when and how these criteria and approaches can be used in project EAs for helping practitioners decide how and to what degree the project should be planned to adapt to climate change. Draft findings are to be presented at a workshop of EA practitioners and academics in the Spring of 2010.

Recent Publications:
Byer, P., M. Lalani and J.S. Yeomans. 2009. Addressing and communicating climate change and its uncertainties in project environmental impact assessments. *Journal of Environmental Assessment Policy and Management* 11(1):29-50.
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. (Awarded prize by International Association for Impact Assessment for best paper published in 2007 in *Impact Assessment and Project Appraisal*.)
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.



Jing Chen

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B.Sc. (Meteorology), Nanjing Institute of Meteorology; Ph.D. (Meteorology), Reading.

Research Interests: Biosphere remote sensing, geographical information systems, regional and global carbon cycles; hydrology, micrometeorology.

Research Projects:
The following projects have a common theme: to quantify the terrestrial carbon source and sink distribution over Canada and North America. Two methods are used for this purpose: (1) bottom-up spatially explicit ecosystem modeling based on remote sensing, climate, soil, forest inventory, and tower flux data, and (2) top-down atmospheric inversion for 30 regions of North America using air CO_2 concentration data from over 200 global baseline stations and an atmospheric transport model. Uncertainties in the regional carbon cycle estimation are assessed through comparing bottom-up and top-down results. These estimates can also be improved through bottom-up (ecosystem) and top-down (atmosphere) mutual constraints using data assimilation techniques.

Regional carbon cycle modelling as part of the *Canadian Carbon Program*, Canadian Foundation for Climate and Atmospheric Sciences (CFCAS). 2007-2010.

Multi-angle and Hyperspectral Remote Sensing of Terrestrial Ecosystems, NSERC, 2005-2010.

Nested Global Inversion for North America Carbon Sinks/Sources with 13CO2 Constraint, CFCAS, 2006-2010.

Mapping the Forest Carbon Flux and Stock in Ontario's Far North Using Remote Sensing and Projecting Their Changes Under Future Climate Scenarios, Ontario Ministry of Natural Resources, 2009-2011.

Forest Carbon Budget of the United States and Canada in Response to Impacts of Disturbances, Succession and Changes in Climate and Atmospheric Chemistry, USDA-Forest Service, 2007-2010.

Forthcoming and Recent Publications:

Chen, J. M., S. Huang, W. Ju, D. Goumont-Guay, and T. A. Black. 2009. Daily heterotrophic respiration model considering the non-linear effect of diurnal temperature variability. *Journal of Geophysical Research-Biogeosciences* 114: G01022, doi:10.1029/2008JG000834.

Govind, A., J. M. Chen, H. Margolis, W. Ju, O. Sonnentag, and M. Giasson. 2009. A spatially explicit hydro-ecological modeling framework (BEPS-TerrainLab V2.0): model description and test in a boreal ecosystem in Eastern North America. *Journal of Hydrology* 367: 200-216.

Govind, A., J. M. Chen, and W. Ju. 2009. Spatially explicit simulation of hydrologically controlled carbon and nitrogen cycles and associated feedback mechanisms in a boreal ecosystem. *J. of Geophysical Research-Biogeosciences* 114: G02006, doi:10.1029/2008JG000728.

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B.A., Manchester; M.Sc. and Ph.D. (Biogeography), Wisconsin.
Summer 2009 CFE Instructor of ENV395Y Special Topics Field Course: Ecology and Conservation in the Amazon, Galápagos, and Andes.

Research Interests: Paleoenvironmental reconstruction; pollen and geochemical stratigraphies of peat, lake and near-shore marine sediments; indigenous peoples and their interactions with environment.

Featured Research Projects:
Interactions between prehistoric people and their local environments. This research is in support of archeological investigations in southern Ontario and Cuba and involves examination of pollen and other biological and geochemical stratigraphies and the information they provide on local and regional environmental conditions and human resource use. It also includes an analysis of human adjustments to short and long-term environmental change, particularly to Holocene sea-level and lake-level shifts. Shorelines of the Great Lakes have changed throughout the Holocene. The major cause has been post-glacial isostatic rebound. In Lake Ontario, the larger rebound at the eastern end caused the gradual drowning of the western margins of the lake, forming Hamilton Harbour and Cootes Paradise. The shores of the latter have been occupied by indigenous people over the last 4000 years. Although people were present during the Archaic, the most prominent users were the Princess Point Complex between 1000 and 1500 years ago. Princess Point people seem to have introduced corn into southern Ontario, but both them and Archaic peoples exploited the rich wild rice beds around the margins of the wetland.

In Cuba, rising sea levels during the Holocene influenced coastal geomorphic processes and changed the patterns of coastal ecosystems. The pre-Columbian Taino faced rising sea level by living in stilt houses. Over the history of the settlement they adjusted its location by following the shoreward migration of the bars on which it was built. The settlement at Los Buchillones on the north shore of the island is one of the most important sites in Cuba. Immersion under lagoonal muds has helped preserve a wealth of artifacts including housing materials and structures, wooden utensils and ritual items.

Recent Publications:

Peros, M., E.G. Reinhardt and A.M. Davis. 2007. A 6000 calendar year record of ecological and hydrologic changes from Laguna de la Leche, north coastal Cuba. *Quaternary Research* 67: 69-82.

Peros, M., E.G. Reinhardt, H.P Schwarcz and A.M. Davis. 2007. High-resolution paleosalinity reconstruction from Laguna de la Leche, north coastal Cuba, using Sr, O and C isotopes. *Paleogeography, Paleoclimatology, Paleoecology* 245: 535-550.

Karen Ing

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M.Sc. (Zoology), Toronto.
2009-10 CFE Instructor of ENV421H Environmental Research and Co-Instructor of ENV/SSC199Y Debating and Understanding Current Environmental Issues, ENV200Y Assessing Global Change: Science and the Environment, ENV222Y Interdisciplinary Perspectives on Environment, and ENV420Y Environmental Research.

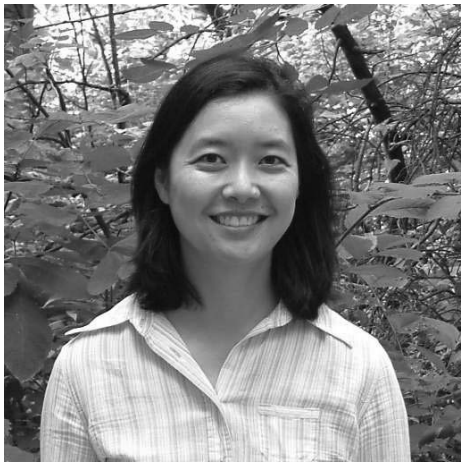
Research Interests:
Environmental education, interdisciplinary team teaching, valuing ecosystem services and well-being; incentive mechanisms for provisioning of ecosystem services.

Featured Research Projects:
Ecosystems and Human Well-Being (United Nations Environment Program). In collaboration with Shashi Kant of Forestry at U of T, the goal of this project is to increase awareness and understanding of the links between ecosystem and human well-being, especially in developing countries. Workshops have been offered to faculty and students in Zhejiang Forestry University in China, and Vietnam National Forestry University, Hanoi.

Impacts of Climate Change on Ice Formation in Canadian Lakes. In collaboration with scientists from the 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 generated and compared with current remote sensing observations to better delineate present and future thermal seasons in lakes with the aim to better predict potential climate impacts on aquatic communities.

Team teaching: does it strengthen or undermine a learning community? With a cross-disciplinary group of U of T colleagues, it explores the extent and variety of team teaching models at U of T. Over 64 team taught courses were surveyed in the Faculty of Arts & Science to assess the perceived advantages and disadvantages of team teaching both from the faculty and student perspective.

Survey of Raccoon Movement in the Niagara Region between 1994-97 (Rabies Research Unit, Ontario Ministry of Natural Resources). This project was a critical component in developing Ontario's current strategies on management and potential disease spread of raccoon rabies into Southern Ontario. It analyzed data from the Trap-Vaccinate-Release program in the Niagara Region to study differential movement trends associated with variables such as sex, age, and seasons.



Recent Publications:
Rosatte, R., M. Ryckman, K. Ing, S. Proceviat, M. Allan, L. Bruce, D. Donovan, T. Buchanan, and C. Davies. 2009. Density, movements, and survival of raccoons in Ontario, Canada: Implications for disease spread and management. *Journal of Mammology.* (In Press.)

Neumann, M, S. Browning, J. Clarke, J. Harlow, D. Harrison, K. Ing, L. Kushnir, C. Kutas, J. Pitre, R. Serbanescu, M. Wall, and R. Wilson. 2008. Serial team teaching and the evolving scholarship of learning: students' perspective. *Collected Essays on Teaching and Learning* 1: 28-34.

Kundan Kumar

Assistant Professor, Dept. of Geography and Centre for Environment.
Office: Department of Geography, Room 5025A, 100 St. George St., U of T, M5S 3G3; tel 416-978-2958; fax: 416-946-3886; kundan.kumar@utoronto.ca. http://www.geog.utoronto.ca; http://www.environment.utoronto.ca
B.Sc. Hons (Physics), Delhi; M.A. (Forestry Management), Indian Institute of Forest Management; Ph.D. expected Fall 2009 (Resource Development), Michigan State.
2009-10 CFE Co-Instructor of ENV/SSC199Y Debating and Understanding Current Environmental Issues and ENV321Y Approaches to Environmental Issues.

Research Interests:
Forest rights and tenure; forest tenure reforms; democratization and decentralization of forest governance; environment and climate justice; environmental governance and civil society; social and environmental movements.

Featured Research Projects and Interests:
Forests tenure, social movements and democracy. Most of the forests in developing countries are state owned, and often ignore customary tenure and subsistence use of forests. I am interested in addressing how collective action by forest dependent populations has led to increased democratization of forest tenure and governance. My research is located in India, where I have been involved in research on the enactment and implementation of a recent law providing forest rights to forest dwellers.

Environmental governance and civil society in developing countries. Environmental governance is one of the most contentious arenas in developing countries, as globalization and neo-liberalism often push the environmental costs to those people who are most vulnerable and marginalized. I am interested in addressing how civil society and social mobilizations organize to influence and modify environmental governance to seek more just and sustainable outcomes. I work with civil society organizations and movements in India on this issue.

Climate Justice. Climate change, its outcomes and efforts at its amelioration amplify a recurrent pattern in recent history – that those who are weak and powerless will pay the price for the excesses of the powerful. Climate change impacts will primarily be felt by those who have least contributed to greenhouse emissions. Ironically, those worst affected are also the least well endowed and capable to face the challenges that climate change poses. Furthermore, measures for climate change amelioration have the potential of further disrupting the lives of the marginalized and poor. The contribution of biofuels to increasing prices of food is an example. My research will examine climate change from the perspective of justice and equity.

Forthcoming and Recent Publications:
Kumar, K. Erasing the Swidden: Constructing forest-agriculture dichotomies in Orissa. In S. Lele, (ed.) *Beyond Joint Forest Management: Rethinking the Forests Question in India.*Sage Publications, Delhi. (Forthcoming.)

Kumar, K. S. Behera, S. Sarangi, O. Springate-Baginski. 2008. *'Historical Injustice': The Creation of Poverty through Forest Tenure Deprivation in Orissa*. Working paper, School of International Development, University of East Anglia, Norwich, UK. 88p.

Douglas Macdonald

Senior Lecturer, Centre for Environment.
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Hon. B.A., M.A., Toronto; Ph.D. (Environmental Studies), York.

2009-10 CFE Instructor of ENV320Y National and International Environmental Policy Making, ENV410H Environmental Research Skills, and ENV1002 Environmental Policy.

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

Research Projects:

Allocating Canadian Greenhouse Emission Reductions Amongst Sources and Provinces: Learning from the EU and Germany, SSHRC, 2009-12, with Jochen Monstadt, Technische Universität Darmstadt, Germany and Kristine Kern, Wageningen Universiteit, The Netherlands. The subject of this research project is the failure of the federal government and provinces to reach agreement on one effective, coherent national climate-change policy which explicitly states what portion of the over-all cost of action will be borne by each province. Two other federated systems, Germany and the EU, have managed to negotiate such explicit agreement. The project intends to apply lessons from those two success stories to the Canadian process.

The Oil and Gas Industry and Government of Canada Climate-Change Policy: Objectives, Legitimacy and Organization, SSHRC, 2009-10. This research attempts to understand the sources of the political power of the oil and gas industry as it lobbies to influence Canadian climate-change policy.

Study of Voluntarism as a Policy Instrument for Climate Change. SSHRC grant with Jean Mercier, Université Laval (Principal Investigator) and other Laval faculty. This project studies voluntarism as an environmental policy instrument used by the Québec and Canadian governments to date and the potential for future use of voluntary programs in Canadian climate policy.

Study of New England Governors and Atlantic Premiers Climate Change Action Plan. SSHRCwith Jean Mercier, Université Laval (Principal Investigator), and Ph.D. candidates in Political Science, U of T. The purpose of the project is to study factors influencing instrument choice selection to date, particularly asymmetries of legitimacy and information between environmental regulators and firms in Quebec, New Brunswick, Massachusetts and Vermont.

Forthcoming and Recent Publications:

Macdonald, D. The failure of Canadian climate change policy, in D.L. VanNijnatten and R. Boardman (eds.), *Canadian Environmental Policy*, third edition, Oxford University Press. (Forthcoming in 2009.)

Macdonald, D. 2007. *Business and Environmental Politics in Canada*. Broadview Press, Peterborough, Ontario. 240 pages. (Winner of the Donald Smiley Prize.)

W. Scott Prudham

Associate Professor, Department of Geography and Centre for Environment.
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B.A.& Sc., McMaster; M.A. (Geography), Victoria; Ph.D. (Energy and Resources), California, Berkeley.

2009-10 CFE Instructor of ENV1444H Capitalist Nature.

Research Interests:
The commodification of nature, including market-based mechanisms for dealing with environmental problems; political ecology; political economy and environmental change/politics in North America; industrial and alternative forestry in western North America; social regulation of commercial biotechnology in agriculture and forestry.

Featured Research Project:

Double movements: a political ecology of land, labour and livelihoods in British Columbia, SSHRC, 2008-12. This project involves examining the inter-connected political, ecological, economic and cultural aspects of commodification in British Columbia's forest economy. The goals are to understand trajectories of commodification, specifically relating to forest based work and forest products production, but also to examine opportunities and constraints facing sustainable livelihoods based on forest appropriation. The research proposes and addresses several interconnected questions: 1. How do labour and land come to circulate as commodities? 2. How does commodification rely on specific processes of political, cultural, and institutional objectification whereby the social allocation of labour and land seem to elude everyday influence? 3. How are these processes evident in the historical and contemporary political ecology of British Columbia's highly globalist forest economy? 4. What strategies are appropriate and available through which sustainable livelihoods based on forest use in BC may be reclaimed, specifically in the Cowichan Valley, and what can be learned from these? What is the prevailing approach to livelihood questions among community forest tenure holders in BC? 5. How can the research process advance processes of subjectification (i.e. renegotiation and re-embedding of social claims to land and labour) with respect to forest-based livelihoods? The research addresses these issues through a combination of historical and contemporary analysis, using secondary and primary sources of evidence, and based on ongoing, active, and action oriented collaboration with NGOs and community forestry groups in the province.

Recent Publications:

Prudham, S. 2009. Commodification. In N. Castree, D. Demeritt, D. Liverman, and B. Rhoads (eds.), *Companion to Environmental Geography.* Basil Blackwell, Oxford. Pages 123-142

Prudham, W.S. 2008. Tall among the trees: Organizing against globalist forestry in rural British Columbia. *Journal of Rural Studies* 24(2): 182-196.

Prudham, S. 2007. The fictions of autonomous invention: accumulation by dispossession, commodification, and life patents in Canada. *Antipode* 39(3): 406-429.

Beth Savan

Senior Lecturer, Centre for Environment; Director, U of T Sustainability Office.
Office: Sustainability Office, Room 208, South Borden Building , 487 Spadina Crescent. mailing address: c/o Campus Mailroom 563 Spadina Crescent, Toronto ON, M5S 2J7; tel: 416-978-8202; fax: 416-978-3884; b.savan@utoronto.ca; http://www.environment.utoronto.ca; http://www.sustainability.utoronto.ca
B.Sc. Hons., Toronto; Ph.D., London, U.K.
2009-10 CFE course supervisor of ENV299Y Research Opportunity and Summer 2009 Instructor of ENV440Y Professional Experience Course.

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

Featured Research Projects:
Energy Conservation and Demand Management: Integrating Design, Behaviour and Technology, SSHRC, 2009-10; with I. Stefanovic, G. Jamieson, D. Dolderman, and A. Smiley, U of T. More widespread practice of conservation and demand management (CDM) will be an important complement to green technology in future efforts to contain resource consumption and greenhouse gas emissions. Designing effective interventions to reduce energy and resource use requires understanding how individuals and groups behave in complex real-world environments, how they interact with technology, and how their decisions are affected by information, incentives, and feedback. The Sustainability Office ***(see page 28)*** has also been researching the capacity of social marketing techniques to change energy consumption behaviours for several years. This project will draw together researchers and students from social sciences and engineering to identify new research questions, develop more robust theoretical perspectives, and refine methodological approaches. ***(See p. 4 for project description.)***

Managing Energy-Related Behaviours: Using a Social Marketing Approach to Promote Energy Efficiency and Energy Technologies, Ontario Centres of Excellence, 2007-10. As part of the Rewire program of the Sustainability Office, this research will generate best-practice 'toolkits', allowing private and public partners to easily integrate energy efficient technology upgrades with an understanding of building user behaviour into their marketing and operations. They will gain the ability to predict the financial savings and energy reductions associated with particular efficiency improvements and social marketing approaches to changing energy-related behaviour. A typical 'toolkit' will include a step-by-step implementation strategy, a discussion of barriers to behavioural change,

and 'action tools' outlining steps needed to motivate a specific behaviour outcome and the resources needed to implement these steps.

Forthcoming Publications:
Savan, B.I., S. Flicker, B. Kolenda and M. Mildenberger. How to facilitate (or discourage) community based research: recommendations based on a Canadian survey. *Local Environment.* (Forthcoming.)
Chan, S. S. Wakefield and B. Savan. 2009. Natural institutions: practising sustainability in an urban university, in I. Stefanovic and S. Scharper (eds.), *The Natural City: Re-Envisioning the Built Environment*, University of Toronto Press. (In press.)

Stephen Scharper

Associate Professor, Department of Anthropology, U of T Mississauga and Centre for Environment.
Offices: 1) Centre for Environment, Room 2103, 33 Willcocks St., Toronto, Ont. M5S 3E8; tel: 416-978-7433; fax: 416-978-3884; 2) Dept. of Anthropology, U of T Mississauga, Rm 118, 3359 Mississauga Rd. N., North Building, Mississauga, Ont. L5L 1C8; tel: 905-569-4912; fax: 905-828-3837; stephen.scharper@utoronto.ca http://www.utm.utoronto.ca/2573.0.html http://www.environment.utoronto.ca
B.A. Hons., Toronto; M.A. (Theology), Toronto; Ph.D. (Religious Studies), McGill.
2009-10 CFE Co-Instructor of ENV222Y Interdisciplinary Perspectives on Environment and Instructor of ENV1008H Worldviews and Ecology.

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 is 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. While much of the religious conservation around ecology has entailed ontological, doctrinal, and cosmological or "worldview" questions, there have also been religious responses that take issues of class, race, gender, poverty, and justice seriously. Indeed, many tensions have surfaced and continue to exist between these two broadly outlined ecological approaches. Thus, the question has emerged whether the ecological contributions of the world's religions are chiefly in the realm of worldviews, doctrine, and cosmology, or in the realm of a political and economic critique. This research probes this question by focusing on one of the most challenging religious developments of the past thirty years that of the theology of liberation, a theology that takes poverty, and increasingly, ecological destruction, seriously. Early formulations of the theology of liberation, through its use of the social sciences and critique of structural economic and political systems such as developmentalism and modernization, yields an approach where questions of worldview and cosmology potentially unite with social, economic, and political critiques, leading to a possible

integration of social, religious, and ecological concerns instructive for religious ecological engagement.

Forthcoming and Recent Publications:
Stefanovic, I.L. and S.B. Scharper (eds.) *The Natural City: Re-Envisioning the Built Environment.* University of Toronto Press. (Forthcoming.)
Scharper, S.B. and A. Weigert. 2009. An Invitation to inclusive environmental reflection: reflections on the compendium. In P. Sullins and A. Blasi (eds.) *Catholic Social Thought: American Reflections on the Compendium.* Rowman and Littlefield, Lanham, Maryland. Pages 127-142.

Ingrid Leman Stefanovic

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Office: Centre for Environment, Room 1020, 33 Willcocks St., Toronto, Ontario, M5S 3E8; tel: 416-978-6526; fax: 416-978-3884; ingrid.stefanovic@utoronto.ca; http://philosophy.utoronto.ca; http://www.environment.utoronto.ca
B.A., M.A. and Ph.D. (Philosophy), Toronto.
Professor, Department of Philosophy and Centre for Environment.
Co-Instructor of ENV1001H Environmental Decision-Making.

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:
Energy Conservation and Demand Management: Integrating Design, Behaviour and Technology, SSHRC, 2009-10; with B. Savan, G. Jamieson, D. Dolderman, and A. Smiley, U of T. A project aimed at exploring the interface between human factors engineering, behaviour modification and environmental ethics in order to identify strategies for more effective energy demand management. While new technological designs offer promise of encouraging more sustainable behaviour patterns, there are also questions of ethics that arise, relating to issues of personal autonomy and social marketing. ***(See p. 4 for project description.)***

Humanities Policy: The Case of Water. There is growing recognition of the important relation between scientific research and the development of public policy. Less attention is placed on the impact of the social sciences and, particularly, the humanities and how they might best impact upon sound environmental policy development. This project focuses on the issue of water policy, recognizing that water is the "new oil". The aim is to investigate instances whereby the arts and humanities have focused on issues of water and impacted upon public policy. Guidelines for improved communication and collaboration between the humanities and public policy makers will be developed.

Greening the Corporate Ethic. This research project explores the interface between business ethics and environmental ethics, arguing for the need of a more comprehensive understanding of how sustainability can impact upon corporate social responsibility in a substantive rather than merely ancillary manner. While businesses increasingly acknowledge the relationship between profit and long term sustainability, there continue to be conflicting value systems that are sometimes implicit and may impede a positive balance between economics and environment.

Forthcoming Publications:
Stefanovic, I.L. and C. Wiseman. Children's health and environmental education and training for health care professionals in Canada: assessing gaps, barriers and needs. *International Journal of Occupational and Environmental Health.* (Forthcoming.)
Stefanovic, I.L., House of dreams: reading architectural and natural environments. *Indian Journal of Eco-Criticism.* (Forthcoming.)

Willem Vanderburg

Professor, Department of Civil Engineering and Centre for Environment; Director, Centre for Technology and Social Development.
Office: Centre for Technology and Social Development, Room 319, 35 St. George St., U of T, M5S 1A4; tel: 416-978-2924; fax: 978-6813; bill.vanderburg@utoronto.ca; http://www.civil.engineering.utoronto.ca; http://ctsd.utoronto.ca; http://www.environment.utoronto.ca
B.A.Sc., M.A.Sc., Ph.D (Mech.Eng.), Waterloo.
2009-10 CFE Instructor of JEI 1901H Technology, Society and the Environment I and JEI 1902H Technology, Society and the Environment II (joint Civil Engineering and Environment).

Research Interests:
Ecology of technology: how technology fits into, depends on and interacts with human life, society and the biosphere; preventive engineering and management: adjusting theory and practice to help create cleaner and greener technologies; 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 Sustainable Cities. The evolution of contemporary cities into sustainable cities will be affected by the decisions of countless specialists according to an established intellectual and professional division of labour. They 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 sustainable cities. The results will be used to unleash the potential of preventive approaches aimed at achieving the desired results while preventing or minimizing undesired consequences.

Desymbolization. For as long as humanity has been a symbolic species, cultures have been the bases for making sense of and living in the world. Contemporary ways of life have created a flood of desymbolizing experiences that are undermining our ability to relate highly specialized knowing and doing to a broader context, thus creating a great many "collisions" with human life, society and the biosphere. Desymbolization is now one of the primary threats to a livable and sustainable future. This diagnosis is the basis for a prescription to turn this situation around, beginning with the university and the professions.

Recent Publications:
Vanderburg, W.H. 2009. The anti-economy hypothesis: part 1: from wealth creation to wealth extraction; part 2: theoretical roots; part 3: toward a solution. *Bulletin of Science, Technology and Society* 29(1): 48-74.
Vanderburg, W.H. 2008. The most economic, socially viable, and environmentally sustainable alternative energy. *Bulletin of Science, Technology & Society*, 28(2): 98-140.
Vanderburg, W.H. 2006. Can the University escape from the labyrinth of technology? (Parts 1-4) *Bulletin of Science, Technology and Society* 26(3): 176-221.

Clare Wiseman

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B.E.S. Hons. (Waterloo), M. Nat. Res. Mgmt. (Simon Fraser), Dr. phil.nat. (Frankfurt).
2009-10 CFE Instructor of ENV4001H Graduate Seminars in Environment and Health and ENV4002H Environment and Health of Vulnerable Populations.

Research Interests: Organomineral associations in soils, human health effects of contaminant exposures, environmental health of vulnerable populations, metal emissions and their potential impacts.

Featured Research Projects:
Platinum Group Element Emissions: Environmental Concentrations, Exposure Levels and Human Health Risks. (Ongoing collaboration with Fathi Zereini, University of Frankfurt). Investigates platinum group element (PGE) emissions from automobiles, equipped with catalytic converters, and how their concentrations have steadily increased over time. Potential human exposures and health impacts are also assessed. Recent work involved the collection and analysis of airborne fine and ultrafine particulate matter samples along a major highway in the Greater Toronto Area (GTA) together with Environment Canada and Ontario Ministry of the Environment. Future research will investigate the concentrations and bioavailability of these metals in other environmental media in the GTA such as street dust and soils.

Soils and their Carbon Sequestration Capacity: Does Mineralogy Matter? This research investigates the sorptive dynamics of soil clay minerals or phases with organic compounds. The goal is to help clarify the mechanisms of carbon stabilization in soils and their use as a potential sink in strategies to mitigate climate change. It also contributes to our knowledge of the extent to which mineralogy controls the bioavailability of potentially harmful organic contaminants. Current work examines clay mineral-organic carbon associations in Athabasca tar sands samples from the Cretaceous period.

Environment and Health of Vulnerable Populations. This investigates how certain populations may be differentially impacted by environmental hazards and the factors that contribute to vulnerability. Planned research will focus on the extent to which

pollutant exposure levels in urban areas are a function of place of residence and socioeconomic status.

Forthcoming and Recent Publications:
Zereini, F and CLS Wiseman. (editors). *Urban Airborne Particulate Matter: Origins, Chemistry, Fate and Health Impacts.* Springer Verlag, Berlin. (Forthcoming in 2010.)
Wiseman, CLS and F Zereini. 2009. Airborne particulate matter, platinum group elements and human health: a review of recent evidence. S*cience of the Total Environment* 407: 2493–2500.

Post-Doctoral Fellows

Ellie Farahani

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B.Sc. (Physics), Tehran Azad University; M.Sc. and Ph.D. (Atmospheric Physics), Toronto; M.B.A., Northwestern/York.
Post-Doctoral Fellow, Centre for Environment, 2009-10.

Research Interests: Stratospheric climate change, stratospheric chemical processes, environmental policy, energy management and conservation, sustainability planning, climate change mitigation and adaptation, community based research.

Research Project:
Energy Conservation and Demand Management (CDM): Integrating Design, Behaviour and Technology, SSHRC; with B. Savan, I. Stefanovic, G. Jamieson, D. Dolderman, and A. Smiley, U of T. ***(See page 4 for description.)*** I am responsible for the broad coordination of the project and work closely with four graduate students to conduct a two-stage research program. In the first stage, participants will collaborate on an interdisciplinary research synthesis to analyse existing CDM research, to develop new research questions, and to form new conceptual and methodological approaches that integrate the diverse perspectives used by social scientists and engineers. In the second stage, we will design two pilot projects, each addressing a different conservation problem and using U of T as a "living lab".

Tim Leduc

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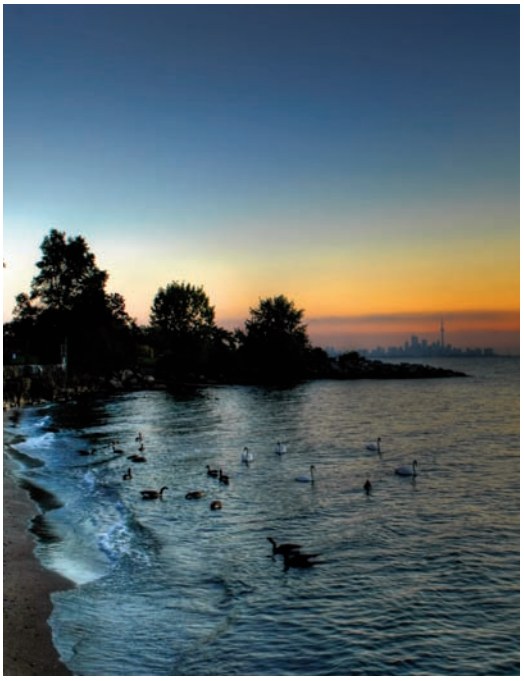
B.Sc. (Psychology), Trent; M.S.W. (Social Work), Toronto; M.E.S. and Ph.D. (Environmental Studies), York.
Post-Doctoral Fellow, Centre for Environment, 2009-11.
2009-10 CFE Instructor of ENV333H Ecological Worldviews.

Research Interests: Interdisciplinary and intercultural views on climate change; Inuit and indigenous knowledge; religion and environment; environmental education; conservation and resource management; interdisciplinarity in Canada's Environmental Studies programs.

Research Project:
From Sustainable Campuses to Sustainable Interdisciplinary Education in Canada's Universities, SSHRC. In my Post-Doctoral research, I am examining trends in Canada's academic approaches to interdisciplinary environmental research and pedagogy. I have surveyed 44 of Canada's interdisciplinary Environmental Studies programs and will submit an article for publication on the dominant trends to the scope and practice of interdisciplinarity this summer. I will then look more closely at the evolution and future vision of interdisciplinarity in four to five programs that reflect the diversity of approaches found in Canada. This research will include reviews of historic documents and interviews with a number of scholars and administrators from each program.



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