Centre for Environment
UNIVERSITY OF TORONTO

Annual Report 2010

2010 Annual Report Contents

Centre for Environment (CFE)

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Douglas Macdonald, Senior Lecturer, CFE
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Beth Savan, Senior Lecturer, CFE
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Brad Bass, Researcher, Environment Canada
Satyendar Bhavsar, Research Scientist, Ont. Min. of Environment
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Message from the Director

BY DONALD JACKSON,
Interim Director, Centre for Environment, 2010-2011.

I am pleased to be able to join the Centre for Environment and serve as the Interim Director. I begin by thanking **Professor Ingrid Stefanovic** for her leadership as Director during the last five years. During this time Ingrid successfully led the development of the Centre and its many accomplishments both inside and outside the University. The breadth of environmental interests and initiatives within and outside the University is considerable and Ingrid's dedication to connecting and integrating many of them into the Centre has been a remarkable accomplishment. She is to be congratulated on her success and we wish Ingrid the best on her well deserved year of leave.

We are fortunate in having our newest faculty member, **Professor Christian Abizaid**, join the Centre and the Department of Geography after completing his post-doctoral work *(please see page 35)*. I am pleased to be working with **Professor Tony Davis**, from Geography, who continues as our Undergraduate Coordinator and welcome **Professor Rick DiFrancesco**, also from Geography, as our Graduate Coordinator *(please see pages 12, 16 and 36)*. They, along with all our faculty, staff, and students provide the ideas, motivation and energy for a dynamic environment that will be all the more important under challenging economic times.

As with the transition in Directors, this is also a time of change in the University. The Faculty of Arts and Science underwent a Strategic Planning exercise during the past year that included multi-year planning proposed by the Centre. Based on the Committee's recommendations there are many potential changes within the Faculty and several of these may provide significant opportunities to the Centre and other academic units, in order to further strengthen our common research and teaching goals. As well, there is the potential to jointly develop new initiatives with the Faculty of Forestry that may allow both groups to better fulfill their goals within the University. We are presented with many interesting possibilities as we begin the new academic year. I look forward to working with faculty, staff and students from the Centre and other units, as well as all interested parties during the coming year to evaluate the possibilities and how to advance valuable initiatives.

Message from the Outgoing Director

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

Five years have passed since the inception of the Centre for Environment. For me personally, these have been the most rewarding years of my career for a number of reasons.

First, through a collective effort of so many friends and colleagues, we have helped to advance the environmental agenda of the University of Toronto and raised the profile around research and teaching in this area. We have made important institutional changes, from launching a first year course in environmental studies in a newly configured B.A. program to preparing a database and inventory of over 400 environmental researchers across all three campuses. Important institutional changes are reflected in so many more initiatives, some of which you will see described in this Annual Report.

But also over the years, I have had the very special privilege of working with the most wonderful people. I have come to see that those who engage in interdisciplinary work seem to recognize instinctively that they can learn from others. That recognition makes for a community of respectful listeners and natural collaborators. That characteristic extends to our students as well, who are so fully committed to improving the state of our planet and doing so with enthusiasm as well as humility.

It has been a special honour for me to participate in the work of the Centre for Environment but now the time has come to pass the baton on to others. I am delighted to welcome **Professor Don Jackson** who will serve as Director. Don's research addresses the composition of ecological communities, particularly in aquatic settings. I wish him well and know that he will enjoy his time here.

As I leave the Centre, there are far too many people to thank. From members of the Steering Committee to our professional development Advisory Committee, to members of the Dean's and Provost's offices, to colleagues and students— I am truly grateful for their support. Particularly though, I thank faculty and staff of the Centre for Environment for their friendship and teamwork. They are a unique, irreplaceable group of people. I will miss working with them, even as I remember them – and my time at the Centre for Environment – with the greatest fondness.

New & Continuing Research Projects

Includes new projects on PFCs, climate governance, and transportation policy

BY SATYENDRA BHAVSAR, ELLIE FARAHANI AND DOUGLAS MACDONALD

The Centre for Environment (CFE) is pleased to announce three new research projects which stared in 2010. The following includes descriptions of these as well as the Centre's continuing projects. These projects complement a vital, well-funded stable of research initiatives underway at the Centre. For other research conducted by faculty members at the Centre, please see pages 35-41.

NEW IN 2010:

Governance Innovation and the Transition to a Low-Carbon Economy

Dr. Douglas Macdonald (Senior Lecturer, CFE; ***see page 38***) received two years of funding in 2010 from Carbon Management Canada for a project to study innovation in governance practices to address climate change and accelerate the transition towards a low carbon Canada. It will be done jointly with **Professors James Meadowcroft** and **Glen Toner** (School of Policy Studies, Carleton University). The research led by Dr. Macdonald will focus on distributional implications of climate-change policy and takes two basic approaches to explore institutional reforms that could strengthen climate governance in Canada.

First, the project will address the particular issue of distributional conflicts potentially associated with climate-change policies, such as inequitable effects imposed upon the poor by a carbon tax. The focus will be on regional/intergovernmental, industrial, and social dimensions of climate-related political conflict in Canada. The analysis will be supplemented by historical case studies of political conflict associated with other major policy initiatives in Canada and a secondary literature review of experiences managing low carbon transition conflicts outside Canada.

Second, the project will examine the systems for climate governance established by six jurisdictions with particularly active climate policy (UK, Netherlands, Germany, Denmark, Sweden and the EU) in order to understand how they operate as a whole and to identify specific institutional innovations that hold wider promise.

Policy Instrument Choices Influencing Sustainable Transportation in Toronto

Dr. Macdonald also received one year of funding (2010-11) as part of a SSHRC funded project led by **Professor Jean Mercier** with co-investigator **Professor Mario Carrier** (Université Laval) to look at factors influencing urban transportation policy. At U of T, Dr. Macdonald with work with **Amir Ganjavie** (Ph.D. candidate, Geography and CFE) and **Scott Sams** (Ph.D. candidate, Political Science) to examine policy instrument decisions made by the City of Toronto and the Governments of Ontario and Canada which have been intended to shift transportation toward sustainability.

Initial transportation policy instruments to be examined include construction and maintenance of infrastructure, land-use planning, government spending, taxation, public transit funding, other instruments influencing urban design and land use, public education and marketing, and parking policies. The purpose is to identify the most important policy instrument decisions which explain, along with other factors, the current transportation mix and to then gain understanding of how and why those decisions were made.

For more information on the above two projects, please contact Doug Macdonald at douglas.macdonald@utoronto.ca.

S. Bhavsar

CFE Adjunct Professor Dr. Satyendra Bhavsar and staff from the Ontario Ministry of the Environment collect fish samples in order to assess their content of perfluorinated compounds.

Study of Human Exposures to PFCs in Ontario Fish Caught Near Industrial Sources

Professor Miriam Diamond (Department of Geography) has recently received funding from Public Works and Government Services Canada for a one-year project (2010-11) to study human exposure to perfluorinated compounds in Ontario fish caught near industrial sources and the effects of skin removal and cooking on exposure. Perfluorinated compounds (PFCs) are a family of fluorine-containing chemicals with unique properties to make materials stain and stick resistant. They have been used in a wide array of consumer products as grease and water repellants (including Teflon and Scotchgard products) and are incredibly resistant to breakdown. Studies have shown that Canadians are exposed to PFCs which accumulate in the body. One of the major routes of exposure is via contaminated food, such as fish, but the relative importance of domestically-caught fish is not known.

Dr. Diamond and co-investigators **Dr. Satyendra Bhavsar** (Research Scientist, Ontario Ministry of Environment; and Adjunct Professor, CFE), **Professor Scott Mabury** (Dept. of Chemistry) and **Professor Eric Reiner** (Senior Research Scientist, Ontario Ministry of Environment; and Adjunct Professor, Chemistry) will estimate dietary exposures to PFCs for consumers of Ontario sport fish. Fish will be sampled near major industrial facilities, a former PFC spill site, and major sewage treatment plants, and then analyzed for a number of PFCs. The effects of preparation, such as cooking and skin removal, on PFC concentrations in the fish will also be studied.

For more information, please contact Miriam Diamond at miriam.diamond@utoronto.ca or Satyendra Bhavsar at s.bhavsar@utoronto.ca.

CONTINUING PROJECTS:

Assessment of Metal Dynamics and Ecotoxicity in Ross Lake, Manitoba

Professor Miriam Diamond received funding in 2009 from the Hudson Bay Mining and Smelting Co. Ltd. for a three-year project assessing metal dynamics and ecotoxicity in Ross Lake, Manitoba. Unlike organic chemicals, metals exist as various geochemical forms or chemical species that experience differential mobility. Metal speciation and concentration in an aquatic system and impacts on biota are controlled by site-specific chemical properties (e.g., pH, dissolved oxygen) and fate/transport parameters (e.g., water inflow rate, sediment resuspension).

To assess metal dynamics and impacts on biota in Ross Lake under various metal discharge scenarios, from which the critical load can be estimated, Professor Diamond and co-investigators **Dr. Satyendra Bhavsar** and **Nilima Gandhi** (Ph.D. candidate, Chemical Engineering and CFE) propose to develop a coupled metal fate/transport, speciation, and toxicity model (termed as TRANSPEC-Tox) for surface aquatic systems. The model will use a multi-species fugacity/aquivalence concept for the fate calculations, incorporate the effects of chemistry parameters on metal partitioning/distribution and speciation, and assess toxicity to aquatic receptors (e.g., fish).

The model structure will be adapted to consider zinc and copper in Ross Lake, assess metal dynamics for various discharge scenarios (e.g., from the Flin Flon mining site), as well as estimate critical discharge levels. To calculate the critical loads, the model will be used in "reverse" mode to calculate the total metal concentrations in the inflow that is expected to be below a decided toxicity threshold. ***For more information, please contact Miriam Diamond at miriam.diamond@utoronto.ca or Satyendra Bhavsar at s.bhavsar@utoronto.ca.***

Allocating Canadian GHG Emission Reductions Amongst Sources and Provinces

Dr. Douglas Macdonald received three years of funding from SSHRC in 2009 for a project studying the allocation of Canadian greenhouse gas emission reductions amongst sources and provinces, learning from the European Union (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 federal and provincial levels. In particular, it examines the failure of these bodies to reach an agreement as to how the cost of policy implemention will be borne by the two levels of government.

Using the successful implementation of climate change policy in the EU and Germany as a model, 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 will then be discussed in three academic seminars and presented in a final report with recommendations to federal and provincial governments.

In the project's first year, a comprehensive review was done of secondary literature related to social co-ordination, the role of institutions and Canadian intergovernmental relations, German federalism, and EU environmental policy making. Interviews were conducted with government officials in four Canadian provinces, Germany and the EU. Two papers were also generated for conferences at Carleton University and at Concordia University.

The Oil and Gas Industry and Canada's Climate Change Policy

Dr. Macdonald also received a two-year SSHRC research grant in 2009 to examine the oil and gas industry and the Government of Canada's climate change policy. 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 oil and gas 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 academic discussion about the influence of business on climate change policy.

In the project's first year, CFE undergraduate student **Gurushabd Khalsa** conducted research on relevant primary documents and news media articles. A conference paper by Dr. Macdonald, titled "Factors influencing the ability of the oil and gas industry to influence Government of Canada climate change policy", was delivered at the annual meeting of the Canadian Environmental Studies Association, Concordia University, Montreal, June 1, 2010. ***For more information on the above two projects, please contact Doug Macdonald at douglas.macdonald@utoronto.ca.***

Integrating Design, Behaviour & Technology in the Study of Energy Conservation

This 2009-10 SSHRC CEI-funded project on energy conservation and demand management employs four graduate students to conduct research on "the human element" in technological feedback design, to promote resource conservation. It is led by **Dr. Beth Savan** (CFE Senior Lecturer, ***see page 39)***, **Professor Ingrid Stefanovic** (former CFE Director, ***see page 40***), and **Professor Greg Jamieson** (Dept. of Mechanical and Industrial Engineering, MIE), and coordinated by **Dr. Ellie Farahani** (CFE Post-Doctoral Fellow, ***see page 41***).

M.A.Sc. students **Adam Smith** and **Kevin Trinh** (both at MIE) and Ph.D. students **Angela Loder** (Geography and CFE) and **Luke Gelinas** (Philosophy) are exploring new strategies to encourage behavioural change when it comes to conserving energy. The intent is to frame feedback to align with conservation attitudes using temporal construal theory (TCT). Studies in the field of energy consumption feedback generally encourage personal benefits – mainly in terms of dollars saved. Due to criticisms of this method, this project integrates energy consumption feedback data with community-based social marketing strategies (CBSM) as well as visual references to deeply- held environmental values.

In the summer of 2010, a two-part pilot study was done on U of T's St. George campus, recruiting students living in residences to evaluate an innovative TCT-based feedback design relating to energy use and then to engage in conversations about nature imagery. The final stage of the project will attempt to more fully combine engineering, social science and humanities approaches by linking nature imagery with CBSM, applying ethical guidelines and testing the degree to which these aspects can be integrated comprehensively in technological feedback design to influence conservation behaviour, particularly of students living in residences. Presentations were made at two conferences, the Centre's Research Day ***(see page 4)***, and will be made at two more venues in 2010-11. ***For more information, contact Beth Savan at b.savan@utoronto.ca or Ellie Farahani at ellie.farahani@utoronto.ca.***

Research Day

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

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The following research presentations were made at the Centre for Environment's (CFE) Research Day, held on Earth Day, April 22, 2010. The annual event showcases research done by some of the Centre's faculty and students. Condensed abstracts are included below.

ELIZABETH EDWARDS, Professor, Dept. of Chemical Eng. and Applied Chemistry; Full member, CFE graduate faculty. ***New Frontiers in Bioremediation Groundwater.*** Groundwater contamination from chlorinated solvents is a serious threat to global health and prosperity. Even small spills render groundwater unsuitable for use, and cleanup is typically a costly and long-term undertaking. A group of subsurface micro-organisms, called Dehalococcoides, has been discovered that can dechlorinate the dry-cleaning solvent tetrachloroethene and the industrial solvent trichloroethene to the benign product ethene. Remarkably, these organisms obtain energy for growth from dechlorination. Several successful demonstrations of bio-augmentation, where an aquifer is inoculated with culture, have lead to the development of a commercial market for such dechlorinating cultures.

ELLIE FARAHANI, CFE Post-Doctoral Fellow (see page 41). ***The Study of Energy Conservation: Integrating Engineering and the Social Sciences.*** This CFE research project explores new strategies to encourage behavior change when it comes to conserving energy and combines engineering, social science and humanities approaches. ***(Please see page 3 for a description of this project.)***

ALICIA HARVEY, **MIKE LAWLER**, **DANIEL McCAFFREY**, and **DEBRA WEINRYB,** Hons B.A. students. ***Promoting Environmental Stewardship Among Private Landowners: Success Stories from Local Conservation Authorities.*** This was a presentation by some of the senior undergraduate students enrolled in this year's ENV 421H Environmental Research course. They discussed their study of various incentive mechanisms used by Southern Ontario Conservation Authorities as a part of their respective Environmental Stewardship programs. ***(Please see page 6 for an article on this research.)***

Justin Kim

Tajinger Singh, Ph.D. candidate in Forestry and Environment, presents his doctoral research on the volatility of world carbon markets.

TYLER HUNT, M.A. alumnus (June 2010), Dept. of Geography and Centre for Environment. ***Big Wind in Small Town Ontario: Residents' Opinions and Perceptions of the Wolfe Island Wind Farm, Frontenac County.*** Wind energy is promoted by the Ontario government to reduce greenhouse gas emissions and diversify electricity systems, but has encountered mixed local reactions and social resistance. This research focuses on residents of Wolfe Island, Ontario, and their perceptions of a local wind energy development. Through semi-structured interviews, it provides a case study of the complexities of residents' opinions. Findings indicate that values of trust and transparency in local decision-making, and community-based environmental and social considerations, are critical attributes in solidifying individuals' perspectives of wind energy.

CHRIS KENNEDY, Associate Professor, Dept. of Civil Engineering; Full member, CFE graduate faculty. ***Greenhouse Gas Emissions from Global Cities.*** This research questions how and why greenhouse gas (GHG) emissions differ between ten global cities (Bangkok, Barcelona, Cape Town, Denver, Geneva, London, Los Angeles, New York, Prague, and Toronto). This study shows how a balance of geophysical factors and technical factors determine the GHGs attributable to cities. Within the overall trends, however, there are differences between cities with more or less public transit; while personal income also impacts heating and industrial fuel use. By including upstream emissions from fuels, GHG emissions attributable to cities exceed those from direct end use by up to 25%.

STEPHEN SCHARPER, Associate Professor, Dept of Anthropology, U of T Mississauga and CFE (see page 39). ***From Community to Communion: The Natural City in Biotic and Cosmological Perspective.*** Implications of Leopold's "land ethic" were discussed as well as Thomas Berry's idea of a universal "communion of subjects" for the notion of ecological integrity within an urban context. As the ecological consequences of sprawling and increasingly poverty-stricken urban spaces are addressed with more frequency in literature on sustainable cities, a significant ethical transformation concerning human relationships with the natural world is emerging. The natural city concept holds the potential of bringing together pragmatic, ontological, and cosmological issues in cogent ways.

TAJINDER SINGH, Ph.D. candidate, Faculty of Forestry and Centre for Environment. ***Forecasting Volatility of World Carbon Markets.*** Volatility of carbon markets plays a big role in investment decision-making of carbon portfolios. Little work has been done on modeling and forecasting carbon market price volatility from an econometric or risk management angle. This research evaluates the performance of various econometric models for predicting price volatility of carbon in different markets. Simple models were tested for the compliance markets of EU and the voluntary market of Chicago. The results show that different carbon markets have different volatility patterns and hence separate econometric models are required for forecasting volatility for each of these markets.

SMITH SUNDAR, Ph.D. candidate, Faculty of Forestry and Centre for Environment. ***The Use of Cellulose Fiber in Bio-based Composite Manufacturing: Improving Orientation and Dispersion for Value Addition.*** Cellulose is a plentiful, natural, biodegradable and renewable raw material that has been in demand in the automotive industry and in the manufacturing of semi-structural furniture. The mechanical properties of cellulose-based composites are governed by factors such as fiber length and dispersion of fiber in the polymer matrix, as well as orientation of fiber in the matrix. This research combines the concepts of hydroxyl group (OH-) modification of cellulose using a ferromagnetic entity to achieve optimal orientation and dispersion of cellulose fibers in the polymer matrix, by subjecting the modified cellulose to an electro-magnetic field.

Adaptation & Impacts Research Section

Partnership with Environment Canada researchers at the University of Toronto

Part of the Science and Technology Branch of Environment Canada, the Adaptation and Impacts Research Section's (AIRS) 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 AIRS has a co-operative research relationship with the Centre for Environment and the Department of Physical and Environmental Sciences at University of Toronto Scarborough.

AIRS' collaborative research at the Centre for Environment focuses on simulating adaptation and developing educational curriculum with the Complexity and Organized Behaviour Within Environmental Bounds (COBWEB), urban heat island visualization, infrastructure technologies such as green roofs and breathing walls and sectoral adaptation studies on energy at the community scale. The Ontario node of the Canadian Climate Change Scenarios Network is also housed at AIRS. 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.

At U of T Scarborough, research is conducted at the Climate Lab in the Dept. of Physical and Environmental Sciences. Focus is on regional climate reports (Greater Toronto, Niagara), 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) and sectoral climate change impact and adaptation studies (energy, tourism, protected areas, engineering).

Both locations engage graduate and undergraduate students in ongoing research and educational initiatives. High school students are also able to participate in the research at the Centre for Environment through the Faculty of Arts & Science's Mentorship Program.

AIRS 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 inventions are in industrial sectors required to adapt to climate change.

Organizational Structure and Adaptation: explores the links between organization structure, size and the capacity to adapt to change.

Climate Change Visualization: uses meteorological simulation, observation, animation and geomatics databases to develop innovative views of the urban heat island.

ADAM FENECH

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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 and 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, 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

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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 in the Greater Toronto Area (GTA): this report presents the analyses of climate data in the GTA and focuses on changes in mean climate and extremes. It is forthcoming late 2010.

Climate Change and the Canadian Energy Sector: this book is co-authored by **Brad Bass** and **Heather Auld** of AIRS is forthcoming late 2009 (Springer New York). It discusses the vulnerability and adaptation of the Canadian energy sector to future climate change.

Special Report on Renewable Energy of the Intergovernmental Panel on Climate Change (IPCC): This report is forthcoming late 2010 and will provide substantial information and broad 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 provide opportunities to study stewardship & to travel to South America

BY ANTHONY DAVIS, KAREN ING AND SHASHI KANT

Justin Kim

Tony Davis

LEFT: Senior undergraduate students, at the Centre's Research Day, after their presentation on the findings of this year's ENV421 course projects focusing on environmental stewardship; from left to right Alicia Harvey, Mike Lawler, Debra Weinryb and Daniel McCaffrey.
RIGHT: Students at 4500 m on the banks of Chimborazo, Ecuador's highest peak and one of the beautiful areas visited as part of the ENV395 field course to the Andes, Western Amazonia and the Galapagos.

Promoting Environmental Stewardship Among Private Landowners: Case Studies from Local Conservation Authorities

ENV 421H Environmental Research course

*2009-10 Instructors: **Karen Ing**, Senior Lecturer, Centre for Environment (see page 36); **Shashi Kant**, Professor, Faculty of Forestry (see page 41).*

Ecosystem services – such as biodiversity, watershed services, and wildlife habitat – play a critical role in all dimensions of human well-being, but economic and population growth have contributed to a sharp decline in most of these services. These are generally public goods, and therefore pose the additional challenge of public good provisions, especially when provided by private landowners. Conservation Authorities (CAs) in Ontario have developed many Environmental Stewardship programs to provide incentives to landowners to continue and enhance the provision of these services.

In 2009-10, these incentive mechanisms were the focus of students' research projects in the Centre's ENV 421H research course. Students conducted eight case studies of various incentive mechanisms used by CAs in Southern Ontario (Credit Valley, Grand River, Hamilton and Halton, Huron County-Maitland Valley & Ausable Bayfield, Niagara Peninsula, Rideau Valley, Toronto Region, and Upper Thames) as a part of their stewardship programs.

Although findings varied, common challenges identified included lack of marketing, limited finances, complexity of administrative processes, difficulty in integrating various stakeholders, and lack of capacity to incorporate desired level of participation. Despite these challenges, there was a positive sense of the capacity and ability of CAs to promote stewardship because of their positive community recognition, the high demand for programs, a demonstration of an effective use of limited resources, and a high degree of trust developed with the landowners.

For more information, please contact: Karen Ing, karen.ing@utoronto.ca or Shashi Kant, shashi.kant@utoronto.ca.

Ecology and Conservation in the Andes, Western Amazonia and the Galápagos

ENV 395Y Special Topics Field Course

*Summer 2010 Instructor: **Anthony Davis**, Prof. Emeritus, Geography and CFE Undergraduate Coordinator (see pages 12 and 36).*

This was the fifth trip to Ecuador for this course, the smallest but probably the most physically and biologically diverse of the Andean countries. Sponsored by the Woodsworth Summer Abroad Program, the 2010 summer course had 19 students and focussed on three very different environments: the High Andes; the tropical rainforest of Oriente, Ecuador's eastern province; and the Galápagos.

In the Andes, students studied the paramo (alpine tundra), the desert-like Arenal Grande, and a forest fragment up to nearly 5000m on the southern flanks of Chimborazo, Ecuador's highest peak at 6310m. Inevitably there was some nausea and headache, but nothing serious. At their base at Achik Nan, a locally run ecotourist lodge, students mixed with locals and saw how tough life was on the physical and economic margins.

A week in the Amazon Basin allowed students an intimate look at a still largely pristine tropical rainforest in a biodiversity hotspot. It was unusually cool and dry this year, but that didn't seem to impact the wildlife. It's well worth the flight, two long boat rides and the bus trip that it takes to get there.

In the Galápagos, time was split between the Galápagos Academic Institute for Arts and Science on San Cristobal and a five day excursion to other islands. The latter included Isabela, the largest and still volcanically active island; Santa Cruz, the home of the Charles Darwin Foundation; and small but spectacular Bartolome. As well as the iconic endemics (giant tortoises, Darwin's finches, marine iguanas, Galápagos penguins, etc.), we saw the deleterious effects of introduced species, and increasing tourism. Las Islas Encantadas may not be enchanted much longer.

For more information: Tony Davis, davis@geog.utoronto.ca.

Graduate Research: Collaborative Programs

Environmental Studies Graduate Program

2009-10 Alumni

The following alumni convocated in 2009-10 from the Centre for Environment's collaborative graduate program in Environmental Studies (CFE ES). Condensed abstracts of research papers or theses are included below. Please see pages 16-17 for program info.

RACHEL ALEXANDER, M.A., June 2010, OISE/UT (Adult Education, Community Development and Counselling Psychology)/CFE ES; supervisor: Jennifer Sumner, AECDCP. ***Connecting with the Global Garment Industry: Can Ethical Consumption Promote Sustainability?*** In the globalized garment industry (GGI), Canadian consumers are disconnected from their clothing's production and disposal processes which involve complex networks that exploit both people and the environment. This thesis reviews how the GGI has developed elaborate processes to create public portrayals whose dominant messages promote consumption. This study uses methods based on institutional ethnography to explore the challenges faced by consumers trying to engage in ethical consumption.

CRAIG BUTT, Ph.D., June 2010, Chemistry/CFE ES; supervisors: Scott Mabury and Derek Muir, Chemistry. ***Understanding Sources of Perfluorinated Acids to Biological Systems.*** This thesis investigates the fate of perfluorinated alkyl compounds (PFCs) in biological systems. Wildlife is known to be ubiquitously contaminated with two classes of PFCs: perfluoroalkyl carboxylates (PFCAs) and sulfonates (PFSAs). However, there is uncertainty in how wildlife is accumulating them, particularly in remote areas. The potential for fluorotelomer acrylate monomers (FTAcs) to act as precursors to PFCAs through atmospheric oxidation was investigated. Temporal and spatial trends of PFCs in arctic ringed seals and seabirds were also examined. The bio-accumulation and biotransformation of 8:2 FTAc and the metabolic pathway of 8:2 fluorotelomer alcohol were also studied in rainbow trout.

RACHELLE CAMPIGOTTO, M.Ed., June 2010, OISE/UT (Sociology and Equity Studies)/CFE ES; supervisor: Margrit Eichler, SESE. ***Farmers' Markets and their Practices Concerning Income, Privilege and Race: A Case Study of Wychwood Artscape Barns in Toronto.*** Because farmers' markets provide high quality and local produce, they are often considered an environmentally sustainable food practice. US studies have scrutinized them as exclusionary white spaces that are not equitably accessible. A case study was conducted at the Wychwood Artscape Barns, located in an economically and culturally diverse Toronto neighbourhood. Demographics surveys of patrons were compared with existing demographic data and interviews of patrons were conducted. Results were consistent with US studies – most Wychwood Farmers' Market patrons were white, university-educated, with high incomes.

ERIC COURCHESNE, M.A., November 2009, Political Science/CFE ES; supervisor: Michael Stein, Political Science. ***Global Trends: System Analysis, Human Networks and Energy Innovations in the 21st Century.*** This paper begins with a discussion of causality, paradigms, perception and systems: biological-ecological to human-social, and the complex web of "causal interconnection" of all things. This is followed by a brief overview of the future as scientists see it: business as usual models and a cautious-realist view of the potential systemic effects of the introduction of carbon into earth systems at current and projected levels. Systems approaches to "carbon resolutions" are discussed, as well as Renewable Energy (RE) and related approaches.

CAROLINE AMY CROSS, M.Ed., March 2010, OISE/UT UT (Adult Education, Community Development and Counselling Psychology)/CFE ES; supervisor: J. Gary Knowles, AECDCP. ***The Birth of a Co-op.*** This paper reflects on the conception, birth and growth of Natural Beauty Co-op and its Summer Workshop Series, at which the author had an internship placement. This paper explores which key factors restored and inspired workshop participants' environmental awareness and activism. The author also shares how her experience may have inspired Natural Beauty Coop to work towards becoming a strong leader in the fields of art, environmental education, awareness and activism in the community.

SARAH DA SILVA, M.A., November 2009, Geography/CFE ES; supervisor: Danny Harvey, Geography. ***Beyond Indicators and Reporting: Needs, Limitations and Applicability of Environmental Indicators and State of the Environment Reporting.*** This research examines the perceptions and use of environmental indicators and state of the environment reports (SOER) by local government and Conservation Authority decision makers and practitioners in the Ontario portion of the Great Lakes and St. Lawrence basin. Information exchange amongst different levels of governance is also explored. To review the dissemination of indicator and SOER information from a higher scale down to the local level, the State of the Great Lakes environmental indicators and SOER developed by Canada and US governments served as a case study.

JESSICA D'EON, Ph.D., June 2010, Chemistry/CFE ES; supervisor: Scott Mabury, Chemistry. ***Exploring Sources of Human and Environmental Fluorochemical Contamination.*** Perfluorinated carboxylates (PFCAs) and perfluorinated sulfonates (PFSAs) are found almost ubiquitously in the environment, however their direct production and use are limited. This thesis explores the connections between observed contamination with the manufacture and/or use of commercial fluorochemical products. It was found that atmospheric oxidation of perfluorinated sulfonamides (PFSAms) contributes to PFCA and PFSA contamination. Perfluorinated phosphonates (PFPAs), defoaming additives in pesticides, were detected in surface waters and wastewater treatment plant effluent. Lastly, the biotransformation of polyfluoroalkyl phosphates (PAPs), used in food packaging, suggest a source of PFCA contamination.

ANGELA DOKU, M.A., November 2009, Economics/CFE ES; supervisor: Don Dewees, Economics. ***Pollution and Development in Ghana: Trade, Aid, and Environmental Pollution.*** Analyses were conducted to examine the relationship between economic growth, aid, and increased trade, and environmental pollution in Ghana. Although the formal analysis had autocorrelation and multicollinearity problems, the informal analysis showed that increased openness has led to increased levels of CO_2, PM_{10}, combustible renewables and waste. Clean energy production was found to have a negative relationship with openness, which may indicate that "unclean" methods of production were adopted with more trade.

NATALYA GOMEZ, M.Sc., November 2009, Physics/CFE ES; supervisor: Jerry Mitrovica, Physics. ***Sea-Level Changes Following Variations in Mass of the Polar Ice Sheets.*** This research presents predictions of sea-level change following rapid variations in the mass balance of the polar ice sheets. Results incorporate deformational, gravitational and rotational effects on sea level, and migration of shorelines due to both local sea-level variations and changes in marine-based ice cover. These properties are essential to accurately project sea-level trends due to any potential climate change scenario. Several ice-melting scenarios are considered, including the West Antarctic, East Antarctic, and Greenland Ice Sheets.

EMMA HEMMINGSEN, M.A., November 2009, Geography/CFE ES; supervisor: Scott Prudham, Geography/CFE. ***Producing Barrels from Bitumen: A Political Ecology of Price in Explaining the Classification of the Alberta Oil Sands as a Proven Oil Reserve.*** In 2002, the oil sands of Alberta were for the first time included in the *Oil & Gas Journal*'s review of worldwide oil reserves, citing a neoclassical economic theory of price-driven resource substitution. This thesis contends that this

Continued on page 8...

Continued from page 7.

theory doesn't explain how it became possible to profitably extract petroleum from the sands. It argues that market prices and supply costs are not independent, but are underpinned by a malleable, contingent, and political process.

TYLER HUNT, M.A., June 2010, Geography/CFE ES; supervisor: Virginia Maclaren, Geography. ***Big Wind in Small Town Ontario: Residents' Opinions and Perceptions of the Wolfe Island Wind Farm, Frontenac County.*** Wind energy is increasingly promoted by the Ontario government but has encountered mixed local reactions and social resistance. This research focuses on residents of Wolfe Island, Ontario, and their perceptions of a local wind energy development. Findings indicate that values of trust and transparency in local decision-making and community-based environmental and social considerations are critical attributes in solidifying individuals' perspectives.

ANTHONY KIMARO, Ph.D., November 2009, Forestry/CFE ES; supervisor: Vic Timmer, Forestry. ***Sequential Agroforestry Systems for Improving Fuelwood Supply and Crop Yield in Semi-arid Tanzania.*** Integrating trees and crops on farmlands may help replenish soil fertility and improve crop yield. Using rotational woodlot and pigeonpea inter-cropping systems in Tanzania, this research examined suitable tree species to increase fuelwood supply and mechanisms for reducing tree-crop competition. Tree species of low wood nutrient concentrations were found to reduce soil nutrient depletion. Intercropping pigeonpea with maize may also replenish soil fertility as well as enhance maize yield.

CAROL LUE, M.Sc.Pl., June 2010, Geography Program in Planning/CFE ES; supervisor: Michael Bunce, Social Sciences, U of T Scarborough. ***The Role of Ecosystem Services Markets in Caribbean Tourism Planning: An Assessment based on the Global Carbon Market and Jamaica.*** This paper argues that the Caribbean tourism sector should align its sustainability goals with investment and business interests by integrating ecosystem service markets into its corporate social responsibility programs and product offerings. The feasibility of a carbon forestry project for Jamaica is discussed, as well as the development of a regional carbon market to leverage natural resources of larger countries to benefit smaller islands.

KATHARINE MYRANS, M.Sc., November 2009, Geography/CFE ES; supervisors: Danny Harvey, Geography and Brad Bass, CFE. ***Comparative Energy and Carbon Assessment of Three Green Technologies for a Toronto Roof.*** Three different green technologies are compared in terms of net energy and carbon savings for a theoretical Toronto rooftop. Energy values are compared to the estimated energies produced and/or saved. Results show that solar photovoltaics displace the most carbon per m^2 and solar thermal displaces the most energy. An analysis of a green roof for growing food reveals that although the high energy of the materials is not quickly repaid by energy savings, the benefits are not insignificant.

Tony Chen

Recent Ph.D. alumna Catherine Robin (Physics, Geology and Environment) gives a seminar on her research on disposal of nuclear wasten in the Centre's Environment Seminar Series (see page 31).

MARK POOS, Ph.D., June 2010, Ecology and Evolutionary Biology (EEB)/CFE ES; supervisor: Donald Jackson, EEB. ***Conservation by Consensus: Reducing Uncertainty from Methodological Choices in Conservation-Based Models.*** Modeling species of conservation concern, such as those that are rare, declining, or have a conservation designation remains an activity filled with uncertainty. In this thesis, the impacts of methodological choices on conservation-based models are examined across a broad selection of available approaches. The use of consensus methods is also developed as a potential tool for reducing uncertainty with methodological choices in conservation-based models.

CATHERINE ROBIN, Ph.D., June 2010, Physics/Geology/CFE ES; supervisor: Robert Bailey, Physics. ***Diapirism on Venus and the Early Earth and the Thermal Effect of Fluid Flows in AECL's Tunnel Sealing Experiment.*** In the environmental component of this thesis, the thermal effect of fluid flow was analyzed by testing two tunnel seals in a Deep Geological Repository (DGR) at AECL's (Atomic Energy of Canada Limited) Tunnel Sealing Experiment in Manitoba. DGR is a favoured permanent disposal option for nuclear waste, with an ability to effectively seal off the disposal area in the event of a failure in the waste containers. The thesis also examines two other flow instabilities in planetary systems.

KATHLEEN ROMATOWSKI, M.A., June 2010, Geography/CFE ES; supervisor: Scott Prudham, Geography/CFE. ***Niagara's Local Food Action Plan: New Responses to Old Problems – Forging a Path to Food System Sustainability***. In 2008, the Niagara Region developed a Local Food Action Plan (LFAP) which aims to strengthen support for agriculture by proposing actions to promote and enhance the sector. This paper argues that instead of enhancing agricultural sustainability, LFAP is an economic plan employing the terminology of a local food movement to create a competitive advantage for Niagara's agricultural industry, capitalizing on the reputation and identity of the region.

ANDREA SABELLI, M.A., November 2009, Geography/CFE ES; supervisor: Thembela Kepe, Geography. ***Carbon Opportunities and Carbon Losses in the Peruvian Amazon: Farmers' Interests in the Offset Business.*** Carbon-based forestry (CBF) projects for the carbon market have been proposed with the aim of mitigating climate change, enhancing forest cover and improving livelihoods in developing countries. This study explores stakeholders' involvement in the development of CBF projects in the Peruvian Amazon. It was found that the potential of earning a carbon credit can influence farmers' current land management practices in favor for implementing reforestation or agroforestry systems.

LAINA SMITH, M.A., November 2009, Geography/CFE ES; supervisor: Virginia Maclaren, Geography. ***Green Bin Participation: A Case Study of Multi-Residential Buildings in Toronto.*** This paper investigates organics diversion behaviour in seven multi-unit residential buildings in Toronto. Results indicate that respondents who recycled also participated in the green bin program. Social influences may cause residents to feel they should participate but they may not directly affect behaviour. Recommendations are made for the future implementation and maintenance of existing green bin programs.

ELIANA TRINAISTIC, M.I.St., June 2010, Information/CFE ES; supervisor: Matt Ratto, Information. ***A Library Sustainability Paradigm: An Alternative.*** Opportunities for libraries to engage with sustainability related literacy and education have yet to be adequately explored in literature. This paper reviews definitions of sustainability and argues for implementation of Sumner's three-dimensional paradigm. Next, library sustainability is examined through socio-political literacy, sustainable education and oral transfer of knowledge. Several case studies utilizing these concepts are described.

ANNE MARIE WETTER, M.Ed., June 2010, OISE/UT (Adult Education, Community Development & Counselling Psychology)/CFE ES; supervisor: Jennifer Sumner, AECDCP. ***Report Providing Recommendations for REEP Energy Saving Renovation Workshop.*** This paper provides the Residential Energy Efficiency Project (REEP) with recommendations to improve their Energy Saving Renovation Workshop series offered to residents of the Region of Waterloo. Specific and general recommendations are provided including building environmental literacy into the series, considering participants' learning styles, and defining learning objectives.

Environmental Studies Graduate Program

New & Continuing

The following students were enrolled in the Centre's collaborative graduate program in Environmental Studies (CFE ES) in 2009-10 and may continue or convocate in 2010-11. Research topics are included.

Matthew Aiken, M.B.A., Management/CFE ES; supervisor: Ignatius Horstmann, Management. *Carbon taxation and carbon credit trading systems and their impacts on competitiveness.*

Claudia Alzate, M.F.C., Forestry/CFE ES; supervisor: Andy Kenney, Forestry. *Comparison of urban forestry programs in U.S. and Canada.*

Simon Appolloni, Ph.D., Religion/CFE ES; supervisor: Stephen Scharper, Anthropology UTM/CFE. *Intersection of religion & the environmental crisis.*

Dominique Barrett, M.F.C., Forestry/CFE ES; supervisor: Andy Kenney, Forestry. *Potential of urban natural tree regeneration in the Toronto District School Board*.

Julia Barnes, M.A., Geography/CFE ES; supervisor: Ken MacDonald, Social Sciences, U of T Scarborough. *Managerial mechanisms of the Global Environment Facility and the implications for a politics of scale.*

Cindy Bongard, Ph.D., Ecology and Evolutionary Biology/CFE ES; supervisor: Robert Fulthorpe, Physical and Environmental Sciences, U of T Scarborough. *Molecular characterization of mycorrhizal fungal colonizers of plant roots: a comparison between the invasive Vincetoxicum rossicum and native species.*

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

Aurel Cristian Ches, Ph.D., Geography/CFE ES; supervisor: William Gough, Physical and Environmental Sciences, U of T Scarborough. *Top-down and bottom-up approaches in Canadian climate change policy.*

Nyssa Clubine, M.Sc., Geography/CFE ES; supervisor: Joe Desloges, Geography. *A quarter century of seasonal and annual sediment yield variations into Lake Huron from Ausable River, Ontario.*

Nicole Desaulnier, M.I.St., Information/CFE ES; supervisor: Matt Ratto, Information. *Environmental assessment alternatives.*

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

Raluca Ellis, 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, U of T Scarborough. *Molecular ecology of hyporheic zones in stream ecosystems.*

Maryn Forde, M.A., Geography/CFE ES; supervisor: Danny Harvey, Geography. *Renewable energy for the tourism sector of small island developing states.*

Charlotte Friel, M.Sc., Geography/CFE ES; supervisor: Sarah Finkelstein, Geography. *Exploration of previous climate change episodes and their possible causes by analyzing palaeo-environmental records from the Canadian High Arctic.*

Nilima Gandhi, Ph.D., Chemical Engineering/CFE ES; supervisor: Miriam Diamond, Geography. *New methods to address metals' speciation, fate, and ecotoxicity issues in the context of Life Cycle Impact Assessment.*

Amir Ganjavie, Ph.D., Planning/CFE ES; supervisor: Paul Hess, Geography. *Exploration of which type of neighbourhood design can encourage people to use cars less.*

Robyn Hall, M.I., Information/CFE ES; supervisor: Matt Ratto, Information. *Communication and management of environmental information.*

David Houle, Ph.D. ,Political Science/CFE ES; supervisor: Grace Skogstad, Political Science. *In a climate of uncertainty: climate change policy in Canadian provinces in a context of multi-level and regional governances.*

Ashleigh Ingle, M.Sc., Physics/CFE ES; supervisor: Paul Kushner, Physics. *The effects of different ecosystems and growth patterns on climate models.*

Lisa Johannesen, M.Sc., Anthropology/CFE ES; supervisor: Gary Coupland, Anthropology. *Complexity and boat use for travel and transport: an archaeological survey and investigation of Salmon Inlet, Sechelt, BC.*

Munya Kabba, Ph.D., OISE/UT (Sociology & Equity Studies in Education)/ CFE ES; supervisor: George Dei, OISE/UT (SESE). *Critical investigation of civilian conflict.*

Andrew Kett, Ph.D., OISE/UT (Adult Education, Community Development and Counselling Psychology)/CFE ES; supervisor: J. Gary Knowles, AECDCP. *Environmental education and the workplace.*

Smita Kothari, Ph.D., Religion/CFE ES; supervisors: Christoph Emmrich, Religion; and Stephen Scharper, Anthropology U of T Mississauga/CFE. *Social justice and ecology within Jainism.*

William Kurth, M.Ed., OISE/UT (Adult Education, Community Development and Counselling Psychology)/CFE ES; supervisor: Jean-Paul Restoule; Jack Quarter, AECDCP. *Community economic development and how environmentally progressive policies can affect community networks.*

Angela Loder, Ph.D., Geography/CFE ES; supervisors: Ted Relph, Social Sci, U of T Scarborough; and Sarah Wakefield, Geography. *Greening the city: exploring the relationship between health, well-being, and the perception of nature in the workplace.*

John Maiorano, M.Ed., OISE/UT (Sociology & Equity Studies in Education)/CFE ES. *Environmental finance and sustainable investment; Environmental Sustainability and Social Justice cohort program.*

Kate Moss, Ph.D., OISE/UT (Curriculum, Teaching & Learning)/CFE ES; supervisor: Dennis Thiessen, OISE/UT (CTL). *Comparative international education for sustainability: Canada, Lithuania and Sweden*

Beverly Neapetung, M.A., OISE/UT (Adult Education, Community Development and Counselling Psychology)/CFE ES; supervisor: Jean-Paul Restoule, AECDCP. *Use of indigenous knowledge to examine fresh water sustainability and rights to this renewable resource.*

Livio Nichilo, M.Eng., Mechanical and Industrial Engineering/CFE ES. *GHG emissions accounting and reduction policies on a municipality level.*

Kaoruko Nitohbe, M.A., Political Science/CFE ES; supervisor: Ryan Balot, Political Science. *The global environmental governance: a global regime of capacity building/technology transfer for greening society and economy in least-developed and developing nations.*

Sedric Pankras, Ph.D., Forestry/CFE ES; supervisor: Paul Cooper, Forestry. *Investigation of methods to minimize copper leaching from alkaline copper quat (ACQ) treated wood in service.* ***(See page 4 for abstract of seminar.)***

Peter Ralevic, Ph.D., Forestry/CFE ES; supervisor: Tat Smith, Forestry. *Evaluating the greenhouse gas mitigation potential and cost-competitiveness of forest bioenergy systems in Ontario.*

Renata Ramasra, Ph.D., Geography/CFE ES; supervisor: Thembela Kepe, Geography. *Governance challenges associated with the establishment of forestry based carbon finance projects.*

Sarah Shujah, M.I., Information/CFE ES; supervisor: Matt Ratto, Information. *Social and environmental inequity issues; raising the community awareness of our environmental footprint.*

Tajinder Singh, Ph.D., Forestry/CFE ES; supervisor: Shashi Kant, Forestry. *Economic modeling of world carbon markets.* ***(See page 4 for abstract of Research Day presentation and photo.)***

Daniel Suarez, M.A., Geography/CFE ES; supervisor: Scott Prudham, Geography/CFE. *Political ecology of ecosystem services in British Columbia.*

Smith Sundar, Ph.D., Forestry/CFE ES; supervisor: Mohini Sain, Forestry. *Chemical modification of cellulose fiber and its orientation in magnetic field.* ***(See page 4 for abstract of Research Day presentation.)***

Solaiman Talut, M.I., Information/CFE ES; supervisor: Matt Ratto, Information. *Impacts of digitization program policy on environmental sustainability.*

Laura Tozer, M.A., Geography/CFE ES; supervisor: Virginia Maclaren, Geography. *Community energy planning in Canada: success and barriers in implementation.*

Daniel Vandervoort, M.A., OISE/UT (Adult Education, Community Development and Counselling Psychology)/CFE ES; supervisor: Roxanna Ng, AECDCP. *The social organization of ecological agriculture knowledge.*

Debbie Waung, M.A.Sc., Chemical Engineering/CFE ES; supervisors: Emma Master and Ramin Farnood, Chemical Engineering. *Application of enzymes for surface chemistry modification of pulp fibres.*

Jennifer Weaver, Ph.D., Geography UT Mississauga/CFE ES; supervisors: Tenley Conway, Geography, U of T Mississauga; and Marie-Josée Fortin, Ecology and Evolutionary Biology. *The effects of landscape structure on the distribution and range expansion of the invasive Mute Swan in Ontario.*

Jenaya Webb, M.I., Information/CFE ES; supervisor: Matt Ratto, Information. *The intersections of culture, technology, and the environment.*

Thomas Paul York, Ph.D., Religion/CFE ES; supervisor: Stephen Scharper, Anthropology U of T Mississauga/CFE. *A Kantan interpretation of climate change issues.*

Xianming Zhang, Ph.D., Chemistry/CFE ES; supervisor: Frank Wania, Physical and Environmental Sciences, U of T Scarborough. *Organic contaminants in the environment: passive air sampling and modeling approach.*

Environment and Health Graduate Program

2009-10 Alumni

The following alumni convocated in 2009-10 from the Centre's collaborative graduate program in Environment and Health (CFE EH). Condensed abstracts of research papers or theses are included. Please see pages 16-17 for information on this program.

DARREN CORREIA, M.H.Sc., June 2010, Public Health/CFE EH. Coursework program in Occupational and Environmental Health.

NITA CHAUDURI, Ph.D., March 2010, OISE/UT (Adult Education, Community Development & Counselling Psychology)/CFE EH; supervisor: Donald Cole, Public Health. ***Participatory Action Research (PAR) for Environmental Health Among Senegalese Peri-Urban Farmers.*** This thesis draws on data collected during a PAR project that engaged peri-urban farmers in Senegal using popular education and in which change in perceptions and behaviour was documented. It was found that health took on greater importance as farmers related good health to their ability to work and to their productivity. Farmers recognized the symptoms of pesticide poisoning and established the link between work practices and health effects and made some changes. However, toxic pesticides continued to be used and exposure to wastewater with limited protection remained widespread. This thesis also identifies determinants of change and social, political and economic barriers.

TRACIE GREENBERG, M.Sc., November 2009, Geography UT Mississauga/CFE EH; supervisor: Harvey Shear, Geography, U of T Mississauga. ***Nutrient Cycling and Water Pollution in Lake Zapotlán, Mexico.*** Lake Zapotlán is a small (1100 ha) endorheic lake in western Mexico that is internationally recognized by RAMSAR. It receives point source pollution from partially treated sewage from two cities, as well as from urban runoff, agricultural runoff, and erosion and consequent deposition of sediment from deforestation. In this research, measurements of nutrient and bacteria levels were conducted and assessed for potential human health and ecological risks in the lake. Nutrient levels were found to have increased since 1994 and were high enough to cause eutrophication problems. Partially treated wastewater contributes over 30 tonnes of phosphorus to the lake each year. E. coli levels were also found to be extremely high.

ERIKA JERMÉ, M.Sc.Pl., June 2010, Geography's Program in Planning/CFE EH; supervisor: Sarah Wakefield, Geography. ***Growing a Just Garden: Environmental Justice and the Development of a Community Garden Policy for Hamilton, Ontario.*** This paper reviews and makes recommendations to the first draft of Hamilton's community garden policy in terms of environmentally justice through literature review, key informant interviews and participant observation. In this paper, environmental justice is interpreted as an equitable distribution of environmental amenities and hazards with recognition of difference and citizen participation in the political and public realms. This study finds that the constraints under which the first draft was written have thus far precluded a consideration of equity concerns and finds that it does not recognize differentials in power that would prevent disadvantaged groups from engaging in community gardening. Recommendations in this paper include the hiring of a garden coordinator and the development of policy-making committees comprised of city staff and stakeholders.

Tony Chen

Recent Ph.D. alumna Nita Chauduri presents a seminar on her research on environmental health among Senegalese farmers in the Centre's Environment and Health seminar series (see page 32).

New & Continuing

The following students were enrolled in the Centre's collaborative program in Environment and Health (CFE EH) in 2009-10 and may continue or convocate in 2010-11.

Ilan Alleson, Ph.D., Public Health/CFE EH; supervisor: Anne-Emanuelle Birn, Public Health. *Contested illness and environmental struggles surrounding Bedouin and Jewish communities.*

Hajera Amatullah, M.P.H., Public Health/CFE EH; sup: Jeremy Scott, Public Health. *Effects of air pollution on the cardiovascular system.*

Dolon Chakravartty, Ph.D., Public Health/CFE EH; supervisors: Blake Poland and Donald Cole, Public Health. *How environmental exposures can be linked to health disparities.*

Stephanie Choi, M.P.H., Public Health/CFE EH. Epidemiology coursework program.

Catherine Maule, Ph.D., Public Health/CFE EH; supervisor: Blake Poland, Public Health. "*Natural" places and their role in the protection of health.*

Michelle North, Ph.D., Medical Science/CFE EH; supervisors: J. Scott, Public Health; F. Silverman, Medicine. *Arginase contribution to airways asthma symptoms & exacerbation by air pollution.*

Balwinder Pandher, M.H.Sc., Public Health/CFE EH. Occupational &Environmental Health prog.

Kate Parizeau, Ph.D., Geog./CFE EH; supervisors: V. Maclaren & A. Daniere, Geog. *Environmental health, labour strategies, and self-representations of informal recyclers in Buenos Aires, Argentina.*

Priyanka Raj, M.P.H., Public Health/CFE EH. Occupational & Env. Health coursework program.

Kavita Singh, M.H.Sc., Public Health/CFE EH. Epidemiology coursework program.

Iffath Syed, M.H.Sc., Public Health/CFE EH. Occupational & Env. Health coursework program.

Benita Tam, Ph.D., Geog./CFE EH; supervisor: W. Gough, Phys. & Env. Sci., UTSC. *Climate change, vulnerable populations and health issues.*

Andrew Thomas, M.P.H., Public Health/CFE EH; supervisor: F. Silverman, Medicine. *Role of volatile organic compounds in human exposures.*

Bruce Urch, Ph.D., Medical Sci. CFE EH; sup: P. Corey, Public Health & F. Silverman, Medicine. *Human exposures to concentrated ambient fine particles and ozone: cardiorespiratory outcomes.*

(See p. 32 for abstract of seminar presentation.)

GESA: Graduate Students' Group

By Nilima Gandhi, 2009-10 GESA President

GESA, the Graduate Environmental Students' Association, is an association for all graduate environmental students at U of T. Its mission is to facilitate interdisciplinary communication between graduate students and faculty from environmental disciplines across campus and build an environmental graduate student community at the university. GESA achieves this goal by organizing various social and academic activities during the year. In 2009-10, GESA helped organize and participated in the annual Environmental Career Day ***(see page 30)***, the Centre for Environment's graduate orientation session, as well as monthly coffee hours and pub nights. GESA also organizes welcome sessions for new students, environment-related film screenings, library research orientations, and an annual holiday celebration party.

GESA provides a coordinated voice from graduate students on decisions such as hiring new faculty, proposing changes in academic curriculum and launching new environmental programs at the university. In addition, it collaborates with other organizations on campus in order to participate in larger environmental projects and decisions affecting the university.

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

Graduate Research: M.Env.Sc. Program

2009-10 Alumni

The following alumni convocated in 2009-10 from the M.Env.Sc. Professional Program, a former Centre for Environment program, now at the Dept. of Physical and Environmental Sciences (DPES), U of T Scarborough. Condensed abstracts of theses are included below for students in the Research Option. See page 18 for more information.

Research Option:

ALEXEY GUDIMOV, M.Env.Sc., November 2009; supervisor: George Arhonditsis, DPES. ***Eutrophication Risk Assessment in Hamilton Harbour: System Analysis and Evaluation of Nutrient Loading Scenarios.*** Environmental modeling has been an indispensable tool of the Hamilton Harbour restoration efforts, where a variety of models have been used for setting the water quality goals by linking management actions with potential ecosystem responses. In this study, a biogeochemical model was developed to depict the interplay among the different ecological mechanisms underlying the eutrophication problems in the harbour. The model suggests that the water quality goals for total phosphorus and chlorophyll a concentrations will likely be met if the Hamilton Harbour RAP proposition for phosphorus loading is achieved.

BOGDAN HLEVCA, M.Env.Sc., November 2009; supervisor: Mathew Wells, DPES. ***Influence of Channel Width upon Water Exchange Driven by Lake Seiches in Coastal Wetlands of the Great Lakes.*** Water circulation in many shallow coastal wetlands of the Great Lakes is partially driven by the rapid water level fluctuations due to lake seiches. Such seiche-driven flushing of coastal wetlands has an impact upon the water quality of the wetland and the suitability of habitat for fish breeding. This research focussed on understanding how the flushing efficiency of wetlands and coastal embayments is related to their physical geometry, in particular, how man-made changes to connecting channels can increase or reduce flushing rates and the residence time of water.

IBRAR AHMED KHAN, M.Env.Sc., June 2010; supervisor: Maria Dittrich, DPES. ***Role of pH, Ionic Strength and Temperature on Cadmium Adsorption on Cyanobacteria.*** This study found a strong dependence of pH, ionic strength and temperature on the cadmium adsorption capacity of the cyanobacteria strain Synechococcus PCC 7942. The cadmium binding capacity increased with decreasing ionic strength. There was increased adsorption with increased pH values at certain levels. An increase of metal update was observed when temperatures increased to a certain level but then decreased after attaining a maximum level.

MONIR HOSSAIN, M.Env.Sc., March 2010; supervisor: George Arhonditsis, DPES. ***Elucidation of Ecosystem Attributes using Ecopath with Ecosim (EwE): Application to an Oligotrophic Lake in Hokkaido, Japan.*** The decline of the sockeye salmon population in the oligotrophic Lake Toya in Hokkaido, Japan due to fishing practices has been well documented and is a serious concern. However, there is uncertainty with regards to its impact on the broader system dynamics. Using the mass-balance modeling software Ecopath with Ecosim (EwE), this research examined the impact of the decline of sockeye salmon population on the trophic dynamics of the lake, in particular, whether other species have benefited and to what extent these changes cascade through the lake's food web.

YUKO SHIMODA, M.Env.Sc., June 2010; supervisor: George Arhonditsis, DPES. ***Our Current Understanding of Lake Ecosystem Response to Climate Change: What Have We Really Learned from the North Temperate Deep Lakes?*** This study reviewed the current state of knowledge on documented climate-induced changes in lake ecosystem phenology. It assessed the existence of long-term trends in the physical, chemical, and biological characteristics of north temperate deep lakes. It also examined impacts of local weather conditions and large-scale climate variability on lake physics, chemistry and biology, and identified underlying mechanisms that may drive these ecological patterns.

SHAMSUL TARAFDER, M.Env.Sc., November 2009; supervisor: Carl Mitchell, DPES. ***Mercury Transport Through Urban Watersheds in Toronto.*** This research studied how urbanization affects the transport behaviour of mercury (Hg) in the Greater Toronto Area. Hg transport during baseflows was studied in the watersheds of Highland Creek East, Highland Creek West, Mimico Creek, Don River and Humber River. All rivers of the studied watersheds emptied into Lake Ontario where Hg has been identified as a priority contaminant. Also studied were the effects of UV absorbance, suspended particulate matter, and dissolved organic carbon (DOC). One rural watershed, the Little Rouge River subwatershed, was also studied as a comparison. Additionally, storm water samples were collected from the two Highland Creek branches to compare the effect of storm flows on the Hg mobility and transport.

ROBERT WIEDEMANN, M.Env.Sc., November 2009; supervisor: Carl Mitchell, DPES. ***Linking Long-Term Sulphate Deposition to Methylmercury Production in an Experimental Peatland.*** Mercury bioaccumulates in aquatic biota in the organic form of methylmercury (MeHg), a known toxin to both aquatic species and humans. Wetland ecosystems are known to be important areas of MeHg production, a biological process mediated by sulphate reducing bacteria (SRB). This research investigates the relationship between acid rain deposition and mercury methylation in an ombrotrophic peatland in Minnesota, U.S.A.

Internship Option:

The following 2009-10 alumni completed the internship option:

Convocated November 2009: **Krysta-Lee Anderson**, **Kiran Anwar**, **John Armour**, **Edyta Chorostkowska**, **Theadora Geach**, **Laura Gail Hill**, **Farah Hirani**, **Raluca Hlevca**, **Ann Marie Jesupillai**, **Mohammad Tarique Kamal**, **Jessica Karpowicz**, **Sepideh Khairkhahi**, **Hugh Langley**, **Stephanie Maguire**, **Megan Mclean**, **Claire Moura**, **Karen Mrema**, **Peter Ng**, **Alana Phelps**, **Katherine Pieczora**, **Yue Qiao**, **Mathura Ragavan**, **Anina Sakaguchi**, **Christian Tenaglia**, **Caitlin Vanderkooy**, **Yuan-Ling Wang**, **Rani Wiedemann, David Young**, **Joyce Zhang**, **Maria Zintchenko**.
Convocated March 2010: **Melissa Evers**, **Haruka Shoji**, **Quentin Stossel**.
Convocated June 2010: **Soo Hyun Chae**, **Anthony DeSilva-Wijeyeratne**, **Georgina Kaltenecker**, **Christopher Murray**, **Jennifer Owen**, **Ashish Sarker**.

New & Continuing

The following students were enrolled in the Research Option of the M.Env.Sc. program in 2009-10 and may continue or convocate in 2010-11. An additional 47 were enrolled in the Internship Option.

Magda Celejewski: *1H NMR metabolic responses of E. Fetida after exposure to chlorophenols in soil.* (Supervisor: Myrna Simpson, DPES).

Milind Shela: *Predicting the response of Hamilton Harbour to the nutrient loading reductions: an ecological analysis of the "known unknowns".* (Supervisor: George Arhonditsis, DPES.)

Morgan Tidd: *Modelling wave transformation, near-bed velocity and bottom stress in Frenchman's Bay, Lake Ontario: potential sediment resuspension and contaminant reactivation.*(Supervisor: Brian Greenwood, DPES.)

Meighen Whitehead: *Nutrient transfer on phosphorus deficient soils under a wheat (Triticum turgidum durum) and legume (Glycine max L. Mer. and Medicago truncatula) intercropping system.* (Supervisor: Marney Isaac, DPES.)

Ana Zaknic-Catovic: *Critical assessment of modelling conducted in support of the Rockfort Quarry.* (Supervisor: Ken Howard, DPES).

Research topics pending: **James Schultz**, **Larisa Shirenko**, **Katie Tulk**, **Brian Turnbull**.

Message from the Undergraduate Coordinator

BY ANTHONY DAVIS

FOR MORE INFORMATION:

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

Prompted by recommendations stemming from the latest Faculty of Arts and Science curriculum renewal process, the Centre for Environment has made some recent curriculum changes to its social science offerings. Modifications of our science offerings await the outcome of the future direction for the Faculty of Forestry and the possible emergence of a Department of Earth Science.

B.A. Programs Amalgamated

One obvious change in the recent year was to the Centre's core programs with an amalgamation of our two B.A. core programs (Environment and Society, Environmental Policy and Practice) into one banner: Environmental Studies. The Centre still continues to offer a core program in Environment and Science. The rearrangement of the B.A. program simplifies our structure and allows wider course selection for students.

New Course Offerings

Perhaps the most important change for this year is the development of a new first-year course, **ENV 100H Introduction to Environmental Studies**, to be taught by Professor Stephen Scharper (Anthropology U of T Mississauga and CFE, ***see page 39***). The course explores major social, cultural, economic, regulatory, ethical and ecological aspects of environmental issues. We anticipate that this large enrollment course will become the major routeway into our B.A. programs.

We are also pleased to offer the following additional new courses in 2010-11:

- ENV 221H Multidisciplinary Perspectives on Environment (**Karen Ing**, CFE Senior Lecturer, ***see page 36***);
- JGE 321H Multicultural Perspectives on Environmental Management (joint course with Geography taught by our new faculty member **Christian Abizaid**, ***see page 35***);
- ENV 430H Environment and Health of Vulnerable Populations (**Clare Wiseman**, CFE Assistant Professor, ***see page 41***);
- ENV 451H Current Environmental Debates (**Karen Ing**; **Doug Macdonald**, CFE Senior Lecturer, ***see page 38***); and
- three new environmental policy courses:
  1. ENV 320Y National Environmental Policy (**Doug Macdonald**);
  2. ENV 322H International Environmental Policy (**Doug Macdonald**); and
  3. ENV 323H Ontario Environmental Policy (**Russ Houldin**, CFE Sessional Lecturer, ***see page 43***).

Many Full Courses Cut in Half

Similar considerations have been the basis for another major modification: the replacement of almost all of our full year courses with half-year courses. This follows general trends across the Faculty of Arts and Science. For us, it allows more effective use of our teaching resources as well as greater flexibility for students. Only some of our 200 level series (ENV 234 Environmental Biology, ENV 235 Physics and Chemistry of the Evolving Earth, and ENV 236 Human Interactions with the Environment) remain as year-long offerings for 2010-11. (***Please see page 13 for a list of course offerings.)***

As part of its important integrative role, the Centre for Environment maintains its suite of collaborative programs with Anthropology, Chemistry, Geography, Geology, Human Biology, Pharmacology and Toxicology, Philosophy, Physics, and Psychology, as well as Directed Minor programs with other units. In the coming year, the Centre anticipates further collaborations with the Faculty of Forestry, as well as other science departments such as the newly proposed Dept. of Earth Science.

As usual, our undergraduate programs have relied greatly on teaching by faculty from other U of T units as well as Sessional Lecturers. The Centre thanks these for their willingness and dedication. ***(Please see pages 42-45 for profiles of our instructors.)***

I would also like to acknowledge the huge contribution that **David Powell** makes to our undergraduate programs. In his role of Undergraduate Student Advisor and Placement Coordinator, David sees to the needs of our students, keeps instructors happy, and covers my shortcomings.

Anthony (Tony) Davis is Professor Emeritus in the Department of Geography and Undergraduate Coordinator at the Centre for Environment. (See page 36.)

ENSU: Environmental Students' Union

By Mike Lawler, 2009-10 ENSU Executive Coordinator

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 environmental film nights, a winter retreat to Hart House Farm, and a graduate studies information session, and has also continued to play a role in the annual Environmental Career Day ***(see page 32)***. A recent focus has been on increasing participation and cohesion among Centre for Environment students, as well as creating study resources for future years and strong social activities. The most prominent goal is to increase the feeling of community among environmental students on campus and co-ordination with other U of T environmental student groups.

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

Undergraduate Courses

2010-11 Centre for Environment (CFE) undergraduate offerings and instructors are subject to change. For profiles of some course instructors, please see pages 35-45.

ENV 100H	Introduction to Environmental Studies *(**new in 2010-11**; Stephen Scharper, Anthropology UTM/CFE)*
SII 199H(F)	Debating and Understanding Current Environmental Issues *(Faculty of Arts and Sciences (FAS) first-year seminar course; Karen Ing, CFE)*
SII 199H(S)	Sustainable and Just Futures: Environmental Politics in an Age of Global Warming *(FAS first-year seminar course; Kundan Kumar, Geography/CFE)*
ENV 200H	Assessing Global Change: Science and the Environment *(Karen Ing, CFE)*
ENV 221H	Multidisciplinary Perspectives on Environment *(**new in 2010-11**; Karen Ing, CFE)*
ENV 222H	Interdisciplinary Environmental Studies *(Douglas Macdonald, CFE)*
ENV 223H	Fundamental Environmental Skills *(Christian Abizaid, Geog/CFE)*
ENV 234Y	Environmental Biology *(Hélène Cyr, Ecology & Evolutionary Biology)*
ENV 235Y	Physics and Chemistry of the Evolving Earth *(Bernd Milkereit, Physics; Nana-Owusua Kwamena, Chemistry)*
ENV 236Y	Human Interactions with the Environment *(Miriam Diamond, Geography; Marco Belmont, sessional)*
ENV 299Y	Research Opportunity Program *(Brad Bass, sessional; Beth Savan, CFE)*
ENV 307H	Urban Sustainability *(Beth Savan, CFE)*
ENV 315H	Chemical Analysis of Environmental Samples *(Michael Gorton, Geology)*
ENV 320H	National Environmental Policy *(**new in 2010-11**; Douglas Macdonald, CFE)*
JGE 321H	Multicultural Perspectives on Environmental Management *(**new in 2010-11**; joint with Geography; Christian Abizaid, Geography/CFE)*
ENV 322H	International Environmental Policy *(**new in 2010-11**; Douglas Macdonald, CFE)*
ENV 323H	Ontario Environmental Policy *(formerly ENV 423H; Russ Houldin, sessional)*
JGE 331H	Resource and Environmental Theory *(**new in 2010-11**; joint with Geography; Scott Prudham, Geography/CFE)*
ENV 333H	Ecological Worldviews *(Kundan Kumar, Geography/CFE)*
ENV 335H	Environmental Design *(Sheila Waite-Chuah, sessional)*
ENV 336H	Ecology in Human Dominated Landscapes *
ENV 341H	Environment and Human Health *(Riina Bray, sessional)*
ENV 346H	Terrestrial Energy Systems *(Bryan Karney, Civil Engineering)*
ENV 347H	The Power of Economic Ideas *(formerly ENV447H; Russ Houldin, sessional)*
JGE 347H	Efficient Use of Energy *(joint with Geography; Danny Harvey, Geography)*
JGE 348H	Carbon-Free Energy *(joint with Geography; Danny Harvey, Geography)*
ENV 350H	Energy Policy and Environment *(Russ Houldin, Keith Stewart, sessionals)*
ENV 395Y	Special Topics Field Course. Ecology and Conservation in the Amazon, Galápagos, and Andes *(**see article on page 6;** Anthony Davis, Geography)*
ENV 398H	Independent Experiential Study Project *
ENV 399Y	Independent Experiential Study Project *
ENV 421H	Environmental Research *(TBA; **see article on page 6**)*
ENV 422H	Environmental Law *(Paul Muldoon, sessional)*
ENV 430H	Environment and Health of Vulnerable Populations *(**new in 2010-11**; Clare Wiseman, CFE)*
ENV 440H	Professional Experience Course *(David Sider, sessional)*
ENV 451H	Current Environmental Debates *(**new in 2010-11**; Karen Ing, Douglas Macdonald, CFE)*
JEH 455H	Current Issues in Environment and Health *(Ron Wilson, Human Biology Program, New College)*
ENV 481H	Special Topics in the Environment I *
ENV 482H	Special Topics in the Environment II *
ENV 492H	Independent Studies Project *(Staff)*
ENV 493H	Independent Studies Project *(Staff)*

* Not offered in 2010-11.

Undergraduate Programs

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

Core Programs:

The Centre offers two core interdisciplinary undergraduate program streams, each as a major and minor:

1. Environment and Science (B.Sc.)
2. Environment Studies (B.A.)*

**(New program offering starting in 2010-11; replaces former two programs Environment and Society & Environmental Policy and Practice.)*

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 the Department of Physics)
2. Environment and Health (B.Sc., with the Human Biology Program, New College)
3. Environmental Chemistry (B.Sc., with the Department of Chemistry)
4. Environmental Geosciences (B.Sc., with the Department of Geology)
5. Environment and Toxicology (B.Sc., with the Department of Pharmacology and Toxicology)

Major Programs:

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

Minor Programs:

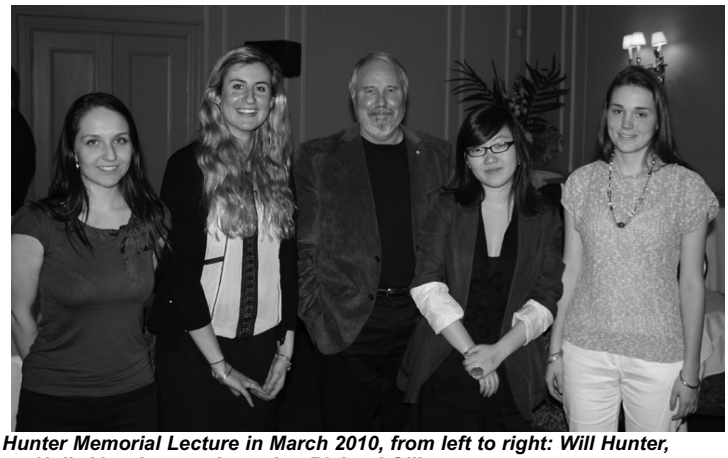
1. Environment and Behaviour (B.Sc., with the Department of Psychology)
2. Environment and Energy (B.Sc., with the Department of Geography)
3. Environmental Ethics (B.A., with the Department of Philosophy)

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.)

Undergraduate Students' Awards



Justin Kim

LEFT: Robert Hunter's family members and award recipients at the Robert Hunter Memorial Lecture in March 2010, from left to right: Will Hunter, presenter Doug Macdonald, recipient Zannah Matson, Bobbi Hunter, recipient Holly Vaughan, and speaker Richard Gilbert.
RIGHT: At the Douglas Pimlott Memorial Lecture in March 2010, presenter Monte Hummel (centre; founding President of the World Wildlife Fund) joins Pimlott Award recipients from left to right Jennifer Shiller, Samantha Azzarello, Sori (May) Jeong, and Gurushabd Khalsa.

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

Frances L. Allen Scholarship: This award is for outstanding second or third-year students in a CFE specialist or double major program. The 2009-10 recipients were **Jun Cheng** (Environment and Toxicology, and Zoology), and **Jiye Jeon** (Environment and Society, and Physical and Environmental Geography).

Chachra Family Scholarship in Environment and Science: This is awarded to students enrolled in a CFE B.Sc. specialist or major program. 2009-10 recipients were **Samantha Azzarello** (Environment and Science, and Economics), **Caroline Franklin** (Environment and Science, and Forest Conservation), and **Alexandra Tevlin** (Environmental Chemistry).

Dr. Stanley Allan Cord Scholarship in Environmental Studies: This is awarded to CFE students in their third or fourth year. The 2009-10 recipient was **Isabelle Eckler** (Environment and Society major).

Peter John Hare Memorial Scholarship in Environment: This is awarded to students in a CFE specialist or major program. The 2009-10 recipients were **Gurushabd Khalsa** (Environmental Policy and Practice, and International Relations), **Mike Lawler** (Environment and Society), **Shannon Lem** (Environmental Policy and Practice, and Environmental Geography), and **Julia Paille** (Env. Policy and Practice, and Physical and Env. Geography).

Robert Hunter Scholarship: This is awarded to outstanding CFE students in memory of Robert Hunter, journalist and co-founder of Greenpeace. The recipients recognized at the 2010 Hunter Memorial Lecture ***(see page 31)*** were **Zannah Mae Matson** (Peace and Conflict Studies, and Environment and Society), and **Holly Vaughan** (Environmental Policy and Practice, and Environ. Geography).

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. The recipients recognized at the 2010 Pimlott Memorial Lecture ***(see page 31)***, were:

Pimlott Award: Samantha Azzarello (Economics, and Environment and Science), **Emma Heath-Engel** (Environmental Policy and Practice, and Anthropology), **Claire Heese-Boutin** (Environment and Society, and Caribbean Studies), **Gurushabd Khalsa** (Environmental Policy and Practice, and International Relations), **Sori (May) Jeong** (Environment and Society, and Political Science), and **Jennifer Shiller** (Environmental Studies, & Environ. Geography).

Pimlott Entrance Scholarship: Daryn Caister (Environmental Policy and Practice, and Urban Studies), and **Jessica Elders** (Environmental Ethics, and Ethics, Society and Law).

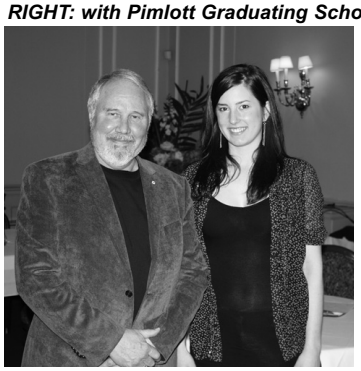
Pimlott Graduating Scholarship: David Berliner (Environment and Health), **Cindy Chao** (Environment and Health) and **David Photiadis** (Environment and Society, and Environment and Resource Management).

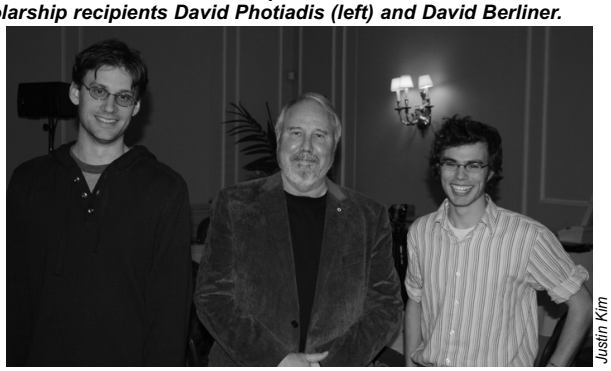
Kathryn S. Rolph Scholarship: This is awarded to outstanding CFE students who have achieved a high mark in a course on environmental issues (currently JGE221Y or ENV321Y). The 2009-10 recipients were **Greta Chiu** (Environment & Toxicology, and Biology), and **Kate Fairbrother** (Environmental Policy & Practice, and Anthropology).

Sidney and Lucille Silver Scholarship: This is awarded to an outstanding third-year student in a CFE or Geography specialist or double major program. The 2009-10 recipient was **Holly Vaughan** (Environmental Policy and Practice, and Environmental Geography).

CFE Undergraduate Student Award: This is awarded to a CFE student and is based on financial need and academic achievement. The 2009-10 recipient was **Daniel McCaffrey** (Environment and Society, and History).

LEFT: Presenter Monte Hummel with Pimlott Entrance Award recipient Jessica Elders, and RIGHT: with Pimlott Graduating Scholarship recipients David Photiadis (left) and David Berliner.





Justin Kim

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Ecolink Students' Website

A portal for U of T students interested in the environment

BY IMRAN HASAN AND TIM WELSH

www.youtube.com

Justin Kim

LEFT: Dan Adler, shown with a hamburger in his humourous short film "An Argument for Vegetarianism", won first place in the video category in Ecolink's first Multimedia contest. RIGHT: Other contest winners, announced at the Centre's Research Day in April 2010, included from left to right Andy Lee (honourable mention, photography), Mike Lawler (second place, video), Laura Tozer (first place, photography), and Dragana Djukic (honourable mention, photography), and the Centre's then Director Ingrid Stefanovic.

Two years ago, the Centre for Environment (CFE) significantly expanded its online presence with the launch of a new website called Ecolink: **http://ecolink.environment.utoronto.ca**. It was created to provide a virtual meeting place for students interested in environmental and sustainability issues, with a contribution from the Vice-President and Provost's Student Experience Fund. Information about academic programs, upcoming events, job and volunteer postings and green living tips can all be found on the site. Since then, the website has also expanded its reach into social media by using Twitter and FaceBook, and introduced a **new Ecoblog** on the website's home page. A wide range of blog topics include recent on-campus events, current environmental topics, video links via YouTube, and even sustainable food recipes.

Web traffic on Ecolink has doubled over the last year, making it an increasingly vital environmental hub for students at the Centre and throughout the university.

EcoSolutions Multimedia Contest

In 2009-10, Ecolink announced the first annual EcoSolutions Multimedia Contest, 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 was open to all U of T students, and accepted video, photography and graphic design entries. The winners were announced at the Centre's Research Day held in April 2010 ***(see page 4)***. **Dan Adler** (B.A. student in Peace and Conflict Studies) took first place in the video category for his humourous film "An Argument for Vegetarianism" while **Laura Tozer** (M.A. student in Geography and Environment) took first place in the Photography category. Second place winners, in photography and video respectively, were **Dan Christensen** (B.A. student in Philosophy) and **Mike Lawler** (B.A. student in Environment & Society). These can be viewed on the website.

In keeping with the Centre's interdisciplinary focus, each member of the Ecolink team has brought to the table specific skills that contribute to the overall success of the project. **Imran Hasan** (CFE IT Manager) has served as Project Manager for all aspects of the website and related initiatives; and **Tim Welsh** (a former CFE Research Coordinator) helped develop the contest. The development and promotion of the website this past year could not have happened without the energy and expertise of the following talented students: **Hira Aslam** (B.Sc. student in Life Sciences), **Victoria Chu** (B.A. student in Environmental Policy and Practice, and Political Science), **Kowsheek Mahmood** and **Fredrich Ombico** (B.A.Sc. students in Computer Engineering), and **Areag Osman** (B.A.Sc. student in Electrical Engineering).

Sustainability Unconference with Student Life

On March 11, 2010, U of T's Office of Student Life, in partnership with the Centre for Environment and Ecolink, held its first ever Environmental Justice and Sustainability Unconference. Over 40 people, including students, staff and members of various community groups were in attendance, contributing to a number of lively discussions around a wide variety of themes.

The unique format of the unconference allowed participants to set the afternoon's agenda themselves. After some preliminary introductions, the group split up into about a dozen smaller groups to discuss topics such as urban issues, community leadership, and technology recycling. Those who were not facilitating were free to move between conversations as they saw fit. As a result, discussions were generated organically by the interests of the participants. At the end of the day, the larger group reconvened to share the insights which were generated in each discussion.

Groups in attendance included Live Green Toronto, No One is Illegal and Justgeneration.ca. The diverse mix of students, staff and community partners represented different viewpoints and divergent opinions which made for some interesting conversations.

Members of the Ecolink team facilitated discussions on social networking, patterns of internet use among various stakeholders, and also brainstormed ideas for making the website a more useful resource to the U of T community.

Tim Welsh is a former Research Coordinator at the Centre for Environment. Imran Hasan is IT Manager at the Centre.

Message from the Graduate Coordinator


R. DiFrancesco

BY RICHARD DIFRANCESCO

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.

Environmental Studies Collaborative Program

The Centre's Environmental Studies Collaborative Program 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 units on an individual basis; for example, we have had students enrolled in Social Work and also South Asian Studies.

In 2009-10, the Centre was pleased to have 21 alumni from this program (5 Ph.D. and 16 Masters); ***see pages 7-8 for abstracts of their theses or research papers.*** In this past academic year, the Centre also welcomed six new Ph.D. and 21 new Masters students in this program, bringing the total of new and continuing students to 46 (23 Ph.D. and 23 Masters). ***(See p. 9 for their research topics.)***

At the Centre for Environment, it is our mission to leverage this university's great intellectual might to produce truly interdisciplinary scholars with the interest and ability to understand, protect and enhance the environment.

Richard DiFrancesco is Associate Professor and Graduate Coordinator in the Dept of Geography and Program in Planning; Director, Urban Studies Program, Innis College, and Graduate Coordinator at the Centre for Environment. (See page 36.)

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 (ENV4001H) 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 32 for last year's 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. 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 for abstracts of theses by 2009-10 alumni and a list of research topics of 2009-10 new and continuing students.)***

In addition to teaching ENV 4001H, I will also be teaching **ENV4002H The Environment and Health of Vulnerable Populations** again in the Fall 2010 term, which is also now cross-listed as an undergraduate course **(ENV430H)**. It explores how and why certain populations may be especially vulnerable to environmental hazards and will address not only the role of various biological, neuro-developmental and physiological factors in determining vulnerability but also related sociocultural, equity and justice issues.

I am also pleased to announce an exciting **new graduate course ENV4003H Global Climate Change and Health** which the Centre plans to offer for the first time in Fall 2011. Using a seminar format, this course will examine the various ways global climate change may impact human health, from its effects on aboriginal peoples to changing patterns of disease and related issues of equity and justice.

Dr. Clare Wiseman is Assistant Professor and Coordinator of the Environment and Health Program at the Centre for Environment. (See page 41.)

Grad Courses

(collaborative programs)

The following Centre for Environment (CFE) and joint graduate courses are offered as part of the Collaborative Programs in Environmental Studies & Environment and Health. 2010-11 offerings and instructors indicated are subject to change. For profiles of instructors, please see pages 35-45.

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

Core Courses

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

Other Courses

ENV 1002H	Environmental Policy*
ENV 1004H	Urban Sustainability *(B. Bass, sessional)*
ENV 1005H	Business and Environmental Politics *(D. Macdonald, CFE)*
ENV 1008H	Worldviews and Ecology *(S. Scharper, Anthropology UTM/ CFE)*
ENV 1444H	Capitalist Nature *(W.S. Prudham, Geog/CFE)*
ENV 1701H	Environmental Law (*P. Muldoon, sessional)*
ENV 1703H	Water Resources Management *(A.P. Grima, Geography)*
ENV 1704H	Environmental Risk Analysis and Management *(TBA)*
ENV 1707H	Environmental Finance and Sustainable Investing *(J. Ambachtsheer, S. McGeachie, sessionals)*
JEI 1901H	Technology, Society and Environment (*W. Vanderburg, Civil Eng/CFE)*
JEI 1902H	Technology, Society and Environment II*
JGE 1212H	Fate of Contaminants in the Environment *(M. Diamond, Geography)*
JPV 1201H	Politics, Bureaucracy and the Environment*
JGE 1413H	Environmental Assessment*
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 *(C. Jia, Chemical Eng.)*
ENV 3000H	Special Topics: Environment and Health
ENV 4002H	The Environment and Health of Vulnerable Populations *(C. Wiseman)*

* Not offered in 2010-11.

Graduate Faculty

The following individuals currently have graduate faculty appointments at the Centre for Environment. Membership is subject to change. For information on appointments and student supervision, please contact Pavel Pripa at 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*
Sharon Cowling, *Geography*
Hilary Cunningham, *Anthropology*
Amrita Daniere, *Geography*
George Dei, *OISE/UT Sociology & Equity Studies*
Donald Dewees, *Economics*
Miriam Diamond, *Geography*
Maria Dittrich, *Physical & Environ. Sci., UTSC*
Steve Easterbrook, *Computer Science*
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*
Donald Jackson, *Ecology & Evolutionary Biology*
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*
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*
Anthony Davis, *Geography*
Andrew Green, *Law*
A.P. (Lino) Grima, *Geography*
H. Roland Hosein, *GE Canada Inc.*
Marney Isaac, *Physical & Environ. Sci., UTSC*
Andy Kenney, *Forestry*
Kundan Kumar, *Geography/CFE*
Sonia Labatt
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*
Helene Wagner, *Ecology & Evolutionary Biology*
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 ROBERTA FULTHORPE

M.Env.Sc. Program

Formerly a program of the Centre for Environment until 2009-10, the Master of Environmental Science professional program has now been transferred to the Department of Physical and Environmental Sciences (DPES) at U of T Scarborough. It is a unique interdisciplinary program in the field of biophysical interactions in terrestrial and aquatic systems. 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 ecological monitoring, site assessment, project management, environmental law and modeling, among many other possibilities. This program is comprised largely of courses, but includes an opportunity for students to undertake laboratory and field research, or the option of interning with a consulting firm, government agency or non-profit group. The program can be completed in 12 months if students study full-time, but part time students are also accepted.

In addition to faculty members, there are two full-time administrators who support the program: **Julie Quenneville,** who oversees virtually all aspects of the program, and **Anna Maria Russo**, who assists students with job related skill development and coordinates all the internship placements. Together, these hard working people have made the program a success.

The program is entering its fifth year of operation and we expect to have more than 50 full-time students registering in September 2010, drawn from a pool of more than 160 applicants. To date there have been 114 graduates of the program and we expect to have another 50 students graduate in fall 2010. ***(See page 11 for abstracts of theses by 2009-10 alumni.)*** Graduates of the program continue to have excellent success at finding full-time, well paying jobs at the end of their programs.

FOR MORE INFORMATION:

www.utsc.utoronto.ca/~physsci/environ_sci or Julie Quenneville, Graduate Administrator, 416-287-7357, menvsc@utsc.utoronto.ca

Ken Jones

New Ph.D. Program

A new Ph.D. in Environmental Science at DPES has just been approved to begin admissions for September 2010. **Professor Emeritus Brian Greenwood** and **Vice-Dean William Gough** (now Chair of DPES) are to be congratulated for their work in getting the proposal approved. As well as core DPES faculty, approximately thirty additional faculty members from departments across U of T, and faculty from other universities, government and industry, have been appointed as graduate faculty. The first five Ph.D. students are expected to be admitted in September 2010.

Roberta Fulthorpe is Associate Chair for Graduate Studies in the Dept. of Physical and Environmental Sciences, UTSC.

M.Env.Sc. Faculty

The following faculty members at the Dept. of Physical and Environmental Sciences, UTSC, are involved with M.Env.Sc. teaching and student supervision.

George Arhonditsis, Assistant Professor
Maria Dittrich, Assistant Professor
Nick Eyles, Professor
Roberta Fulthorpe, Associate Professor *(Associate Chair, Graduate)*
William Gough, Associate Professor *(Chair)*
Brian Greenwood, Professor Emeritus
Ken Howard, Professor
Marney Isaac, Assistant Professor
Carl Mitchell, Assistant Professor
Monirul Mirza, Adjunct Professor
Anthony Price, Associate Professor (retired)
André Simpson, Assistant Professor
Myrna Simpson, Associate Professor
Frank Wania, Associate Professor *(Associate Chair, Research)*
Mathew Wells, Assistant Professor
Dudley Williams, Professor

M.Env.Sc. Courses

The following courses are offered by the Department of Physical & Environmental Studies, UTSC, as part of the M.Env.Sc. program. 2010-11 offerings and instructors indicated are subject to change.

EES1100H Advanced Seminar in Environmental Science *(TBA)*
EES1101Y Research Paper in Environmental Science *(TBA)*
EES1102H Analytical Chemistry for Geoscientists*
EES1103H Air and Water Quality Sampling and Monitoring*
EES1104H Detection of Microorganisms in the Environment *(P. Dennis)*
EES1105H Soil Contamination Chemistry*
EES1106H Environmental Challenges in Urban Areas *(N. Eyles)*
EES1107H Remediation Methods*
EES1108H Environmental Science Field Camp *(K. Howard)*
EES1109H Advanced Techniques in Geographic Information Systems *(TBA)*
EES1110H Sediment and Contaminant Transport in Aquatic Systems*
EES1111H Freshwater Ecology and Biomonitoring *(E. Azim)*
EES1112H Boundary Layer Climates and Contaminant Fate*
EES1113H Groundwater Hydrochemistry and Contaminant Transport *(K. Howard)*
EES1114H Directed Readings in Environmental Science I *(TBA)*
EES1115H Directed Readings in Environmental Science II *(TBA)*
EES1116Y Internship Placement
EES1117H Climate Change Impact Assessment *(A. Fenech)*
EES1118H Fundamentals of Ecological Modelling *(G. Arhonditsis)*
EES1119H Quantitative Environmental Analysis*
EES1120H The Dynamics of Contaminant Dispersal in Fluids *(M. Wells)*
EES1121H Modeling the Fate of Organic Chemicals in the Environment *(F. Wania)*
EES1122H Global Environmental Security and Sustainable Development *(TBA)*
EES1123H Environmental Regulations *(R. Fulthorpe)*
EES1124H Environmental Project Management *(R. Fulthorpe)*
EES1125H Contaminated Site Remediation *(R. Fulthorpe)*
EES1126H Environmental Tracers *(C. Mitchell)*
EES1127H Geomicrobiology and Biogeochemistry *(M. Dittrich)*
EES1701H Environmental Legislation and Policy (Pending Approval)
EES1704H Environmental Risk Assessment (Pending Approval)

*Not offered in 2010-11.

Graduate Students' Awards

The Centre for Environment (CFE) wishes to congratulate the recipients of the following graduate awards, most of which were presented at Research Day on April 22, 2010 (see page 4).

GreenSaver Alastair Fairweather Memorial Award in the Environment

This inaugural award was established in memory of Alastair Fairweather, a member of the Board of Directors of GreenSaver, who passed away in October 2009. Mr. Fairweather had been actively involved in many local issues including Out of the Cold, the Beaches-East York NDP, and was a member of the Board of Directors of GreenSaver, a company committed to assisting homeowners make their homes more energy efficient. The inaugural recipient in 2010 was **Dan Suarez**, M.A. candidate in the Department of Geography and CFE's Collaborative Program in Environmental Studies. His research focuses on political ecology of ecosystem services in British Columbia.

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 **Zhang Xianming** at the Eric Krause Memorial Lecture held in February 2010 ***(see page 31)***. He is a Ph.D. candidate in Chemistry and the CFE's Collaborative Program in Environmental Studies. He researches the effect of environmental factors on the uptake of passive air samplers and the influence of partitioning property estimation methods on the results of screening for emerging contaminants.

Justin Kim

Labatt fellowship recipients from left to right David Houle, Carol Lue, Peter Ralevic, Dan Suarez, Joanna Vince join then CFE Graduate Coordinator Jing Chen. (Absent: Cindy Chao and Zia Islam.)

A summer internship was also established at the City of Toronto Environment Office in Eric Krause's name. In 2010, it was awarded to **Ian Clark**, a M.Sc.Pl. candidate in the Department of Geography's Planning Program.

Arthur and Sonia Labatt Graduate Fellowships

Through a generous donation by Arthur and Sonia Labatt, these fellowships are awarded on an annual basis to support students enrolled in a Centre for Environment (CFE) graduate program or the Juris Doctor (J.D.) Certificate in Environmental Studies offered by Law and CFE. Students are asked to submit a paper on practical solutions to environmental issues and/or marketplace for solutions to environmental issues. 2009-10 recipients were

- **Cindy Chao**, M.Env.Sc. student, CFE's former program (internship option);
- **David Houle**, Ph.D. candidate, Political Science and CFE's Collaborative Program in Environmental Studies (CFE ES; ***see page 9 for research topic)***;
- **Zia Islam**, M.Env.Sc. candidate, CFE's former program (internship option);
- **Carol Lue**, M.Sc.Pl. June 2010 alumna, Geography's Planning Program and CFE ES ***(see page 8 for abstract of research paper)***;
- **Peter Ralevic**, Ph.D. candidate, Forestry and CFE ES ***(see page 9 for research topic)***;
- **Dan Suarez**, M.A. candidate, Geography and CFE ES ***(see page 9 for research topic)***; and
- **Joanna Vince,** J.D. June 2010 alumna.

FOR MORE INFORMATION:

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

LEFT: Krause fellowship recipient Xianming Zhang (third from left) and speaker Peter Love (centre) join Krause family members from left to right: Katy Krause, Arnie Krause, Rina Fishman-Krause, David Fishman and Kalman Krause at the Eric Krause Memorial Lecture in February 2010.
RIGHT: GreenSaver Fairweather award recipient Dan Suarez (centre) joins Gavin Fairweather and Vladan Veljovic (President and CEO of GreenSaver).

Tony Chen

Justin Kim

Message from the Prof. Development Advisor

BY RODNEY WHITE

Through all the twists and turns in the human response to climate change and related environmental challenges it has been apparent that the grassroots appreciation of the challenge is far more reliable than the actions of senior levels of government. This is especially true in North America, though less so in the European Union.

This poses a problem for those of us committed to providing professional development in the university context. Individuals are anxious to prepare themselves for a shift in their professional life, while the senior institutions that could create environmental markets through legislations have been slow to act.

Despite the scientific complexity of the processes embedded in the phrase "environmental change", a new simplified paradigm has emerged to meet these challenges. It is increasingly recognised that we need to focus on the management of carbon, energy, waste and water.

Online Distance Education

For the last seven years, the Centre for Environment (and its predecessor the Institute for Environmental Studies) has provided opportunities for those individuals who – having completed their university education – wish to maintain an edge in their professional field by gaining further experience and qualifications within a university setting.

We have approached this mandate by offering certificates in various aspects of environmental management available online and by hosting regular workshops with partners in the business community under the general rubric of "environmental finance".

Our online education program began with a certificate in Environmental Management and has grown steadily every year since its inception. To this we added certificates in Renewable Energy, Geographic Information Systems for Environmental Management and last year – Carbon Finance ***(see page 21)***. We are recently in the process of developing a **new Certificate in Water Resources Management**.

The certificates are modular, allowing students to select from across the broad array of courses on offer. All environmental issues are related, so it is important that our academic structure recognises this by making course selection flexible. The new Certificate in Water Resources Management will link a core course to the subject matter of the other certificates. In this way we hope to make the carbon, energy, waste and water connections visible in our program.

Professional Workshops

Our distance education program is global. Our students come from every continent and many countries. On the other hand, we enjoy a location in Canada's largest city and economic centre. We have capitalised on this proximity by working with members of the business community and members of our Environmental Finance Advisory Committee ***(see pages 22-23)*** to provide seminars and workshops on a variety of topics within the field of environmental finance. In the past academic year, the workshops have included **a three-part series on The Value of Water**, in partnership with *Water Canada* magazine, the Canadian Urban Institute and UNU-INWEH ***(see page 26)***.

We have also presented workshops on a three-day format (and featuring an optional exam) in the growing field of Carbon Finance. In this past academic year, these were offered in Toronto and Vancouver ***(see page 24)***. We are planning to offer more workshops in 2010-11, starting with Toronto and Vancouver this fall.

Unlike full-time students on campus, the numbers of participants in professional development are difficult to predict from month to month. Everything depends on the perception of how such post-university training will be valued currently in the workplace. Such perceptions shift with the legislative calendar and international relations. Will a climate-related bill eventually emerge from the U.S. Senate? Will the U.S. struggle to maintain some of the gains from the Copenhagen COP to demonstrate leadership in Mexico in the Fall? Will the recession linger, discouraging companies from investing in their employees' professional development?

Over the years we have had to become very flexible in order to function in this new educational environment.

Carbon, energy, waste and water.

Perhaps we can develop new ways to get the message across to a wider audience.

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

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

Online Distance Education Programs

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 500 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 CECAB's (The Canadian Environmental Certification Approvals Board) national certification program for Canadian environmental practitioners. Individual courses from the Certificate programs may also meet the professional development criteria required to maintain students' environmental certification.

In 2009-10, the Centre was pleased to introduce its latest online certificate program – in **Carbon Finance**, a specialized field on the use of market instruments to reduce greenhouse gas emissions.

FOR MORE INFORMATION:

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

Course offerings and Fall 2010 instructors indicated are subject to change. Please visit the website for updates. For profiles of course instructors, please see pages 42-45.

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

This certificate 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 *(Jane Macdonald)*
ECF 401 Carbon Finance *(Oliver Bussler)*
ECF 402 Environmental Finance Case Study: European Union Emissions Trading System ***(new Fall 2010**; Barbara Hendrickson)*
CRE 400 Principles in Renewable Energy*
CRE 402 Wind Energy*
CRE 403 Urban Energy Systems* *(Anna Moser)*
*also part of Certificate in Renewable Energy.

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 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 *(Lenore Newman)*
CEM 401 Environmental Case Management: Water *(David Sider)*
CEM 402 Strategies in Environmental Management *(Lenore Newman)*
CEM 403 Environmental Risk Assessment (*Sharonna Greenberg)*
CEM 404 Environment and Human Health
CEM 405 Global Environmental Change and Human Health
CEM 406 Climate Change and Human Health

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 this certificate 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 *(Michael Govorov)*
GEM 401 Advanced GIS for Environmental Management *(Michael Govorov)*
GEM 402 Geospatial Technologies for Environmental Mapping with GIS
GEM 403 Environmental Remote Sensing *(Gennady Gienko)*
GEM 404 GIS Modeling for Environmental Applications ***(new Fall 2010**; Gennady Gienko)*

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 interdisciplinary view of the impact of renewable energy on the current global energy picture. 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 Energy *(Lucy Sportza)*
CRE 401 Case Studies in Renewable Energy *(Lucy Sportza)*
CRE 402 Wind Energy
CRE 403 Urban Energy Systems *(Anna Moser)*

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 the Centre's Director, it meets regularly to plan Environmental Finance and Carbon Finance seminar and workshops (see pages 24-27) 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.


Mercer

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 renewable energy, water technologies, sustainable agriculture, and clean technologies. Prior to joining Investeco, Mr. Chamberlain 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.


www.macleoddixon.com

Elisabeth (Lisa) DeMarco
Partner, Macleod Dixon LLP
Ms. DeMarco heads Macleod Dixon's Toronto Energy and Environmental Finance Group and is recognized as a leader in the law relating to emissions trading, the Kyoto Protocol and carbon finance. In Ontario, she works with electricity and natural gas sector clients to assist with policy development and regulatory matters. She has been ranked by Chambers Global as a leading climate change lawyer.


J. Desjardins

Julie M. Desjardins
Chartered Accountant and Consultant
Ms. Desjardins is a chartered accountant and a consultant in performance measurement and reporting. She has been actively engaged in accounting, reporting and verification aspects of climate change. She is a member of Canadian and international advisory panels and has co-authored climate change, environmental and sustainability publications and documents on regulatory reporting.


McMillan LLP

Barbara Hendrickson
VP, Legal & Sustainability, League Assets Corp
Prior to joining League Assets Corp., Ms. Hendrickson was a partner at McMillan LLP where she co-chaired and founded its Emissions Trading and Climate Change Group. She regularly publishes in the climate change area and is currently co-authoring a book on emission trading. LawDay identified her as one of Canada's leading lawyers in environmental law and climate change.


Torys LLP

Patricia A. Koval
Partner, Torys LLP
Ms. Koval's practice focuses on corporate and securities law, with an emphasis on corporate finance (including investment funds) and mergers and acquisitions. She regularly acts in structuring international and domestic public and private financings and designing new or enhanced financial products and services. She is Co-Chair of Torys' Climate Change and Emissions Trading Group.


S. Labatt

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 titled *Environmental Finance* and *Carbon Finance: The Financial Implications of Climate Change* (John Wiley & Sons, 2002 and 2007).


http://actualmedia.ca

Todd Latham

President & CCO, Actual Media Inc.

Mr. Latham is a media entrepreneur with two decades of experience in B2B marketing and communications, with broad industry knowledge and an extensive international network in the environment, infrastructure and government sectors. Actual Media is a publishing, research and creative design company that publishes *ReNew Canada* and *Water Canada* magazines.

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 TD Bank, she was a senior director with the former Innovest Strategic Value Advisors.


PricewaterhouseCoopers

Sue McGeachie

Manager, Sustainable Business Solutions, PricewaterhouseCoopers

Ms. McGeachie manages projects for both global companies and not-for-profit organizations that address sustainability-related governance and management models. She is Adjunct Professor at the Centre for Environment where she co-teaches a graduate course on Environmental Finance and Sustainable Investing.


A. Polak

Alan Polak

Managing Director, Investment Banking, Canaccord Genuity

Dr. Polak helps lead Canaccord Genuity's initiatives in the power and cleantech sectors. 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 financings and advisory assignments for a range of companies.


S. Reichenbach

Stefan Reichenbach

Global Head of Strategy & Marketing Commodities, Thomson Reuters

Mr. Reichenbach leads the strategy & marketing functions for the global Thomson Reuters Commodities business. He is responsible for mergers and acquisitions, strategic planning, customer insight, product inception and marketing activities. Prior to this, he built a profitable carbon information business for Thomson Reuters.


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 is a leading financial solution provider focused on the low-carbon, water constrained, alternative energy and efficiency marketplace. Mr. Tharp has extensive experience in merchant banking and as an entrepreneur working within the low-carbon, water constrained, alternative energy and efficiency marketplace.

Rodney White

Professor Emeritus, Dept. of Geography, U of T

Dr. White is a geographer and infrastructure planner and is co-author (with Sonia Labatt) of *Environmental Finance* and *Carbon Finance: the Financial Implications of Climate Change* (published by Wiley). 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.canadianwatertreatment.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

Successful series continues in Toronto and Vancouver

BY RODNEY WHITE

Tony Chen

LEFT: Panellists at the October 2009 Carbon Finance workshop in Toronto, from left to right: David Antonioli (CEO, Voluntary Carbon Standard Association), Jean-Philippe Brisson (Climate Action Reserve), Michael Barrett (Partner, Bennett Jones LLP) speak about North American Voluntary and Pre Compliance Markets for Offset Credits. RIGHT: Participants work with Laura Zizzo of Zizzo Allan Climate Law LLP (far right) in interactive workshop sessions using computer-based simulation developed by Fortis Carbon Banking.

Carbon Finance Workshop Series:

October 28-30, 2009, Toronto
November 23-25, 2009, Vancouver, British Columbia

The Centre for Environment continued to offer its successful Carbon Finance Workshop series in 2009-10 with workshops in Toronto and Vancouver. Carbon Finance deals exclusively with the use of market instruments to reduce greenhouse gas emissions, in the hope of avoiding "dangerous" climate change. The three-day workshops are designed as an intensive learning experience limited to 30 participants. Those who successfully complete the 24 hours of instruction, associated readings, and pass the take-home exam are awarded a "Certificate of Achievement". The workshops also offer important networking opportunities for participants and presenters who represent the avant-garde of the carbon finance community. The Centre has offered these workshops in Toronto, Calgary, Vancouver, as well as an international offering in São Paulo, Brazil.

Not surprisingly, the largest contingent of the participants came from the energy sector – both from major utilities and new players in renewable energy. Others came from banking, investment, cleantech, biofuels, transportation, ecosystem restoration and government. A number of students from the Centre's graduate course on Environmental Finance and Sustainable Investing attended the October 2009 workshop in Toronto, as did students from the University of Western Ontario and Queen's University.

The Toronto workshop was opened and addressed by the **Honourable John Gerretsen**, Ontario's then Minister of the Environment. The workshop was presented by the Centre's core team from the University, the business community and NGOs (and members of the Centre's Environmental Finance Advisory Committee, ***see pages 22-23***), plus by invited participants who provided up-to-the minute experience of this emerging field. For this event we were happy to receive personal input, and sponsorship, from Sustainable Development Technology Canada and from the former Fortis Bank in the Netherlands (now ABN AMRO).

Critical to the success of November 2009 workshop in Vancouver was a partnership with the Pacific Carbon Trust, a BC Crown corporation dedicated to the support of BC's low-carbon economy. The Trust provided several of the speakers and attendees – people from government, universities and the private sector, including several start-up companies operating wholly within the carbon economy. It was exciting to deliver the workshop in a province where it is already possible to experience the early stages of the evolution of the carbon economy. The opening address was delivered by the **Honourable John Yap**, BC's Minister of State for Climate Action. The second day was opened by **Scott MacDonald**, CEO of the Pacific Carbon Trust.

The workshops were structured in a modular fashion to meet the needs of an audience working at different levels of experience within the carbon economy. Day One covered an overview of the carbon markets, while Day Two explored the generation of offset credits, voluntary markets in North America, the financing of renewable energy, the buying and selling of Emission Reduction Purchase Agreements, and the development of forestry offset projects. In Vancouver, the specifics of the role of the Pacific Carbon Trust were also discussed. Day Three provided hands-on experience of project development in carbon markets and the trading of offset credits. For the latter we had access to the computer-based simulation developed by Fortis Carbon Banking.

As the carbon economy becomes a reality in North America – as it already is in the European Union – we expect to see a rapid growth in interest in our Carbon Finance Workshops. More workshops are planned for 2010-11.

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

Cleantech in Canada Seminar Series

In collaboration with Deloitte, Ogilvy Renault, MaRS, & Marqaurie Capital Markets

BY LUKASZ BRZOZOWSKI AND EDWARD SARGENT

Solar Power: What's on the Horizon?
February 24, 2010

The sun is an abundant source of clean energy, but solar energy only accounts for a small portion of the global energy market. Why? Because today's technologies are either efficient and costly, or inexpensive and inefficient. But the prices are dropping and efficiencies are increasing, and the solar industry will soon be economically competitive with legacy energy technologies.

An audience of over 400 attended a breakfast seminar with a panel of industry representatives and academic researchers. Moderated by **Richard S. Sutin** (Co-Chair, Cleantech at Ogilvy Renault), the panel brought perspectives from Ontario solar companies (**Kerry Adler,** President and CEO, SkyPower; and **Nick Morgan**, VP, Morgan Solar), a solar materials company (**Scott Nichol,** President and CTO, 6N Silicon), investors (**Paul Huebener**, Managing Director, Macquarie Capital Markets Canada), and emerging third generation solar technologies (**Professor Edward Sargent**, Dept. of Electrical and Computer Engineering, U. of Toronto).


Tony Chen

Edward Sargent (Professor, Electrical and Computer Engineering, U of T) speaks about emerging solar technologies. Panellist Scott Nicol (President & CTO, 6N Silicon) is at left.

The panellists first discussed the benefits and weaknesses of different current and emerging photovoltaic technologies. Also discussed was manufacturing and the emergence of local solar industry and promising research and development (R&D) in Ontario and Canada, which has been lagging behind regions.

The importance of R&D on third generation inexpensive and efficient solar platforms was also discussed. In his own research, Dr. Sargent is using a technology known as "quantum-size-effect tuning" to tap into a broader spectrum of the sun's rays, the key to improving solar efficiency.

The first seminar in this series, held in November 2009, was on ***Opportunities in the Energy Storage Market*** and focussed on the increasing demand on energy storage.

Dr. Brzozowski is Director of Photovoltaics Research in Dr. Sargent's research group. Dr. Sargent is Professor, Canada Research Chair in Nanotechnology, Dept of Electrical & Computer Eng, U of T. For info on their research, please visit www.light.utoronto.ca.

Environmental Risk Management

In collaboration with PricewaterhouseCoopers and TD Bank Financial Group

BY RODNEY WHITE

Environmental Risk Management
January 21, 2010

This breakfast seminar was organized by **Susan McGeachie** (Manager, Sustainable Business Solutions, Pricewaterhouse-Coopers) and **Michelle McCulloch** (Senior Manager, Corporate Environmental Affairs, TD Bank Financial Group) to address the challenge of managing environmental risks (ERM) under uncertainty, especially climate change and its many ramifications. The focus was the extent to which corporate awareness of environmental risk has been growing and methods of addressing the risk have changed over the last few years.

Moderator **Graham Campbell** (Associate Director of Energy, Environment & Transportation, Conference Board of Canada) opened the session with an assessment of the changing role of the Carbon Disclosure Project (CDP), a very useful indicator of growing corporate awareness of carbon risk (i.e. climate change risk) and of growing corporate willingness to begin to actively manage this risk.


Tony Chen

Joanne Lam of Pricewaterhouse-Coopers and George Boire of March Canada discuss corporate awareness of environmental risk.

Panellist **Joanne Lam** (VP, Enterprise Risk Management, Pricewaterhouse-Coopers), concentrated on risks that are "low probability, high impact", such as extreme weather events. **George Boire** (Environmental Practice Leader, Marsh Canada) elaborated the extent to which corporate approaches to ERM are changing from a reactive to a pro-active approach.

The panel also included **Paul Walsh** (Senior VP, Atmospheric and Environmental Research Inc.) who is a meteorologist now working as a consultant to enterprises whose operations and sales are sensitive to the weather. He stated that under climate change, the uncertainty of future weather is a major problem for management for as much as one third of the national economy.

The seminar marked an interesting point in the evolution of our thinking in environmental finance in that much of the corporate world has moved from questioning the science of climate change to developing tools to manage the risks that it will bring.

Rodney White is the Centre's Academic Advisor for Professional Development.

The Value of Water

A 3-part series with Water Canada, the Canadian Urban Institute, & UNU-INWEH

BY KERRY FREEK

Tony Chen

Justin Kim

LEFT: Panellists from left to right Ian Richler (Associate of Gowlings Lafleur Henderson LLP), Lou Di Gironimo (General Manager of Toronto Water), and Andy Manahan (Executive Director of the Residential and Civil Construction Alliance of Ontario) discuss emerging issues at the first seminar in the Value of Water series. RIGHT: At the last seminar in the series, Nicholas Parker (Executive Chairman of Cleantech Group) speaks about global perspectives on investing in innovation.

The Value of Water: Emerging Issues

April 22, 2010, Toronto

"The problem is that current water governance is generally poor and tends to be reactionary, political, managerial, complicated, ad hoc and unmanageable," said **Professor Bruce Pardy**, of Queen's University's Faculty of Law, as he opened the first in a three-part series presented by the Centre for Environment, in partnership with *Water Canada* magazine, the Canadian Urban Institute, and the United Nations University Institute for Water, Environment and Health (UNU-INWEH).

Bringing together over 80 business, government and academic leaders to discuss some of the pressing issues related to water management in Canada, the first seminar's panellists included **Andy Manahan** (Executive Director of the Residential and Civil Construction Alliance of Ontario) who questioned where the funds for infrastructure renewal will come from and who will do the work. **Lou Di Gironimo** (GM of Toronto Water at the City of Toronto) spoke about the challenge cities face when managing reinvestment in water systems. Lastly, **Ian Richler** (Associate of Gowlings Lafleur Henderson LLP) discussed the changing legal rights and responsibilities for water resources as we adapt to climate change.

The Value of Water: Lessons from Abroad and the Homefront: Governance, Technology and Innovation

May 26, 2010, Toronto

Colin Isaacs (President of the CIAL Group) led the discussion at the second seminar in the three-part series. **Colin James** (Operating Manager at GHD Canada) presented on the Australian and US water experience, while **Fabian Papa** (Founder and CEO of Vatten Infrastructure) discussed the role of technology and innovation in reducing costs, mitigating risk and helping corporate Canada meet its commitments for corporate social responsibility (CSR). The International Joint Commission's **Murray Clamen** explained IJC's role in solving disputes around international water boundaries.

The Value of Water: Priorities for Investment: Mutual Benefits for Public and Private Sector

June 29, 2010, Toronto

Moderated by *Water Canada*'s Editor, **Kerry Freek**, this third event tied together many of the topics previously discussed, and featured a lively discussion on public and private involvement in water's management.

In his talk, **Ian McPherson** (President of Criterion Investments), recalled issues of governance and public-private partnerships discussed during the first and second sessions above. "How do you hold accountable a utility that belongs to the municipality?" he asked. This was also argued in an article on water myths published by *Water Canada* in 2009.

He added further arguments for private involvement in water services, such as the need for long-term planning in municipal environments with rapid political turnover. He also mentioned that where the civil service culture is risk-averse and limits technology adoption that may make operations more efficient, private companies may be more willing to update and try new solutions.

Mr. McPherson also claimed that there is more than enough public AND private money to solve our infrastructure woes – even with Canada's estimated infrastructure deficit of $35 billion. "There is no shortage of capital for building infrastructure," he said. "It's a drop in the bucket, no problem. The system is not broken."

Rounding out the discussion, **Kevin Mercer** (of Hampton Consulting Group) discussed how low-impact development applications work with industrial and commercial entities in addition to municipalities and communities, while **Nicholas Parker** (Executive Chairman of Cleantech Group) tackled the question of whether or not new models for governance can be created that protect the public interest but open the door to new sources of finance.

Kerry Freek is Editor of Water Canada magazine (http://watercanada.net/), published by Actual Media.

Canadian Water Summit

Presented by Innovolve Group

BY KERRY FREEK

Kerry Freek

LEFT: Ontario Premier Dalton McGuinty refers to Ontario's proposed Water Opportunities and Water Conservation Act in his keynote address at the Canadian Water Summit. RIGHT: At the Summit's first panel discussion on water and the future of the Canadian economy, from left to right: moderator Rosemary Niechcial (VP of Veolia Water Solutions & Technologies Canada) and panellists Michael Glade (Director of Water Resources and Real Estate at Molson Coors Brewing Co.), Nicholas Parker (Executive Chairman of Cleantech Group), and Gerald Butts (President and CEO of WWF-Canada).

Canadian Water Summit

June 17, 2010, Toronto

Presented by Innovolve Group in collaboration with Sustainable Development Technology Canada, the Centre for Environment, *Water Canada* magazine, Sustainable Buildings Canada, Waterlution, and the World Wildlife Federation (WWF).

"Everyone is part of this conversation," said **Michael Glade** (Director of Water Resources and Real Estate at Molson Coors Brewing Company), as Innovolve Group's inaugural Canadian Water Summit opened. His words couldn't have been truer, and the Summit couldn't have been better timed. Held just a few short weeks after the tabling of Ontario's Water Opportunities and Water Conservation Act, the Summit also provided a great chance for the National Roundtable on the Environment and Economy (NRTEE) to release *Changing Currents*, a new report on water sustainability and the future of the country's natural resource sectors.

From global corporate social responsibility strategies to Canadian water venture investments (of which there were zero in 2009, reported by Cleantech Group's Executive Chairman **Nicholas Parker**) to the role of water in natural resources to climate change adaptation, this well-attended day of sessions and conversation packed a real punch.

The morning started with a panel on "Water and the Future of the Canadian Economy" and was moderated by **Rosemary Niechcial** (VP of Veolia Water Solutions & Technologies Canada). Panellists discussed the changes to public policy and business practice that will be required to secure a sustainable freshwater future for Canada. Michael Glade spoke about Molson Coor's aggressive global water strategy, its involvement in the Water Disclosure Project, and the water use goals it is meeting. ***(For information on the Water Disclosure Project, please visit http://www.cdproject.net or see Water Canada's upcoming November/December 2010 issue.)***

Panellist Nicholas Parker told audiences to look out for the following investment trends in 2010: water-energy, land-energy, land-water, carbon-water. Despite the drop in venture dollars, water innovation surges. "Many investors are coming up to speed," he said.

"Water is how people will come to know that the climate is changing," said **Gerald Butts** (President and CEO of WWF-Canada) bringing mitigation and adaption into the conversation. Providing an excellent segue to the next panel of the morning, he also said we must set aside water for nature and "respect the limits of what nature can provide."

Moderated by NRTEE's President and CEO **David McLaughlin**, the second panel focussed on the results of NRTEE's recent report *Changing Currents* and examined the use of Canada's water supply in the production activities of its natural resources sector. ***(Please visit http://www.nrtee-trnee.com for a free copy of the new report.)***

"Our world is growing thirsty; our goal is to satisfy that thirst," said **Ontario Premier Dalton McGuinty** during his lunchtime keynote address, in reference to Ontario's proposed Water Opportunities and Water Conservation Act. "Water does not belong to us," he added. "We merely hold it in trust for our children." ***(For information on the Act, please visit http://www.ene.gov.on.ca.)***

Following several afternoon breakout sessions, the day's final panel titled "Half-Full: Our Water Future" focussed on innovative water policies and program that local governments are implementing and included speakers from the cities of Guelph, Toronto, Winnipeg and Vancouver. Regarding stakeholder engagement and public education, **Jane Comeault** (Sustainability Strategist for Metro Vancouver) said: "We need to think about a whole suite of tools – not just brochures." In Metro Vancouver, they're implementing some interesting programs – for example, the Region engaged a group of young filmmakers to create short videos promoting the Region's municipal tap water campaign.

Kerry Freek is Editor of Water Canada magazine (http://watercanada.net/), published by Actual Media.

Jane Goodall Institute

Partnership with the Centre provides various learning opportunities for students

BY JANE LAWTON

It's hard to believe it's been almost four years since the Jane Goodall Institute (JGI) moved into the U of T community, and almost two years since we've been happily housed in the Earth Sciences building, courtesy of the Centre for Environment (CFE). The partnership between JGI and CFE continues to grow and uncover new opportunities for educational collaboration through research, lectures and our popular Roots & Shoots youth engagement program.

This year marks a special anniversary for Dr. Jane Goodall: it has been 50 years since she first set foot on the shores of Lake Tanganyika in the Gombe area of Tanzania, where she began her pioneering research on chimpanzee behaviour. In Canada, she kicked off this remarkable accomplishment in a very personal lecture at U of T's Convocation Hall on April 9, 2010. In partnership with CFE and the Royal Ontario Museum, she was warmly introduced by CFE's then Director **Professor Ingrid Leman Stefanovic**, who called Dr. Goodall a "person of unparalleled integrity." In this one-of-a-kind lecture, Dr. Goodall addressed the sold-out crowd with special anecdotes and photographs from her "Fifty Years of Chimps and Change".

Roots & Shoots, our global youth action program, has been very active this year and has made several significant connections with both CFE and the University. Our national forest campaign, Planet Releaf, was launched at U of T in February 2010 with support from CFE, the Faculty of Forestry and its student union, and the University of Toronto Environmental Resource Network (UTERN). The event included films on inspiring forest stories, discussions with the film-makers, and information booths hosted by local forest organizations.

As part of the Planet Releaf campaign, Roots & Shoots is facilitating a series of forest workshops for high school students across the country called "Speak for the Trees", kicked off in Toronto in April 2010, offering opportunities to learn about forest issues and stewardship activities.

FOR MORE INFORMATION & VOLUNTEER OPPORTUNITIES:

www.janegoodall.ca;
416-978-3711; info@janegoodall.ca

Jo-Anne McArthur

Dr. Jane Goodall presents a special lecture at Convocation Hall in April 2010 on "50 Years of Chimps and Change", celebrating 50 years since she first arrived in Tanzania and started her pioneering research on chimpanzee bahaviour.

Over the past year there have been a number of other collaborative events worth highlighting. In November 2009, JGI Board Member **John Wall** (Ph.D. candidate, Carleton University) delivered an engaging seminar on human-wildlife conflict resolution as part of CFE's seminar series ***(see page 31)***, and another JGI Board Member **Professor Kerry Bowman** (Joint Centre for Bioethics, U of T) delivered a number of seminars throughout the year, as well as the keynote speech at the Faculty of Forestry's Spring Banquet in 2010. JGI Executive Director **Jane Lawton** delivered a guest lecture on community-centred conservation to Anthropology students at U of T Mississauga in February 2010, and also addressed Victoria College students in March 2010. Former Roots & Shoots Coordinator **Naomi Resnick** gave a presentation to visitors from Atlanta at a workshop organized by Environment Canada's Adaptation and Impacts Research Section ***(see page 5)*** in July 2009.

JGI is also pleased to have **Cynthia Wesley-Esquimaux** (Assistant Professor, Social Work) join an advisory group to help JGI launch a pilot project to introduce Roots & Shoots to Aboriginal communities.

JGI has been fortunate in its placement at U of T to benefit from a number of young, bright minds volunteering and working for us. We are happy to announce that **Sara Hsiao**, a U of T B.Sc. graduate, has recently taken over as our new Roots & Shoots Coordinator. Sara has been a great asset to the team and has worked with U of T on several initiatives including running a booth at Environmental Career Day in March 2010 ***(see page 30)***. **Daniel Kwan**, a U of T Mississauga student, and **Hamsha Pathmanathan**, a U of T Forestry student, have volunteered with JGI and now sit on our Youth Leadership Council. **Aidan Morishita-Miki**, a recent U of T B.A. graduate, completed a work-study placement through CFE and played an important role in developing the Planet Releaf campaign. Volunteer **Erica Reid**, a U of T Forestry and Aboriginal Studies student, was also another great addition.

In the coming year, we hope to work closely with the Centre for Environment and the Faculty of Forestry to create research opportunities for U of T students with key projects such as our new CIDA-funded community-centred conservation project in Uganda. The partnership established between JGI and CFE has been a rewarding one and we look forward to another year of fruitful collaboration.

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

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, ***see page 39***), 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 the University of Toronto, 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 six years and continues to play an important role in our research and student engagement activities.

In the past year the Sustainability Office has engaged thousands of students through its programs; volunteer, employment and leadership opportunities; coursework; and independent research. One example is **Annette Gagliano**, a second-year B.Sc. Biochemistry student, who worked with the office as part of the ROP299 program in 2009-10 to research ways to reduce laboratory waste and hazardous material generated by U of T's laboratories.

In addition to providing students with valuable opportunities, the Office acts as an information resource for students, staff and faculty interested in campus sustainability. The Office's website **(http://sustainability.utoronto.ca)** saw a significant increase in traffic last year while its new Twitter account **(@SustainableUofT)** has proven very popular with over 550 followers. Also launched this year was the U of T Sustainability Wiki **(http://SustainableUofT.pbworks.com)** which can be updated by anyone and is intended to be a repository of information on all aspects of sustainability at U of T. The wiki is an excellent example of collaboration with students and student groups; conceived at the Office, the project is now maintained by the University of Toronto Environmental Resource Network (UTERN).

Last year an exciting **new paper reduction initiative** was launched with workshops for instructors aimed at reducing course paper consumption and a pilot program at Gerstein Science Information Centre library. Working with students and library staff, a 30% reduction in library paper use was measured compared to last year. The program combined technical changes to printer settings with a complementary behavior change program to promote paper reduction and reuse. In the coming year we hope to expand the program to over 15 additional libraries, reaching an estimated 20,000-30,000 new students annually. We expect to reduce paper use at participating sites by up to 50% or 2 million sheets each year.

A **new 100-panel solar-thermal system at the U of T Athletic Centre** was also installed. The project, which is currently the largest known installation in the Greater Toronto Area or at any Canadian university, was implemented by the Dept. of Facilities & Services but was originally conceived by **Ashley Taylor**, a fourth-year Engineering student, as part of her thesis. Now employed as one of two Sustainability Coordinators at the Office, Ashley was able to continue to contribute to making her vision a reality.

The Sustainability Office's **sustainability planning program** has expanded significantly in the past year. The Office's model engages stakeholders in the creation of tailored, "living" sustainability plans for units within the university. In its role as facilitator, the Office can ensure best practices are followed and that lessons learned are shared among participants. Resources and recommended steps are available online, creating an efficient and accessible process which is nonetheless owned by the departmental planners, ensuring uptake and ongoing action. In the first year of the program, the Office has worked with five units, and several more are interested in joining in the coming year. This is a major step toward the ultimate goal of establishing sustainability plans for all university units. Information and preliminary steps for departments seeking develop plans of their own can be found on the Sustainability Office's website.

Sustainability Office

Sustainability Office's staff, left to right: Ashley Taylor (Sustainability Coordinator), Luke Raftis (Project Coordinator), Dr. Beth Savan (Sustainability Director), Elah Feder (Project Coordinator), JP Davidson (Project Coordinator), Tyler Hunt (Project Coordinator), David Photiadis (Graduate Student Intern), and Stuart Chan (Sustainability Coordinator).

The Office looks forward to continued success working together with Centre for Environment's students and faculty on valuable campus sustainability initiatives. In the coming year, the Office will address energy conservation in students moving out into the community through an extention of its Rewire program called **"Moving Out: Start Green"**. Through this program, and workshops being offered to other institutions, Rewire will build communities and enable significant energy savings beyond the thousands of residence students participating in the program today. Students interested in working with the Office on this and other exciting 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:

http://sustainability.utoronto.ca; twitter.com/SustainableUofT
tel: 416-978-6792; email: sustainability@utoronto.ca

Environmental Career Day

An annual spring event for all university and community college students

BY DAVID POWELL

Pavel Pripa

LEFT: Julie Quenneville (Program Assistant for the M.Env.Sc. professional program) and Pavel Pripa (Graduate Student Advisor at the Centre for Environment) advise students at the career expo of the 2010 Environmental Career Day. RIGHT: Students and exhibitors participate in "The Great Big Crunch", an event organized by Foodshare Toronto to promote healthy eating.

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.

In 2010, the event was held on March 11 in the Hart House's Great Hall with 320 students in attendance. It was a successful collaborative effort by the Centre for Environment, Environmental Students' Union (ENSU, ***see page 12***), the Forestry Union of Students (FUS), the Graduate Environmental Students Association (GESA, ***see page 10***), and the Toronto Undergraduate Geography Society (TUGS). It included a career expo with 25 exhibitors from government, consulting and non-governmental organizations, and U of T professional and graduate programs, providing 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 about their present jobs, how they got there and the key steps for students before and after graduation.

University of Toronto alumna **Josephine Archbold** (M.Sc. alumna, Geography and Environmental Studies) was amongst the engaging group of speakers. She is an Environmental Health Research and Policy Advisor at 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. Key success factors also include a passion for environmental health and a commitment to professional development.

Susan Butler (Volunteer Program Facilitator at Foodshare Toronto) spoke about the importance of flexibility in searching for opportunities as needs change, which will require taking courses, attending seminars and conferences, and keeping up with the literature, on an ongoing basis. To enhance passion for your work, she recommends seeking out mentors, taking initiative and leadership at work, honing communication skills, and working for organizations that provide learning opportunities. Ms. Butler also organized students and exhibitors to participate in **"The Great Big Crunch"** asking everyone to simultaneously crunch on an apple in order to promote healthy eating. In total, 62,987 students in 170 schools across Canada and beyond participated on March 11.

Dr. Ray Clement (Senior Research Scientist at 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.

Thomas Esakin (Executive Director of the Canadian Institute for Environmental Law and Policy) encouraged students to "pursue what you love and love what you pursue", as engagement with one's work, paid or volunteer, is vital to success and satisfaction. Volunteering can enhance work skills and capacities, as well as provide employment opportunities.

Neil Sentence (Assistant Deputy Minister of the Ontario Public Service (OPS) Green Office) spoke about the OPS Green Transformation Strategy, its objective to reduce the environmental footprint of OPS and its operations, and related employment opportunities for those in the environmental field.

Peter Love (Principal of Love Energy Consultants and Ontario's former Chief Energy Conservation Office) spoke about key next steps to establish one's career: get involved through volunteering and professional associations, network with those working in your field of interest and by attending conferences and events, and stay current by looking for research opportunities.

The Centre for Environment looks forward to continuing to offer this event, in order to assist our students as they plan their future.

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

FOR MORE INFORMATION:

http://careerday.environment.utoronto.ca
or David Powell, Undergraduate Student Advisor,
416-946-8100, david.powell@utoronto.ca

Environment Seminar Series

Held Wednesdays, 4:10 p.m.

FOR MORE INFORMATION
on past and upcoming seminars:

www.environment.utoronto.ca
416-978-3475
environment.seminars@utoronto.ca

The following seminars were presented in this series in 2009-10. Condensed abstracts are included below.

SEDRIC PANKRAS, Ph.D. candidate, Faculty of Forestry and Centre for Environment, U of T. ***Investigation of Methods to Minimize Copper Leaching from Alkaline Copper Quat (ACQ) Treated Wood in Service.*** Chromated copper arsenate has been used as a major wood preservative, with arsenic, chromium and copper as its active ingredients. There is a new generation of wood preservatives (alkaline copper quat, ACQ) which are less carcinogenic but still leach considerable amounts of potentially harmful copper into the environment. This talk examined different approaches to optimizing the ACQ wood preservative in order to minimize leaching.

CATHERINE ROBIN, Ph.D. candidate, Dept. of Physics, Dept of Geology and Centre for Environment, U of T. ***Deep Geological Disposal of Nuclear Waste***. One of the favoured permanent disposal options for nuclear waste is a Deep Geological Repository (DGR). Once excavated, a DGR can effectively seal off the disposal area in the event of a failure in the waste containers. In this talk, aspects of DGR were reviewed, along with results of tests done on two types of seals. ***(See p. 8 for thesis abstract and photo.)***

JOHN ROBINSON, Professor, Institute of Resources, Environment and Sustainability, and Dept. of Geography, UBC. ***Accelerating Sustainability at UBC: The Centre for Interactive Research on Sustainability (CIRS), and Beyond.*** This talk highlighted CIRS, proposed to open in 2011 on the University of British Columbia campus. CIRS is intended to be a state-of-the-art living laboratory, in a sustainable building, for research on sustainable building systems and technologies. It intends to offer visualization, simulation and community engagement technologies and processes in exploring sustainable lifestyles.

LEAH SUMNAUTH MCINTOSH, Project Coordinator, Sustainability Office, U of T, and **MATTO MILDENBERGER**, Consultant, Adapt Environmental. ***Changing Behaviour to Conserve Resources: Results of an Empirical Trial Measuring Attitudes, Behaviour and Resource Consumption.*** U of T's Rewire program assesses the efficacy of social marketing used to drive community energy conservation behavioral changes. This talk reviewed the range of psychological metrics available to evaluate changes in behaviour, effective ways to integrate energy metrics into psychological indicators, and the financial implications of a social marketing approach. ***(Please see page 28 for other Sustainability Office projects.)***

Tony Chen

Dr. Zafar Adeel (Director of the United Nations University Institute for Water, Environment and Health) speaks on Canada's Role in the Global Water Crisis.

JOHN WALL, Ph.D. candidate, Department of Geography and Environmental Studies, Carleton University. ***A Quest for Co-Existence: People and Other Animals in an Increasingly Human World.*** In Canada alone, 485 species are listed by the government as "at risk" and at least 36 species have disappeared. This talk explored efforts such as integrated conservation and development and human-wildlife conflict resolution in fostering long term co-existence between humans and other species.

ZAFAR ADEEL, Director, United Nations University Institute for Water, Environment and Health. ***Canada's Role in the Global Water Crisis.*** The WHO estimates that unsafe water and poor sanitation causes 80% of all diseases in the developing world. Underlying this crisis are major policy failures to regulate societal water demands resulting in increasing water scarcity and pollution. This talk addressed ways in which Canada could play a role, such as demonstrating novel management approaches and cutting edge green technologies and exporting expertise in water management and technology to developing countries.

Memorial Lectures

The Centre was pleased to present the following memorial lectures in 2009-10 as part of its Environment Seminar Series. For photos and details of students awards presented, please see pages 14 and 19.

Eric Krause Lecture, February 10, 2010

PETER LOVE, Love Energy Consultants. ***Climate Change, Conservation and Distributed Leadership.*** Mr. Love recently completed his term as Ontario's first Chief Energy Conservation Officer. In this timely seminar, he spoke about climate change as the most important environmental issue to face humankind. He highlighted the critical role conservation plays, the benefits of conservation and also its challenges, and referred to what we can do at home, at work and within schools to conserve energy. ***(Please see page 19 for recipients of the Eric Krause graduate fellowship.)***

Robert Hunter Lecture, March 10, 2010

RICHARD GILBERT, Consultant, Transport & Energy Issues. ***Transport and Energy Turmoil: Lessons from Recent Events, Prospects for the Medium-Term.*** This seminar focused on the recent tumultuous years in transport and energy, and discussed possible options for the near future. The recent turmoil may have been caused by the imminence of a peak in the world production of oil. The end of the rising production of natural gas, coal, and uranium is also in sight. Possible replacement fuels for land, marine and air transport were discussed. ***(Please see page 14 for recipients of the Hunter undergraduate scholarship.)***

Douglas Pimlott Lecture, Mar 17, 2010

JOE DUFF, Co-Founder and CEO, Operation Migration Inc. ***Bird's Eye View: Using Ultralight Aircraft To Teach Endangered Whooping Cranes How To Migrate.*** Each year, Joe Duff's team of pilots and biologists at Operation Migration condition a new generation of Whooping Cranes to follow their custom designed ultralight aircraft. The birds are led over 1200 miles in an effort to teach them to migrate. In the spring they make the return journey on their own. The cranes have made a slow comeback. In their ninth season, Operation Migration has created a new eastern flock of over 100 birds migrating where none have existed in over 100 years. ***(See p. 14 for recipients of the Douglas Pimlott undergraduate awards.)***

Environment & Health Seminar Series

Held Thursdays, 4:10 p.m.

FOR MORE INFORMATION
on past and upcoming seminars:

www.environment.utoronto.ca
416-978-3475
environment.seminars@utoronto.ca

The following seminars were presented in this series in 2009-10. Condensed abstracts are included below.

JEFFREY BROOK, Senior Scientist, Environment Canada; Assistant Professor, Dalla Lana School of Public Health, U of T. ***The CHILD Birth Cohort Study: Overview and Description of the Environmental Exposure Assessment Activities.*** This seminar introduced a new McMaster University CHILD (Canadian Healthy Infant Longitudinal Development) study which follows children from "pre-birth" to five years. and studies how the environment interacts with genetics to affect health and development.

MONICA CAMPBELL, Manager, Environmental Protection Office, Toronto Public Health. ***Right to Know: Scare Mongering or Fostering Intelligent Discourse about Chemicals in the Community?*** In 2008, Toronto introduced the Environmental Reporting & Disclosure Bylaw which requires facilities to report if they use or release one or more of 25 toxic substances above reporting thresholds. This talk discussed the development of the bylaw, the health rationale and capacity building to support facilities in assessing chemical usage.

NITA CHAUDHURI, Ph.D. Candidate, OISE/UT (Adult Education, Community Development and Counselling Psychology) and Centre for Environment, U of T. ***Participatory Action Research (PAR) for Environmental Health among Senegalese Peri-Urban Farmers.*** This seminar was on a doctoral study of a PAR project that engaged peri-urban farmers in Senegal using popular education and in which change in perceptions and behaviour was documented. ***(Please see page 10 for condensed thesis abstract and photo.)***

DONALD COLE and **SHELLEY HARRIS**, Associate Professors, Dalla Lana School of Public Health, U of T. ***Teaching and Learning Environmental Epidemiology: How Does It Work Best?*** Environmental epidemiologists study the linkages between adverse health outcomes and environmental exposures, etiological linkages between environmental exposures and health status in populations, as well as the impacts of programs and policies. This seminar explored how environmental epidemiology should be taught, given the variety of activities involved.

RAY COPES, Director of Environment and Occupational Health, Ontario Agency for Health Protection and Promotion. ***Hazard or Outrage? Wind Turbines in Ontario.*** Wind power has been proposed as part of a solution to reduce greenhouse gas emissions and regional air pollution, but has been met with opposition. This seminar discussed how hazardous wind turbines are and some factors to explain why wind power may be welcomed or opposed.

Tony Chen

Professor Cheryl Teelucksingh of Ryerson University speaks about building community capacity for environmental health promotion Toronto's Parkdale neighbourhood.

DIONNE GESINK, Assistant Professor, Dalla Lana School of Public Health, U of T. ***Space, Place and Sex: The Social Epidemiology of Sexually Transmitted Infections.*** This seminar explored the spatial distribution of sexually transmitted infections and the social, cultural and environmental factors that may influence the spread of disease and pattern changes over time. Dr. Gesink discussed her research projects in areas such as Grand River, Ontario; Saddle Lake Cree Nation, Alberta; North Carolina, Montana, and Greenland.

BLAKE POLAND, Associate Professor, Dalla Lana School of Public Health, U of T. ***Resilience in the Face of Climate Change and Peak Oil: Community-Building Responses for an Equitable Transition to a Low-Carbon Society.*** The world is in a period of unprecedented change. This seminar argues that building resilience at psychological/personal, community, and systems levels must be at the centre of social justice and environmental change movements. Also discussed was an arts-enabled transformative learning curriculum on the transition to a low-carbon society.

RICK SMITH, Executive Director, Environmental Defense Canada, and **BRUCE LOURIE**, President, Ivey Foundation. ***Taking on Toxins: A Story of Emerging Success.*** Studies have shown that significant levels of toxic substances can leach out of commonplace items in our homes and workplaces. The authors of the book *Slow Death by Rubber Duck* talked about how they experimented upon themselves to find how some toxins make their way inside us. Ultimately hopeful, they empowered the audience with ideas for protecting themselves and changing things for the better.

CHERYL TEELUCKSINGH, Associate Professor, Dept. of Sociology, Ryerson University. ***Local Knowledge and the Use of Photovoice: Building Community Capacity for Environmental Health Promotion in the Neighbourhood of Parkdale, Toronto.*** Using findings from a study in Parkdale, the Photovoice project was discussed as an approach to identify local knowledge about experiences of environmental health. The project uses photographs and narratives to highlight neighbourhood-level environmental and health inequalities with the goal of contributing to developing policy aimed at promoting environmental health justice.

ED TOPP, Principal Research Scientist Agriculture and Agri-Food Canada, London, Ontario. ***Drugs in Sludge: Assessing the Risk When Municipal Biosolids are Recycled onto Agricultural Land.*** Pharmaceuticals and personal care products (PPCPs) found in the sewage treatment process may be carried to biosolids, which are commonly used as a fertilizer in agriculture. This talk featured a study investigating the movement of PPCPs from land treated with biosolids, and their potential uptake into crops.

BRUCE URCH, Ph.D. Candidate, Inst. of Medical Science and Centre for Environment, U of T. ***Controlled Human Exposures: Cardiorespiratory Health Effects of Ambient Particulate Matter and Ozone.*** Respirable particulate matter (PM) with a diameter less than 2.5 micrometres (μm) and ground-level ozone (O_3) are major contributors to urban smog. There has been recent interest in studying coarse particles (> 2.5 μm) and ultrafine particles (<100 nm). This talk focussed on a study of the acute cardiorespiratory effects of fine and course PM and O_3, using a state-of-the-art human inhalation facility.

DAVID WALTNER-TOEWS, President, Network for Ecosystem Sustainability and Health; Professor, Dept . of Population Medicine, University of Guelph. ***Chickens, Complexity and Ecosystems: Tackling Wicked Health Problems in an Unstable World.*** This seminar discussed the intransigent health and disease problems we face and their associations with policy, trade, climate change, land use, urban planning, transportation, belief systems and medicine. It argued that to deal with these issues requires a re-imagination of our place in the world, and the invention of better methods to investigate and manage that place.

COP-15 in Copenhagen

The Centre co-hosts session on Indigenous Peoples and sends U of T students

BY BARBARA HENDRICKSON AND STEPHEN SCHARPER

Lindsay Frischer

Laura Tozer

LEFT: U of T students at COP-15 in Copenhagen, December 2009, from left to right: Leo Josephy, Leah Sumnauth McIntosh, Harleen Panesar, May Jeong, Laura Tozer, Claire-Helene Heese-Boutin, David Gordon, Zannah Matson, Lindsay Fischer. (Absent from photo: Jesse Elders, Gurushabd Khalsa, and Robert Stupka.) RIGHT: A peaceful protest on the streets of Copenhagen during COP-15.

Nations from across the world met in Copenhagen, Denmark from December 7 to 18 2009 at the 15th annual Conference of the Parties to the United Nations Framework Convention on Climate Change, also known as COP-15, to negotiate a new global climate change treaty. This would set the course for international action on climate change after the first phase of the Kyoto Protocol expires in 2012. The Centre for Environment (CFE) was pleased to participate by sending 12 students and **Professor Stephen Scharper** (Anthropology, U of T Mississauga, and CFE) and **Barbara Hendrickson** (VP, Legal & Sustainability, League Assets Corporation) as representatives and by officially co-hosting an official side session on Indigenous Peoples' issues.

The hope was that a successor protocol to Kyoto would be finalized during these two weeks, hence the rebranding of Copenhagen as "Hopenhagen". However, no binding agreement emerged. The only result was the Copenhagen Accord which required developed countries to submit 2020 emission reduction targets and developing countries to identify their mitigation actions. Although non-binding, the Accord lays the groundwork for a second Protocol which is expected to be finalized at the end of this year.

Unfortunately, Canada received the Fossil Award on the first day of the convention for its "unwavering commitment to stand firm in its inaction throughout these negotiations" and was ranked 56th out of the 57 countries, one higher than Saudi Arabia.

The Centre for Environment participated in a number of side sessions and co-hosted a coveted official side session titled ***Impacts and Opportunities for Indigenous Peoples: Developing Indigenous-Led Climate Ventures for a Sustainable Future***, in collaboration with the Assembly of First Nations and the Centre for International Sustainable Development Law. The main theme throughout these sessions focused on funding projects for Indigenous and developing communities – a complex problem which relates to an economically disadvantaged status and the fact that their interests tend not to be adequately considered in the structuring of climate change regulatory frameworks in both domestic and international contexts.

U of T students moved by climate justice issues

Despite staying in cold, damp, crowded billets in a floating youth hostel, the following 12 U of T students, partially sponsored by the Centre, participated actively and effectively at COP-15: **Jesse Elders** (B.A. students, Ethics, Society & Law), **Lindsay Fischer** (B.A. student, Peace and Conflict), **David Gordon** (Ph.D. student, Political Science), **Claire-Helene Heese-Boutin** (B.A. student, Caribbean Studies, Environment & Society), **May Jeong** (B.A. student, Political Science, Environment & Society), **Leo Josephy** (B.A. student, Architecture, Environmental Ethics), **Gurushabd Khalsa** (B.A. student, International Relations, Environmental Policy & Practice), **Zannah Matson** (B.A. student, Peace & Conflict, Environment & Society), **Harleen Panesar** (B.A. student, Architecture, Environment & Society), **Robert Stupka** (M.A.Sc. student, Civil Engineering), **Leah Sumnauth McIntosh** (Hons B.A. alumna, International Development, Environmental Studies), and **Laura Tozer** (M.A. student, Geography and Environment).

Our students helped articulate the issues of global "climate justice", brought forward by small countries and communities which are currently suffering the brunt of global climate change. For example, the tiny island nation of Tuvalu is in danger of completely submerging owing to rising sea levels accompanying the melting of the polar ice caps. With developed countries leading the world in per capita greenhouse gas emissions, these threatened nations brought a compelling message of basic justice and survival.

By attending side events, participating in vigils, celebrations, and rallies, blogging and contributing to media such as *The Toronto Star* and *The Huffington Post*, our students were a refreshing counterpoint to the official Canadian government delegation. Their actions there, and subsequent talks and writings on their experience of Copenhagen continue to make a positive and hopeful difference.

Barbara Hendrickson is VP, Legal & Sustainability at League Assets Corporation and member of the Centre's Environmental Finance Advisory Committee (see pages 22-23). Stephen Scharper is Associate Professor, Anthropology UTM and CFE (see page 39).

Guyana President Jagdeo visits U of T

A special lecture on tropical rainforests and climate change

BY TIM WELSH AND INGRID LEMAN STEFANOVIC

***Tropical Rainforests: An Abatement Solution to Climate Change*,**
Special Lecture by Bharrat Jagdeo, President of the Republic of Guyana,
October 22, 2009

The Centre for Environment (CFE) was pleased to host a special lecture by **His Excellency Bharrat Jagdeo**, President of the Republic of Guyana – the first time that the Centre has hosted a sitting Head of State. In her introduction, CFE's then Director **Ingrid Leman Stefanovic** noted Jagdeo's international influence on debates around climate change, as well as his progressive stance on the relation between economics and conservation. She praised him for his international leadership on these issues and fostering dialogue between developing and developed countries.

President Jagdeo spoke primarily about the need to generate political will from the ground up. He outlined the economic and scientific rationale behind adopting aggressive policies towards climate change, and noted that a lack of public support is the largest obstacle which politicians face when attempting to advance conservation-minded legislation. He spoke of the need for ambitious goals, both in terms of the challenges around the global reduction of carbon emissions, and in the need for investment of developed nations in environment-based economic initiatives.


Johnny Guatto

The leading role that Guyana has been playing in rainforest conservation was another theme of President Jagdeo's talk. With over 16 million hectares of forest, conservation is a relevant issue for Guyana. Trained as an economist before entering politics, he has proposed a model for a forest carbon economy, in which developed nations invest in the preservation of Guyana's forests to counterbalance their own carbon consumption. He emphasized that it should not be thought of in terms of a provision of aid to a developing country but instead, as a market-driven solution. Although it is specific to Guyana, he noted that the model is also part of a larger process of awareness-raising about the true cost of energy use.

Tim Welsh is a former Research Coordinator at the Centre for Environment. Professor Ingrid Leman Stefanovic is the former Director of the Centre.

Climate Wise Women

In collaboration with Geography & Women's and Gender Studies Institute

BY TIM WELSH

Climate Wise Women Speaking Tour
Only Canadian stop: April 16, 2010, University of Toronto

Often, recognizing the global scope of environmental problems can be difficult or disheartening. In April 2010, the Centre for Environment hosted the only Canadian engagement of the Climate Wise Women Speaking Tour, an event which emphasized the human face of climate change, as well as the individual capacity for making a positive difference.

Throughout April 2010, the Climate Wise Women toured North and Central America, meeting with local experts and activists as part of a global conversation about climate change. In Toronto, they were joined by keynote speaker **Dr. Dorothy Goldin Rosenberg** (Women's Healthy Environment Network), green communications expert **Janet McCausland** (Principal, Get it Done Communications) and **Professor Danny Harvey** (Department of Geography, U of T).

The Climate Wise Women are **Constance Okollet** (Chairperson, Osukura United Women Network, Uganda), **Ulamila Kurai Wragg** (Coordinator, Pacific WAVE Media Network, Cook Islands), **Sharon Hanshaw** (Executive Director of Coastal Women for Change, Biloxi, Mississippi) and **Ursula Rakova** (Executive Director, Tulele Peisa, Carteret Islands, South Pacific). The tour was created after the women participated in a presentation on "Global Women Take Action on Climate Change" coinciding with the 2009 UN General Assembly High Level Event on Climate Change in New York City.

At the Toronto event, each of the women shared stories of how they have been personally affected by climate change. Ms. Okollet spoke of the cycle of flooding and drought in Uganda which led to malnutrition, water-borne diseases and an increase in infant death. Ms. Kurai Wragg discussed environmental instability in the Pacific Islands caused by recent hurricanes. Ms. Hanshaw saw her entire community destroyed by Hurricane Katrina. Lastly, Ms. Rakova spoke of her experience as one of the 1700 Carteret Islanders forced to relocate due to rising sea levels and disappearing food supply.

In her address, Dr. Goldin Rosenberg spoke about the need to involve women in climate change discussions. This was followed by talks by Dr. Harvey, who spoke of the long history of institutional procrastination on climate change, and Ms. McCausland, who outlined some of the difficult individual choices that must be made in order to go green. It was a night of global and local perspectives, diverse cultures, and sometimes divergent opinions. Throughout the event, though, the good humor and positivity of the Climate Wise Women kept things grounded and lively.

For more information, please visit www.climatewisewomen.org.

Tim Welsh is a former Research Coordinator at the Centre for Environment.

Christian Abizaid

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Licenciatura (International Relations), Iberoamericana, Mexico; M.A. and Ph.D. (Geography), McGill.
2010-11 CFE Instructor of ENV 223H Fundamental Research Skills and JGE 321H Multicultural Perspectives on Environmental Management (joint course with Geography).

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 land cover change, neotropical rainforests, Latin America, Amazon, Mexico.

Featured Research Projects:
Floodplain Dynamics, Socioeconomic Change, and Traditional Livelihoods in the Upper Amazon. This project examines the prospects for economic livelihood within the context of rapid environmental and socioeconomic change. As part of my dissertation, I studied the origins, and the (social and economic) consequences of a recent meander cutoff along the Ucayali River in Peru. Since then, South American governments announced important infrastructure projects in the Amazon, under IIRSA, which are likely to change the prospects for economic livelihood in my study area. Building on my earlier research, I have a unique opportunity to document long-term livelihood responses to the cutoff in a socioeconomic context that promises to change dramatically in the coming years.

Life and Livelihoods on Amazonian Floodplains (with O. Coomes, McGill University). The floodplains of the Amazon river and its tributaries are considered to be among the last agricultural frontiers in Amazonia. Research on floodplain ,se 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.

Forthcoming and Recent Publications:
Coomes, O., Y. Takasaki, C. Abizaid and B. Barham. 2010. Floodplain fisheries as natural insurance for the rural poor in tropical forest environments: evidence from Amazonia. *Fisheries Management & Ecology*. (In Press.)
Coomes, O.T., C. Abizaid and 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.

Philip Byer

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S.M. (Civil Eng.), S.B. (Electrical Eng.), Ph.D. (Civil Eng.), Mass. Inst. Technology
2010-11 CFE Instructor of ENV1001H Environmental Decision-Making.

Research Interests:
Environmental planning and decision making, multiobjective project evaluation, environmental assessment, risk management, 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.

Recent Publications:
Byer, P. 2009. Improving municipal waste management planning. *The Journal of Policy Engagement* 1(5):7-10.
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.

Karen Ing

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M.Sc. (Zoology), Toronto.
2010-11 CFE Instructor of SII 199H Debating and Understanding Current Environmental Issues, ENV 200H Assessing Global Change: Science and the Environment, ENV 221H Multidisciplinary Perspectives on Environment; and Co-Instructor of ENV 451H Current Environmental Debates.

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

Featured Research Projects:
Incentive Mechanisms for the Provision of Ecosystem Services in Ontario. The provision of ecosystem services poses challenges similar to as those associated with the provision of public goods. These challenges become more serious when the providers are private landowners. In partnership with conservation authorities in Southern Ontario, this project is being undertaken to enable community organizations to implement the most appropriate incentive mechanisms by enhancing their capacities, and to facilitate relevant policy changes related to the provision of ecosystem services, at the national, provincial, and municipal levels, through dissemination of research results.

Ecosystems and Human Well-Being (UNEP). In collaboration with **Professor Shashi Kant** (Faculty of Forestry, 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 China and Vietnam.

Team Teaching: Does It Strengthen Or Undermine a Learning Community? With a cross-disciplinary group of U of T colleagues, this study 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. This project was a critical component in developing Ontario's 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 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, J.C. Davies. 2010. Density, movements, and survival of raccoons in Ontario, Canada: implications for disease spread and management. *Journal of Mammalogy* 91(1): 122-135.
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.

Academic Coordinators

Anthony Davis

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B.A., Manchester; M.Sc. and Ph.D. (Biogeography), Wisconsin.
Summer 2010 CFE Instructor of ENV395Y Special Topics Field Course: Ecology & Conservation in the Amazon, Galápagos & Andes ***(see article on page 6)*** .

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 Project:
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, such as the changing shorelines of the Great Lakes and the coastal geomorphic processes and changed patterns of coastal ecosystems in Cuba.


R. DiFrancesco

Richard DiFrancesco

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B.A. Hons, M.A., Ph.D. (Economic Geog./Regional Sci.), McMaster.

Research Interests: The relationship between the industrial and occupational structure of municipal labour forces and the potential for urban economic growth and development; brownfield redevelopment, especially on older inner cities; agricultural production (and related agri-food activities) in highly urbanized economic regions.

Recent Publications:
DiFrancesco, R. 2009. Specification and evaluation of alternative projections of the magnitude and structure of the Ontario economy to 2020. *Ontario in the Creative Age Working Paper Series*, Martin Prosperity Institute, University of Toronto.
Petrov, A.N. and R. DiFrancesco. 2007. Contract federalism? New public management and reforming Aboriginal public employment and training services in the Canadian North. In J.F. Young (ed.), *Federalism, Power and the North: Governance Reforms in Russia and Canada*, Centre for European, Russian, & Eurasian Studies, U of T.

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B.Sc., M.Sc., Ph.D. (Zoology), Toronto.

Research Interests:
The mechanisms by which environmental conditions structure ecological communities; fish and aquatic invertebrate communities; statistical methodologies; environmental contaminants; ecological restoration/recovery.

Featured Research Projects:
Impact of Invasive Species on Biodiversity of Lakes. Much of our research focuses on factors impacting the biodiversity of ecological systems. One research theme relates to the impact of invasive species on the biodiversity of lakes. We have ongoing projects examining the impact of invasive species of fish and invertebrates on our native species, determining the potential invisibility of Canadian lakes, and assessing how large-scale environmental alterations such as climate change, further increase the vulnerability of our ecosystems to invasive species. Many of these issues relate to the fundamental science of invasive and native species; however, often human actions contribute to the dispersal and impact of these species through largely unrecognized ways. Our work also aims to better educate the public about these largely unrecognized actions and consequences.

Decline of Endangered Canadian Fish Species. The PhD research of recent alumnus **Mark Poos** ***(see page 8)*** has been to determine the factors contributing to the decline of the endangered Canadian fish species Redside Dace, which is restricted to increasingly urbanized areas around Toronto. Mark's work serves to provide critical knowledge about the biology of this species and its critical habitat features and most importantly, to quantify the importance of connections among habitat patches essential to allow it to survive.

Natural Recovery/Restoration. Although most environmental studies show deterioration in biodiversity, environmental quality and virtually all other attributes measured, we have been studying the natural recovery of an area severely impacted by mining and acidification near Lake Superior. Although these types of impacted systems generally show limited recovery even with considerable cost and effort expended by humans, our research area has shown unparalleled recovery in habitat and all types of aquatic life without human intervention. This set of systems provides a great model system of ecological development.

Forthcoming and Recent Publications:
Gewurtz, S.B., S.P. Bhavsar, D.A. Jackson, E. Awad, J.G. Winter, E.J. Reiner, R. Moody, and R. Fletcher. 2010. Trends of legacy and emerging-issue contaminants in Lake Simcoe fishes. *Journal of Great Lakes Research*. (In Press.)

Gido, K.B and D.A Jackson. 2010. (Editors.) *Community Ecology of Stream Fishes: Concepts, Approaches, and Techniques.* American Fisheries Society. 664 pages.

Edwards, B.A., D.A. Jackson, and K.M. Somers. 2009. Multi-species crayfish declines in lakes: implications for species distributions and richness. *Journal of the North American Benthological Society* 28:719-732.

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2010-11 CFE Instructor of SII 199H Sustainable and Just Futures: Environmental Politics in an Age of Global Warming, and ENV 333H Ecological Worldviews.

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:
Democratizing Forest Governance in India: Rights, Justice and Conservation (SSHRC, 2010-11; with **Professor Neera M. Singh**, Faculty of Forestry, U of T). This research examines the forest reform process in India and its implications for marginalized forest dwellers, in context of the recently enacted Forest Rights Act. It seeks to understand how cross scale organizing by forest dwellers can contribute to a more democratic and just forest governance.

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.

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.* Oxford University Press, Delhi. (Forthcoming.)

Kumar K, S. Behera, S. Sarangi, and O. Springate-Baginski. Historical Injustices: The Creation of Poverty through Forest Tenure Deprivation in Orissa. In O. Springate-Baginski (ed.), *Understanding Livelihood Impacts of Participatory Forest Management Implementation in India & Nepal.* Overseas Development Group, University of East Anglia, U.K. (Forthcoming.)

Douglas Macdonald

Senior Lecturer, Centre for Environment.
Office: Centre for Environment, Room 1049B (5 Bancroft Ave. entrance). Mailing address: 33 Willcocks St., Toronto, ON, M5S 3E8; tel: 416-978-1558; fax: 416-978-3884; douglas.macdonald@utoronto.ca; http://www.environment.utoronto.ca.

Hon. B.A., M.A., Toronto; Ph.D. (Environmental Studies), York.

2010-11 CFE Instructor of ENV 222H Interdisciplinary Environmental Studies, ENV 320H National Environmental Policy, ENV 322H International Environmental Policy, ENV 1005H Business and Environmental Politics; and Co-Instructor of ENV 451H Current Environmental Debates.

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 **Dr. Jochen Monstadt**, Technische Universität Darmstadt, Germany and **Dr. Kristine Kern**, Wageningen Universiteit, The Netherlands). The subject of this project is the failure of the Canadian 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 agreements. The project intends to apply lessons from those two success stories to the Canadian process. ***(Also see page 3.)***

The Oil and Gas Industry and Government of Canada Climate-Change Policy: Objectives, Legitimacy and Organization (SSHRC, 2009-11). This research attempts to understand the sources of the political power of the oil and gas industry as it has lobbied to influence Government of Canada climate-change policy during the past twenty years.

Industry Power to Influence Climate-Change Policy (SSHRC, 2007-10; with Ph.D. students **Gabriel Eidelman** and **David Houle** of Political Science and Centre for Environment). This is a study of why the aluminium industry was more successful in influencing Quebec climate-change policy than was the electricity industry in Massachusetts.

Managing Political Tensions Associated with the Transition to a Low-Carbon Economy Carbon Management Canada (2010-12; with **Professor James Meadowcroft**, Political Science, Carleton University). This is a study of ways to reduce political conflict in state, market and civil society associated with redistributive implications of effective climate-change policy.

Forthcoming and Recent Publications:

Macdonald, D. and D.L. VanNijnatten. Canadian climate policy and the North American influence, in S. Blank, M. Gattinger and G. Hale (eds.), *Borders and Bridges: Navigating Canada's International Policy Relations in a North American Context.* Oxford University Press. (Forthcoming.)

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.
Office: Dept. of Geography, Room 5028, 100 St. George St., Toronto, ON, M5S 3G3; tel: 416-978-4975; fax: 416-946-3886; scott.prudham@utoronto.ca; http://www.geog.utoronto.ca; http://www.environment.utoronto.ca.

B.A.& Sc., McMaster; M.A. (Geography), Victoria; Ph.D. (Energy and Resources), California, Berkeley.

2010-11 CFE Instructor of JGE331H Resource and Environmental Theory (with Geography), and ENV 1444H 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 examines 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 BC's 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.

Forthcoming and Recent Publications:

Prudham, S., G. Gad, and R. Anderson. *Networks of Power: Toronto's Waterfront Energy Systems from 1840 to 1970.* University of Toronto Press. (Forthcoming.)

Prudham, S. 2009. Pimping climate: a critique of Richard Branson's entrepreneurial activism. *Environment and Planning A* 41: 1594-1613. ***(Winner of Ashby Prize awarded to the most innovative paper published in Environment and Planning A in 2009.)***

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.

Beth Savan

Senior Lecturer, Centre for Environment; Director, U of T Sustainability Office.
Office: Sustainability Office, Room 208, South Borden Building, 487 Spadina Crescent.
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http://www.environment.utoronto.ca;
http://www.sustainability.utoronto.ca.
B.Sc. Hons., Toronto; Ph.D., London, U.K.
2010-11 CFE Instructor of ENV 307H Urban Sustainability and Supervisor of ENV 299Y Research Opportunity.

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 **Professors Ingrid Stefanovic**, ***see page 40***, and **Greg Jamieson**, Mechanical & Industrial Eng). 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. This project draws together researchers and students from social sciences and engineering to identify new research questions, develop more robust theoretical perspectives, and refine methodological approaches. ***(See page 3.)***

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. ***(See page 29 for more on the Sustainability Office.)***

Reducing Resource Consumption and Greenhouse Gas Emissions: A Sustainability Planning Module for the Private Sector (MITACS Accelerate, 2009-10, with Geography graduate student **David Photiadis** and Toronto Hydro). The Sustainability Office has been testing a Sustainability Planning program, where researchers facilitate a planning process that integrates behavioural and technological interventions to achieve resource and greenhouse gas emission reductions in institutional units at U of T campus. This research tests aspects of the Sustainability Planning module in a private

sector setting – a department within the Toronto Hydro Corporation.

Recent Publications:
Savan, B.I., S. Flicker, B. Kolenda and M. Mildenberger. 2009. How to facilitate (or discourage) community based research: recommendations based on a Canadian survey. *Local Environment* 14(8): 783-796.
Flicker, S, B.I. Savan, M. McGrath, B. Kolenda and M. Mildenberger. 2008. If you could change one thing; what community-based researchers wish they could have done differently. *Community Development Journal* 43(2): 239-253.

Stephen B. 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, ON, M5S 3E8;
tel: 416-978-7433; fax: 416-978-3884;
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http://www.environment.utoronto.ca.
B.A. Hons., Toronto; M.A. (Theology), Toronto; Ph.D. (Religious Studies), McGill.
2010-11 CFE Instructor of ENV 100H Introduction to Environment Studies and ENV 1008H Worldviews and Ecology.

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

Featured Research Project:
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

Professor, Department of Philosophy; Director, Centre for Environment, 2005-10.
Office: Alumni Hall, St. Michael's College, Room 309, 121 St. Joseph St.;
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http://philosophy.utoronto.ca.
B.A., M.A. and Ph.D. (Philosophy), Toronto.
Co-Instructor of ENV 1001H Environmental Decision-Making.
(On sabbatical leave July 1, 2010 to June 30, 2011.)

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). This project is with **Dr. Beth Savan** ***(see page 39)***, **Professor Greg Jamieson** (Mechanical and Industrial Engineering), and coordinated by **Dr. Ellie Farahani** ***(see page 41)***. It is 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 page 3 for project description.)***

The Schools My Father Built: A phenomenology of modernist architectural school design. Rather than focusing on the traditional ocularcentric analysis of modernism, this project focuses instead on issues of embodiment, memory and imagination as part of a phenomenology of place. A conference presentation is scheduled in the fall of 2010, and a book is underway.

Values in Environmental Decision Making: How taken for granted personality characteristics, biases, social values and broader paradigms affect decision making when it comes to issues of environment. A book is in preparation.

Forthcoming and Recent Publications:
Stefanovic, I.L. and S. Scharper. (eds.) The *Natural City: Re-Envisioning the Built Environment*. University of Toronto Press. (Forthcoming.)
Stefanovic, I.L. The greening of corporate ethics. *Forum on Public Policy.* (Forthcoming.)
Stefanovic, I.L. and C. Wiseman. 2009. 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.* 15(4): 410-415.
Stefanovic, I.L. 2009. House of dreams: reading architectural and natural environments. *Indian Journal of Eco-Criticism.* Vol. 2 (August): 90-99.

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 (Dept. of Civil Engineering), Rm. 319, 35 St. George St., Toronto,M5S 1A4;
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B.A.Sc., M.A.Sc., Ph.D (Mech. Eng.), Waterloo.
2010-11 CFE Instructor of JEI 1901H Technology, Society and the Environment I (joint course with Dept. of Civil Engineering).

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 Projects:
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

Assistant Professor and Coordinator of the Environment and Health Collaborative Graduate Program, Centre for Environment.
Office: Centre for Environment, Room 2097, 33 Willcocks St., Toronto, Ontario, M5S 3E8; tel: 416-978-2972; fax: 416-978-3884; clare.wiseman@utoronto.ca; http://www.environment.utoronto.ca.
B.E.S. Hons. (Waterloo), M.Nat.Res.Mgmt. (Simon Fraser), Dr. phil.nat. (Frankfurt).
2010-11 CFE Instructor of ENV 4001H Graduate Seminars in Environment and Health and ENV 430H/4002H 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:
Urban Gardening & Airborne Particulate Matter: Exploring the Fate of Traffic-Related Emissions and the Effectiveness of Risk Reduction Measures. (Centre for Urban Health Initiatives seed grant, in collaboration with Foodshare, 2009-11). This research aims to investigate airborne sources and fate of metal contamination in urban gardens, their uptake by plants and the effectiveness of soil remediation measures. A pilot garden has been established on campus to assess the impact of traffic-related metal emissions on cultivated plants and the potential health risks. The goal is to identify ways to minimize risks, while promoting the health and community development benefits of urban gardening.

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. Airborne fine and ultrafine particulate matter (PM) samples along a major highway in the Greater Toronto Area (GTA) have been collected and analysed. The bioavailability of these metals in airborne PM and other environmental media such as street dust and soils will be investigated.

Soils and their Carbon Sequestration Capacity: Does Mineralogy Matter? This research investigates the sorptive dynamics of soil clay minerals or phases with organic compounds to help clarify the mechanisms of carbon stabilization in soils and their use as a potential sink to mitigate climate change. This research also contributes to our knowledge regarding the extent to which mineralogy controls the bioavailability of potentially

harmful organic contaminants. Current work involves the examination of clay mineral-organic carbon associations in Athabasca tar sands samples from the Cretaceous period.

Forthcoming and Recent Publications:
Zereini, F and CLS Wiseman. (Editors.) *Urban Airborne Particulate Matter: Origins, Chemistry, Fate and Health Impacts.* Springer Verlag, Berlin. (Forthcoming.)
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

Post-Doctoral Fellow, Centre for Environment, 2009-10.
tel: 416-946-0972; ellie.farahani@utoronto.ca; http://www.environment.utoronto.ca.
B.Sc. (Physics), Tehran Azad University; M.Sc. and Ph.D. (Atmospheric Physics), Toronto; M.B.A., Northwestern/York.

Research Interests: Climate change impact analysis, environmental policy, energy management and conservation, sustainability planning, applied mathematics in sustainable development, climate change mitigation and adaptation and community based research.

Research Project:
Energy Conservation and Demand Management: Integrating Design, Behaviour and Technology (SSHRC; with **Drs. Beth Savan** ***(see p. 39)***, **Ingrid Stefanovic** ***(page 40)*** and **Greg Jamieson**, Mechanical Eng.). I do the overall coordination of this project and work closely with four graduate students, two from social sciences and two from engineering, to conduct research on "the human element" in technological feedback design. It frames the feedback in the context of energy conservation to align with conservation attitudes using temporal construal theory (TCT) in the behavioural economy. This summer, a two-part study was piloted at U of T: the first part employs students living in residences to evaluate the design and the second part is a qualitative study engaging the same student populations. ***(Also see page 3.)***

Tim Leduc

From August 2010: Assistant Professor, Environmental Studies, York U.
4700 Keele St., Downsview, Ontario, M3J 1P3; tel: 416-736-2100 x 22103; tleduc@yorku.ca; www.fes.yorku.ca.
To August, 2010: Post-Doctoral Fellow, Centre for Environment.
B.Sc. (Psychology), Trent; M.S.W. (Social Work), Toronto; M.E.S. and Ph.D. (Environ. Studies), York.

Research Interests: Interdisciplinary and intercultural views on climate change, indigenous/colonial relations and knowledges, religion and ecological worldviews; environmental education, interdisciplinarity in Canadian Environmental Studies.

Research Project:
From Sustainable Campuses to Sustainable Interdisciplinary Education in Canada's Universities. This research began with the SSHRC Post-Doctoral project at U of T concerned with questions of inter-disciplinarity in Canadian environmental studies programs. It argues that interdisciplinary climate research is being limited by disciplinary specialists, and that the physical sciences and humanities need to be better intertwined. I am now examining trends in Canada's academic approaches to interdisciplinary environmental research and pedagogy and have surveyed interdisciplinary Environmental Studies programs at various Canadian universities. An article will be published in the journal *Environments* this fall.

PROFILES: OTHER INSTRUCTORS & SESSIONAL LECTURERS

In addition to its core faculty members (see pages 35-41), the Centre for Environment (CFE) is pleased to have other experts from within and without the University instructing its undergraduate, graduate, and distance education courses. The following individuals instructed CFE courses in 2009-10 and may instruct in 2010-11 (subject to change). Please see pages 13, 17, 20-21 for respective undergraduate, graduate and distance education course listings.


Chemistry, U of T

Jonathan Abbatt

Professor, Dept. of Chemistry, U of Toronto
ENV235Y Physics & Chemistry of the Evolving Earth, 2009-10
Dr. Abbatt uses state-of-the-art analytical techniques, involving mass spectrometry and spectroscopy, to study the fundamental physical chemistry of processes involved in global atmospheric change, with an emphasis upon the molecular level. His current research looks at the role that aerosol particles play in the chemistry of the troposphere, in global climate, and in urban air pollution.


A. Abelsohn

Alan Abelsohn

CFE Undergraduate Sessional Lecturer
ENV 341H Environment & Human Health, 2009-10
Dr. Abelsohn is a Family Physician in Toronto and Assistant Professor in the Dept. of Family and Community Medicine and the Dalla Lana School of Public Health at U of T. He is a physician-epidemiologist in the Health Canada's Air Quality Health Index program and has authored journal articles on environment and impacts on human health. He also designed two CFE distance courses on environment & health.


Mercer

Jane Ambachtsheer

CFE Adjunct Professor & Sessional Lecturer
ENV 1707H Environmental Finance and Sustainable Investing
Ms. Ambachtsheer is a Partner of Mercer, based in Toronto. She leads Mercer's global responsible investment business, and consults to North American and international investors. She was a consultant to the United Nations and is a global advisor to the Carbon Disclosure Project. She is a member of the Centre for Environment's Environmental Finance Advisory Committee ***(see page 22-23)***.

Brad Bass

CFE Adjunct Professor & Sessional Lecturer
ENV 1004H Urban Sustainability
Dr. Bass is a researcher in Environment Canada's Adaptation and Impact Research Section with an office and lab at the Centre for Environment. His research interests include simulating adaptation with anticipatory/ emergent computing, green walls and green roofs, community energy systems planning and adaptations to climate change. ***(See page 5 for his current projects)***.


M. Belmont

Marco Belmont

CFE Undergraduate Sessional Lecturer
ENV 236Y Human Interactions with the Environment
Dr. Belmont is a research consultant at Toronto Public Health in the Environmental Protection Office, where he researches and implements programs on environmental health. After working for the Ministry of Environmental Protection in Mexico, he obtained a Ph.D. in environmental toxicology from Trent University and completed postdoctoral work in the US and Canada. He also teaches at Ryerson University.


O. Bussler

Oliver Bussler

CFE Distance Education Instructor
Carbon Finance Certificate Program
Mr. Bussler is the Senior Manager responsible for Capital Power Corporation's Environmental and Emissions Portfolio group, and provides strategic direction to Capital Power's environmental market activities. He has developed a broad skill in the world of carbon finance, having spent the past nine years involved with Canadian carbon policy, project development and carbon offset acquisitions.


S. Cohen

Saul Cohen

CFE Undergraduate Sessional Lecturer
ENV 321Y Approaches to Environmental Issues, 2009-10
Mr. Cohen is a Ph.D. candidate in the Dept. of Anthropology at U of T. His research examines a cultural tourism conservation and development project in a San ("Bushman") village in northern Botswana. He is also investigating the move by international conservation organizations toward market-based conservation. He is a member of the IUCN Commission on Environment, Economic, and Social Policy.


M. Diamond

Miriam Diamond

Professor, Dept. of Geography, U of Toronto
ENV 236Y Human Interactions with the Environment
JGE 1212H Contaminants in the Environment
Dr. Diamond is interested in chemical contaminants from source to health effects. Her research includes measuring and modelling sources, fate and exposure of the plasticizers phthalates indoors to advancing methods in Life Cycle Impact Assessment. Her projects focus on minimizing exposure to contaminants via indoor and outdoor environments.


G. Gienko

Gennady Gienko

CFE Distance Education Instructor

GIS for Environmental Management Certificate Program

Dr. Gienko is an Associate Professor in the School of Geomatics at the University of Alaska Anchorage, where he develops and teaches undergraduate and graduate courses in remote sensing, Geographic Information Systems, and fundamentals of geographic techniques. He has extensive international experience in geospatial science, geomatics and photogrammetry, along with over 25 years of research and teaching.


Dept. of Geology, U of T

Michael Gorton

Asst. Professor, Dept. of Geology, U of Toronto

ENV 315H Chemical Analysis of Environmental Samples

Dr. Gorton is a geochemist who has specialized in the trace element geochemistry of rocks and especially, the rare earth elements. His research includes a wide range of practical applications on the origin of rocks and theoretical studies on the effects of intense alteration on the usefulness of trace element geochemistry in rocks. He also specializes in analytical methods and supervises a range of analytical instruments.


M. Govorov

Michael Govorov

CFE Distance Education Instructor

GIS for Environmental Management Certificate Program

Dr. Govorov has instructed in the Centre's GIS (Geographic Information Systems) in Environment Management distance program since its advent and was instrumental in its initial development. He has been teaching GIS and Remote Sensing in the online environment for over five years and currently teaches and prepares undergraduate and postgraduate courses at the Vancouver Island University.


S. Greenberg

Sharonna Greenberg

CFE Distance Education Instructor

Environmental Management Certificate Program

Dr. Greenberg is a Post-Doctoral Fellow in the Department of Chemistry at U of T. Her research with Dr. Douglas Stephan's group focuses on finding ways to use more environmentally friendly elements in the process of hydrogenation, which is required in the manufacture of many electronics, pharmaceuticals, and pesticides, and often uses small amounts of potentially toxic metals.

A.P. Lino Grima

Associate Professor (retired), Geography, U of T

ENV 1703H Water Resource Management and Policy

ENV 1704H Environmental Risk Analysis & Management

Dr. Grima has taught environmental/water resources management at U of T since 1972. His research and advocacy of Great Lakes water quantity and quality issues go back to the 1970s. He has published over 60 scientific papers and several books on natural resources and environmental management. He has also served as a consultant for public and private bodies.


A. Hall

Andrew Hall

CFE Distance Education Instructor

Carbon Finance Certificate Program, 2009-10

Andrew Hall has worked in the field of carbon finance for the past four years and specialized in the subject as a core component of his MBA. He works for Capital Power Corporation in the Environment and Emissions Portfolio group where he is responsible for originating, developing and transacting carbon offset projects. Prior to this, he worked for Lloyds Banking Group in Tokyo and London.


D. Harvey

L. Danny Harvey

Professor, Dept. of Geography, U of Toronto

JGE 347H Efficient Use of Energy

JGE 348H Carbon-Free Energy

Dr. Harvey's research focuses on computer climate modelling, with applications to the understanding of past climatic changes and projection of future climatic change due to emissions of greenhouse gases. Particular emphasis is on coupled climate-carbon cycle models and the impacts of different future global energy scenarios.


McMillan LLP

Barbara Hendrickson

CFE Distance Education Instructor

Carbon Finance Certificate Program

Ms. Hendrickson is VP, Legal & Sustainability at League Assets Corp. Prior to this, she was a partner at McMillan LLP where she co-chaired and founded its Emissions Trading and Climate Change Group. She regularly publishes in the climate change area and is currently co-authoring a book on emission trading. She is a member of CFE's Environmental Finance Advisory Committee ***(see page 22-23)***.


C. Hostovsky

Chuck Hostovsky

CFE Undergraduate Sessional Lecturer

ENV 307Y Urban Sustainability, 2009-10

Dr. Hostovsky has taught in various departments at the University of Toronto and received a Ph.D. in Regional Planning & Resource Management from the University of Waterloo. His interests are in planning in the context of urban infrastructure, in particular, sustainable urban development and the effects of land use and environmental regulations on environmental and social justice.


R. Houldin

Russ Houldin

CFE Undergraduate Sessional Lecturer

ENV 323H Ontario Environmental Policy; ENV 347H Power of Economic Ideas; ENV 350H Energy Policy & Environment

Mr. Houldin has worked, mainly as a policy adviser, in the Ontario Public Service for over 30 years in a variety of Ministries. He is currently a senior adviser to the Ontario Energy Board. His interests include environmental and ecological economics; sustainable electricity systems; environmental and economic regulation; and Ontario environmental policy.

PROFILES: OTHER INSTRUCTORS & SESSIONAL LECTURERS


C. Jia

Charles Jia
Professor, Dept. of Chemical Engineering & Applied Chemistry, University of Toronto
JNC 2503H Environmental Pathways
Dr. Jia's research applies sciences and engineering principles to address environmental problems related to sustainable energy. His projects address clean air, clean water and climate change and develop new technologies for minimizing industrial emissions. He also studies the fate, transport and impacts of pollutants in the natural environment.


Forestry, U of T

Shashi Kant
Professor, Dept. of Forestry, U of Toronto
ENV 421H Environmental Research, 2009-10
Dr. Kant's research is focused on sustainability, economics, and natural resources, in particular, valuation of ecosystem services and Aboriginal land use activities, incentive mechanisms for the provision of ecosystem services, agent-based modeling, carbon markets, economics of co-management, and participatory governance. He is editor-in-chief of the Springer book series *Sustainability, Economics, & Natural Resources.*


B. Karney

Bryan W. Karney
Professor, Dept. of Civil Engineering, U of T
ENV 346H Terrestrial Energy Systems
Dr. Karney is also Associate Dean, Cross-Disciplinary Programs in the Faculty of Applied Science and Engineering. His current research considers the design, analysis, operation and optimization of various water resource and energy systems, with emphasis on hydroelectric and pumped storage systems, pipe networks and water distribution systems. He is also interested in engineering education and ethics.


N. Kwamena

Nana-Owusua Kwamena
Post-Doctoral Fellow, Chemistry, U of T
ENV235Y Physics & Chemistry of the Evolving Earth, 2010-11
Dr. Kwamena's research interests have focussed on understanding the physical and chemical processes that govern the heterogeneous reactions and uptake behaviour of organic compounds on aerosol particles, thin organic films and ice surfaces. A better understanding of these reactions is key to fully describing the fate and transport of organics in the environment.


Geography, U of T

Virginia Maclaren
Professor & Chair, Dept. of Geography, U of T
JGE 1413H Environmental Assessment
Dr. Maclaren is also Graduate Chair for the tri-campus Geography and Planning programs. Her main research interests are in the policy, economic and social aspects of urban waste management. Her current research projects include a study of extended producer responsibility in Canada and a longitudinal study of NIMBY (Not in My Backyard) attitudes around a landfill.


J. McDonald

Jane McDonald
CFE Distance Education Instructor
Carbon Finance Program
Before starting a maternity leave, Ms. McDonald was the Executive Director of Sustainable Prosperity in Ottawa. Before that, she served as the Director of Competitiveness and Carbon Markets for Environment Canada, as negotiator for the Canadian delegation to the UN climate negotiations, and as Associate Vice-President in the Toronto office of international carbon brokers CO2e.com—Cantor Fitzgerald.


PricewaterhouseCoopers

Sue McGeachie
CFE Adjunct Professor & Sessional Lecturer
ENV 1707H Environmental Finance and Sustainable Investing
Ms. McGeachie develops sustainability-related governance and management models for clients with PricewaterhouseCooper's Sustainable Business Solutions practice. Prior to this, she was a director with Innovest Strategic Value Advisors, where she analyzed companies on environmental, social and governance performance. She is a member of CFE's Environmental Finance Advisory Committee ***(see pages 22-23)***.


Physics, U of T

Bernd Milkereit
Professor, Department of Physics, U of T
ENV235Y Physics & Chemistry of the Evolving Earth, 2010-11
Dr. Milkereit is a geophysicist with interests in seismic imaging, borehole geophysics, petrophysics and scientific drilling. He has over 35 years of international experience and joined Physics at U of T in 2001 as the first Teck Chair in Exploration Geophysics. His current research is on scale and frequency dependent geophysical responses for mineral, hydrocarbon and groundwater exploration and monitoring.


A. Moser

Anne Moser
CFE Distance Education Instructor
Renewable Energy Program
Ms. Moser received a Master's degree in Chemical Engineering from the University of Erlangen-Nuernberg, Germany and then started her doctoral studies in Mechanical and Industrial Engineering (MIE) at U of T. Her research focuses on the aerodynamics of small-scale vertical axis wind turbines with the aim of improving turbine efficiency. She has also been a teaching assistant for alternative energy courses.


P. Muldoon

Paul Muldoon
CFE Adjunct Professor & Sessional Lecturer
ENV 422H/1701H Environmental Law
Mr. Muldoon is the Vice-Chair at the Environmental Review Tribunal, a body that adjudicates appeals, applications and referrals under 12 statutes. Prior to this, he was the Executive Director at the Canadian Environmental Law Association. He has graduate degrees from McMaster University and McGill University and has co-written two books on Canadian environmental law and policy.


L. Newman

Lenore Newman

CFE Distance Education Instructor

Environmental Management Certificate Program

Dr. Newman received her Ph.D. in Environmental Studies from York University and is currently an Assistant Professor in the School of Environment and Sustainability at Royal Roads University, B.C. She is also a tutor at the Centre for Global and Social Analysis at Athabasca University. Her research is on sustainable food systems and urban sustainable development, including the urban nature/culture interface.


E. Opuko-Boateng

Ernest Opuko-Boateng

CFE Distance Education Instructor

Carbon Finance Certificate Program

Dr. Opoku-Boateng obtained his M.A. and Ph.D. in Geography and Environmental Studies from U of T. In Canada, he is exploring the use of market-based approaches to achieve environmental objectives. In Sub-Saharan Africa, where he is currently working on a biodiesel and sustainable livelihood program, his interests centre on poverty, environmental change and public finance.


C. Robin

Catherine Robin

CFE Undergraduate Instructor

ENV235Y Physics & Chemistry of the Evolving Earth, 2009-10

Dr. Robin is a recent Ph.D. alumna in the Department of Physics, in collaboration with Geology and the Centre for Environment ***(see page 8)***. Her research focuses on fluid flows on terrestrial planets. In particular, she researches mantle dynamics on the planet Venus, tectonics and crustal reorganization on the very early Earth, and, on a smaller scale, the transport of heat by fluid flow in nuclear waste repositories.


D. Sider

David Sider

CFE Sessional Lecturer & Distance Ed Instructor

ENV 440H Professional Experience Course; and
Environmental Management Distance Education Program

Dr. Sider received his Ph.D. in Geography and Environment at U of T, for which he carried out his fieldwork in India, focusing on community-based approaches to water supply, sanitation, and solid waste management in low-income urban settlements. He has also worked with environmental organizations in Nicaragua, Malaysia, and Canada.


K. Snarr

Kymberley Snarr

CFE Distance Education Instructor

Environmental Management Certificate Program

Dr. Snarr has been with the CFE distance education program since its advent and was instrumental in its initial development and has been teaching in the online environment for nearly a decade. She received her Ph.D. in Anthropology and Environmental Studies from U of T. Her current work examines large mammal ecology, in particular, primate population & hunting preferences in Honduras.


L. Sportza

Lucy Sportza

CFE Distance Education Instructor

Environmental Management, Renewable Energy Programs

Dr. Sportza has also been teaching in the online environment and undergraduate program at the University of Guelph for the last several years. She has a M.A. and Ph.D. in Planning from the University of Waterloo. Her doctoral research focused on planning for Toronto's urban parks and protected areas. Her current interests focus on the use of parks and other protected areas as part of overall urban sustainability.


EEB, U of T

Ivana Stehlik

Lecturer, Biological Sciences, UT Scarborough

ENV 234Y Environmental Biology, 2009-10

Dr. Stehlik has recently joined Biological Sciences at U of T Scarborough as a Lecturer. Prior to this, she was a Lecturer in the Dept. of Ecology and Evolutionary Biology (EEB) at U of T and Associate Director of the Koffler Scientific Reserve at Joker's Hill. She received her Ph.D. from the Institute of Systematic Botany, University of Zurich, Switzerland then received a Postdoctoral Fellowship at EEB.


S. Waite-Chuah

Sheila Waite-Chuah

CFE Undergraduate Sessional Lecturer

ENV 335H Environmental Design

Ms. Waite-Chuah has been teaching environmental/sustainable design for 15 years. Her interest in sustainable design is intimately linked with sustainable development, in both local and global contexts. She received a Masters in Environmental Studies from York University. She also teaches sustainable design and is Coordinator for the Sustainability Office at the Ontario College of Arts and Design University.


C. Young

Charlotte Young

CFE Sessional Lecturer, Undergraduate

ENV 223H Fundamental Environmental Skills, 2009-10
ENV 340H Informed Environmental Practice, 2009-10

Dr. Young has worked for over 25 years to catalyze forward-looking environmental solutions. She leads educational and training sessions on collaboration, facilitation, conflict management, team building, and program evaluation for environmental and natural resource professionals. She has a Ph.D. in environmental psychology from U of Michigan.


A. Zimmerman

Ann Zimmerman

Professor, Ecology & Evolutionary Biology, UofT

ENV 200Y Assessing Global Change, 2009-10

Dr. Zimmerman has recently retired after 32 years as an aquatic ecologist at U of T. Her research was in the biogeochemical behaviour of freshwater ecosystems. She was also the founding Director of the Koffler Scientific Reserve at Jokers Hill, 2002-07. She taught ENV 200Y (now H) for over the 18 years, a course deliberately structured to explain the role of science in understanding the environment.

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