



School of the Environment
UNIVERSITY OF TORONTO

2013 ANNUAL REPORT





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Message from the Director

BY KIMBERLY STRONG,
Inaugural Director, School of the Environment.

Environmental issues are everywhere, ranging from the local to the global scale – issues of sustainability, energy, climate change, mitigation and adaptation, extreme weather, biodiversity, land use, air quality, conservation, water, resource use, health, and more. The need for solutions has never been greater. With its focus on interdisciplinary studies, the School of the Environment has a real opportunity to make a difference. By bringing together scholars from many disciplines, students interested in the environment, and the wider community beyond the University, we are well placed to contribute to understanding and improving the complex relationships between humans and the environment in which we live.

I am delighted to have become an active participant in the School in my new role as Director, which began in July 2013. As you may know, the School was established in July 2012, emerging from the previous Centre for Environment after an extensive consultation process within the Faculty of Arts and Science (FAS). The School was initially led by Interim Director **Don Jackson**, and I'd like to thank him for his leadership during the transition from the Centre to the School. Don was at the helm during a period of uncertainty, and very ably steered the Centre, and subsequently the School, through this process. Don did such a great job that he was recruited to become the Chair of the Department of Ecology and Evolutionary Biology. We wish him every success in his new position.

Since the summer, I have been getting to know the School, its people, and its programs. I'd like to thank all the faculty, staff, and students who welcomed me, particularly **Doug MacDonald**, who kindly agreed to serve as Academic Associate Director this year.

The School's mandate is to enhance and expand environmental teaching and research within FAS. It aims to involve multiple units in offering environmental programs as shared endeavours and to support research and scholarship that builds on existing disciplinary strengths. It provides an intellectual home for students in environmental programs, including academic advising and enhanced research opportunities, with a focus on rebuilding shared undergraduate teaching programs; developing graduate programs; maintaining sustainability-related co-curricular opportunities; and offering high-quality professional development opportunities.

I envision the School as a dynamic unit that serves as a nexus for faculty, bringing together scholars from a wide range of disciplines, strengthening existing links, and creating new ways of collaborating and interacting with colleagues; as a magnet for students interested in the environment, offering them the best courses and programs in this field; and as a portal for the wider community beyond the University, providing access to all of the diverse and interdisciplinary environmental scholarship that is underway here. We want to train the next generation, enabling them to put their environmental knowledge to use in many positive ways. With about 7.5% of undergraduate students in FAS (St. George campus) currently enrolled in environmental programs, it is clear that our students understand the importance of the environment. We need to engage their interest and provide a meaningful education that will allow them to contribute to society in a multitude of ways.



Faculty of Arts and Science

So what have we been doing lately? On the undergraduate front, we rolled out the new **major in Environmental Science** this fall, and our revamped **major in Environmental Studies** is going strong. We submitted a proposal for a new minor in Environmental Science that is consistent with the new major. We are actively working to expand **international opportunities** for our students, with **Karen Ing** taking the lead on this. She visited a number of universities in Singapore and Hong Kong in November 2013, and we are now rolling out “structured pathways” to enable students to more easily identify opportunities for study abroad. This past year, our students participated in field courses in the Andes, the Amazon, the Galápagos Islands, and Australia. Our graduate **collaborative programs in Environmental Studies and Environment & Health** provide students from different departments with a broad perspective that complements their discipline-based degrees, and we are starting to think about developing new stand-alone graduate programs. We are very pleased to have two searches for joint faculty positions underway, one in Aquatic Ecology and Environmental Science with the Department of Ecology and Evolutionary Biology, and one in Experimental Climate Physics with the Department of Physics.

Our Professional Development Program continues to thrive, and has offered a range of in-class and distance courses this past year, with a big line-up organized for 2014. Our Distance Education program is celebrating its 10th birthday this year, which is a major milestone. One recent event, organized with our **Environmental Finance Advisory Committee**, was a Thought Leadership Panel with leaders in the field of environmental finance and management. At this event, we awarded the inaugural **Skip Willis Undergraduate Scholarship** to Laura Heintzman, a 3rd Year Environmental Studies Major and Psychology Major. The award is in honour of Errick “Skip” Willis, who was an internationally recognized expert in climate change and valued member of our Environmental Finance Advisory Committee. This coming year, we will award the first **Rodney White Environmental Studies Scholarship**, set up in memory of Professor Rodney White, an internationally renowned scholar, who, as Director of the former Institute for Environmental Studies, helped in the founding of the Centre for Environment. I would like to thank the many people whose generous donations in memory of Skip and Rodney enabled these scholarships to be established at the School. We are very fortunate to have a number of other endowed scholarships, and I'd also like to acknowledge the donors who have contributed to these over the years.

Thank-you to everyone who has supported the School over the past year. Looking ahead, there is plenty to do! I see this as a wonderful opportunity, and I look forward to working with many of you to make the School of the Environment a great success.

Toronto Cycling Think & Do Tank

Partnership aims to encourage more cycling for short trips in Toronto

BY TRUDY LEDSHAM



Left: Daniel Rather



LEFT: The Toronto Cycling Think & Do Tank project partnered with BikeChain and the Charles Street Graduate Residence to hold a free bike tune-up clinic in the spring to help residents get ready for a summer of cycling. **RIGHT:** Elena Jusenlijska (left) of Delta Management Group presents project leader Beth Savan with the Clean16 and Clean50 awards in recognition of her contributions to sustainable development or clean capitalism.

The Toronto Cycling Think & Do Tank, funded by a SSHRC Partnership Development Grant, combines expert practitioners and academics to address an important gap in knowledge about building more sustainable cities: how experience from the behavioural change field (applied to building occupants) can be transferred to the field of active transportation. Active (or human-powered) transportation has been identified as one of the solutions to congestion in the Greater Toronto and Hamilton Area, which is significant and increasing. The project's goal is to encourage more people to cycle as their primary means of transportation, particularly for the short neighbourhood trips that comprise approximately half of all travel in Toronto.

Transportation behaviour is extremely complex and creating change is challenging. In order to leverage both academic and practical knowledge of cycling for transportation, **Dr. Beth Savan**, Senior Lecturer Emerita at the School of Environment and former Director of the U of T Sustainability Office, has partnered with the Toronto Centre for Active Transportation, 8-80 Cities, Fourth Floor, BikeChain, Evergreen, Spacing, and *Dandyhorse* magazine.

In cities like Toronto, political support for planning, programs and physical infrastructure for cycling has lagged behind world leaders. In spite of this, cycling's share of short daily trips has grown dramatically in Toronto and differences by ward reveal that social and behavioural factors are crucial in determining where and how cycling adoption takes place. Because social infrastructure is a key factor in creating behavioural change, the Toronto Cycling Think & Do Tank's research focuses on this critical component.

Reports available on the project's website (torontocycling.org) include the frequently requested *Tool Kit to Accelerate the Adoption of Cycling for Transportation*; *Mapping Cycling Behaviour in Toronto* which analyzes cycling behaviour to understand who cycles, how, where and why; and the summary report *A Snapshot of Cycling Behaviour in Toronto*. Soon to be released are *Cyclists, Bike Lanes, and On-Street Parking: Economic Impacts* and a report on how cycling retailers can act as agents of social change.

Two behaviour change pilot projects were undertaken in the summer of 2013. The first worked with BikeChain, a do-it-

yourself educational bike repair shop on campus (<http://bikechain.utoronto.ca>), and with the Charles Street Graduate Residence. The second worked with CultureLink settlement services and with new Canadians. These projects are just winding up and results will be analysed and published in late 2013.

Knowledge mobilization has been a focus for the project and early results have been widely dispersed through several local workshops and conferences including Velo-City 2013; the Garrison Institute's Climate, Mind and Behaviour and Climate, Cities and Behaviour symposia; Complete Streets Forum 2013; ExpoCycle 2013; and the project's extensive website. In the fall of 2013, Dr. Savan presented at the Behaviour, Energy and Climate Change Conference in Sacramento. On November 6, 2013, she gave a seminar in the School's seminar series at which she was **presented with Delta Management Group's Canada's 2014 Clean16 (education category) and Clean50**, in recognition of her contributions to sustainable development or clean capitalism.

As part of the project's outreach to the public, blogs by research team members are regularly published in *Spacing* magazine. Additionally, the cycling magazine *Dandyhorse* published an article on the project's mapping work. In recognition of the relevance of the project's work to transportation policy, the Ontario Transportation Minister invited the group to participate in the Minister's Working Group to develop a new cycling strategy for Ontario, **#CycleON**. Released in late summer 2013, it looks ahead 20 years and outlines steps to promote cycling as transportation across the province (www.mto.gov.on.ca/english/pubs/cycling).

With seven official partners and several more organizations interested in participating, the Cycling Think & Do Tank has engaged more than 20 students and research assistants (with plans for more) through coursework, internships, part-time research assistantships, and work study positions. Four articles are currently being prepared for academic publication and a number of future research projects are under consideration.

Trudy Ledsham is Project Coordinator of this project. For more information, please visit www.torontocycling.org or contact her at trudy.ledsham@utoronto.ca or Dr. Savan at b.savan@utoronto.ca.

Metals in Toronto roadside gardens

Study tracks traffic-related metals and uptake in plants grown in Toronto

BY CLARE WISEMAN



Visiting Masters student Imke Stamme, from the Goethe University of Frankfurt, samples at Foodshare's headquarters, as part of Clare Wiseman's project assessing metal uptake in plants close to traffic.

A research study led by **Professor Clare Wiseman** (see page 29) of the School of the Environment since 2010 is assessing the fate of traffic-related trace metal and metalloid emissions and their uptake by plants grown in Toronto. The overarching goal is to elucidate how soil trace metal behavior and bioaccessibility are influenced by stabilization processes, as determined by primary physicochemical soil parameters and changing field conditions over time. A wide range of trace metals are being examined, ranging from lead, copper and nickel to lesser known elements such as cerium. The ultimate aim is to assess the hazard potential of gardening in close proximity to traffic and provide a knowledge basis for decision-making in the establishment of community gardens in Toronto.

The first phase of this research, which involved the analysis of cultivated oregano, beets, and eggplants cultivated at four locations with variable traffic-related metal inputs in 2010, demonstrated that

metal accumulation in soils and uptake by plants is highly variable. Certain elements, most notably cadmium, were found to be highly mobile in soils and accumulate in the root zone of plants, which contributed to a higher tissue uptake. Metal concentrations in the root zone of plants turned out to be better predictors of plant tissue levels, providing evidence that soil quality guidelines based on total metal concentrations for bulk soils are poor indicators of hazard.¹

Soil samples which have been collected along with plant tissues since the first phase of this research (from 2011 to 2013) were analyzed in the Summer of 2013 by Dr. Wiseman at the Johann Wolfgang Goethe University of Frankfurt, Germany, during her stay as a Visiting Scholar at the Institute of Atmosphere and Environment (funded through U of T Faculty of Arts and Science's Germany/Europe Research and Study Fund). The particular focus of this sub-study is to determine how traffic-related metals and metalloids have accumulated at the locations of interest since 2010, as a function of both depth and proximity to traffic.

In addition, this line of research has been recently expanded to include three other locations in Toronto, involving gardens cultivated by Dr. Wiseman's community partners **Foodshare** and the student-led **Dig In! UofT Campus Agriculture Network**. These locations are the foci of a Master's research project of a visiting student from Goethe University in the Fall of 2013, **Imke Stamme**. Her research is being supervised by Dr. Wiseman and **Professor Dr. W. Püttmann**, as part of a larger initiative to strengthen our international ties and provide enhanced opportunities for student exchange and study with our partner university in Frankfurt. The particular focus of Imke's research is to examine the emissions of arsenic and antimony in an urbanized environment and their fate in roadside gardens.

¹ Wiseman et al. 2013. Traffic-related trace element fate and uptake by plants cultivated in roadside soils in Toronto, Canada. *Science of the Total Environment* 442: 86-95.

For more information, please contact Professor Clare Wiseman at clare.wiseman@utoronto.ca.

Metal dynamics & ecotoxicity in Ross Lake near Flin Flon mine

Professor Miriam Diamond of the Department of Earth Sciences (see pages 30 and 31) and her lab recently completed a three-year project in collaboration with Hudson Bay Mining and Smelting Co. Ltd. (HBMS), administered by the School of the Environment. The project assessed metal dynamics and ecotoxicity in Ross Lake, located in Flin Flon, Manitoba.

Ross Lake has received zinc-enriched mine tailing effluents for over 50 years. Due to resuspension of sediments, the lake is a source of zinc to downstream waterbodies. In this project, the general model of metal speciation and fate developed in Dr. Diamond's lab has been

adapted to assess metal dynamics and metal ecotoxicity in Ross Lake as part of the nearby mine's closure plan. (Although the mine is not closing, government regulations demand that they develop a closure plan.) In addition to modelling, then Master's student **Sumera Yacoob** (Chemical Engineering and Applied Chemistry) worked with personnel from Hudson Bay Mining and Smelting at their Flin Flon site, and also worked in collaboration with **Professor Celine Gueguen** of Trent University, **Bob Santore** of Hydroqual Inc., and members of Stantec consultancy.

Results indicate that despite very high levels of zinc in Ross Lake, copper appears

to be responsible for toxicity to algae and fish. An important source of concern is dips in lake pH in spring-summer due to the microbial breakdown of sulphur compounds from the tailings pond.

In late March 2013, Sumera successfully produced her Master's (M.A.Sc.) thesis and a baby girl who was delivered one week after her thesis defense. Sumera is now devoting her full attention to her daughter and has put aside debates about mines and metal toxicity.

For more information, please contact Professor Miriam Diamond at miriam.diamond@utoronto.ca.

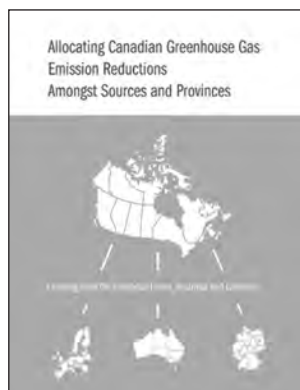
Studying Canadian environmental policy on climate change and sustainable transportation

BY DOUGLAS MACDONALD

The following projects on environmental policy are led by Dr. Douglas Macdonald, Senior Lecturer at the School of the Environment (see page 27). For more information, please contact him at douglas.macdonald@utoronto.ca.

Allocating Canadian GHG emission reductions amongst sources and provinces

This recently completed four-year project was funded by SSHRC and studied the allocation of Canadian greenhouse gas (GHG) emission reductions amongst sources and provinces, learning from the European Union (EU), Australia and Germany. Done in collaboration with researchers at the Technische Universität Darmstadt (Germany) and Wageningen Universiteit (The Netherlands), it addressed the inability of Canadian federal and provincial governments to reach agreement on one national climate change program, including allocation of cost amongst sources and provinces, in comparison to programs in the EU, Australia, and Germany.



The final project report was completed in April 2013: *Allocating Canadian Greenhouse Gas Emission Reductions Amongst Canadian Sources and Provinces: Learning from the EU, Australia and Germany*. It is available online at <http://www.environment.utoronto.ca/AllocatingGHGReductions2013>

The authors argue that the fact that all Canadian federal and provincial governments are making climate policy unilaterally is a major factor explaining why Canada is expected to reach only half its

goal of reducing GHG emissions to 17% below 2005 levels by 2020. The next post-2020 target, to be established by 2015, will be equally hollow unless governments can start to work together. The report lays out a pathway for politically viable steps which Canadian governments can take to achieve co-ordinated, effective national policy built upon a basis of agreement for equitable sharing of costs amongst provinces. Copies have been sent to all Canadian federal and provincial governments, relevant trade associations, ENGOs, think tanks, and the news media. Academic papers have been and will continue to be published.

Governance innovation and the transition to a low-carbon economy

This project, funded by Carbon Management Canada, examines innovation in governance practices to address climate change and accelerate the transition towards a low-carbon Canada. Done jointly with Professors James Meadowcroft and Glen Toner of Carleton University, the U of T portion examines distributive effects of the transition to a low-carbon economy which motivate some actors to stall or divert the transition from full effectiveness.

The focus is on regional/ intergovernmental, industrial, and social dimensions of climate-related political conflict in Canada. Case studies have been done of the proposed National Energy Strategy, cross-border hydro-electricity transmission, political activity to influence policy and thus maintain market share by the coal and renewable energy industries, resistance to electricity price increases and the role of distributive justice in wind-turbine siting. Papers are being published and the final report will be sent to governments in 2013.

Policy instrument choices influencing sustainable transportation in Toronto

This recently completed project was part of a SSHRC-funded project led by Professor Jean Mercier with co-investigator Professor Mario Carrier (both from Université Laval) to look at factors influencing urban transportation policy.



Dr. Doug Macdonald, Senior Lecturer at the School of the Environment, addresses an audience at a seminar presentation.

At U of T, Dr. Macdonald worked with Ph.D. candidates Amir Ganjavie (then Geography) and Scott Sams (Political Science) to examine decisions made since 1946 respecting capital construction of the Toronto subway, and to examine policy instrument decisions made by the City of Toronto and the Governments of Ontario and Canada which were intended to shift transportation toward sustainability.

The study attempted to determine why the majority of existing subway lines were decided upon in the first half of the post-war period to gain insight into the workings of Toronto and regional urban transportation multi-level governance. An article by Macdonald, Sams and Ganjavie (draft title: "Why did Toronto stop building subways? Understanding multi-level transit governance in the City of Toronto") is currently being written, with assistance from Shazeen Tejani and Brina McMillan, recent Bachelor's alumni majoring in Environment programs.

The Laval team is amalgamating the Toronto case findings with those of Seattle, Boston and Montréal to provide a generalized understanding of transportation policy decision-making.

Monitoring contaminants in fish in the Great Lakes & St. Lawrence River Areas of Concern

BY SATYENDRA BHAVSAR AND DONALD JACKSON

Professor Donald Jackson, of the Dept. of Ecology and Evolutionary Biology (EEB) and Interim Director of the School of the Environment from July 2010 to June 2013, has had an active collaboration with the Ontario Ministry of the Environment (OMOE) in studies of contaminants in fish.

Many areas in Ontario underwent environmental degradation over the past century (by persistent organic chemicals or mercury) resulting in their being “listed” as significant Areas of Concern by the International Joint Commission. Considerable efforts have been underway to rehabilitate these areas in order to “delist” them. Although many contaminants were banned or highly restricted, their persistent nature has led to their longevity.

One of the collaborative projects funded by OMOE studied the condition of fish in the upper St. Lawrence River Area of Concern (AOC) to determine if levels meet the objectives for delisting them. Done with



Dr. Satyendra Bhavsar (Research Scientist, OMOE; and Adjunct Professor at the School) on a research boat used in the study of fish mercury levels in the upper St. Lawrence River.

Dr. Satyendra Bhavsar (Research Scientist at OMOE, and Adjunct Professor at the School), **Dr. Margaret Neff** (Post-Doctoral

Fellow, EEB), and **Jennifer Robinson** (recent Bachelor's alumna, majors in Environment & Science, and Zoology), it accessed the long-term temporal trends of fish mercury levels from 1975 to 2011. The fish mercury problem in the AOC, in comparison to other Ontario water bodies, was also evaluated for the first time.

Results show that AOC fish mercury levels have declined by 33-59%. Although recent high fish mercury levels in the AOC indicate that recovery is still ongoing, levels are not the worst in the province. Results were published in the *Journal of Great Lakes Research*:

Neff, M.R., J.M. Robinson, and S.P. Bhavsar. 2013. Assessment of fish mercury levels in the upper St. Lawrence River, Canada. *JGLR* 39: 336-343.

For more information, please contact Dr. Bhavsar at s.bhavsar@utoronto.ca or Dr. Jackson at don.jackson@utoronto.ca.

Research Day

Annual event showcases research of the School's faculty, post-docs, & students

The following presentations were made at Research Day, held on April 17, 2013. The annual event showcases research conducted by some of the School of the Environment's faculty, post-doctoral researchers, and graduate students.

Research Day 2014 will be held on April 16. Please visit www.environment.utoronto.ca/ResearchDay.aspx for details.

JENNIFER MURPHY, Associate Professor and Canada Research Chair, Dept. of Chemistry; Full graduate faculty member, School of the Environment.

Chemistry and Climate, from the City to the Country. This talk highlighted research on the role of nitrogen oxides in controlling smog production in Toronto, the coupling of ammonia and acidic particles with implications for human and ecosystem health, the atmospheric fate of amines, and the linked carbon and nitrogen biogeochemical cycles at an Ontario forest.

JOANNE MOYER, Post-Doctoral Fellow, School of the Environment. **Faith, Sustainability, and Learning in Kenya and North America.** This talk was on doctoral research investigating learning among individuals within faith-based organizations (FBOs) engaged in environmental and development work in Kenya. Post-doctoral research will explore FBOs in North America to study the worldviews of FBOs, and their place in the journey from learning and transformation to action on sustainability. (See page 25.)

HEATHER WHEELER, Ph.D. candidate, Dept. of Cell and Systems Biology/Environment. **Plant Cell Wall Deposition and the Future of Biofuels.** Cellulose is abundant in the secondary cell wall that surrounds certain plant tissues. Because it is tightly bound to other cell wall components, it needs a large energy input for extraction and biofuel production. This talk



discussed doctoral research that uses a plant mutant deficient in cellulose synthesis, to better understand how the secondary cell wall is formed.

DAVID HOULE, Ph.D. candidate, Dept. of Political Science/Environment. **Canadian Provinces' Action or Inaction on Climate Change: Does Policy Capacity Explain Use of Market-Based Instruments?** Climate change policy-making in Canada has been increasingly dominated by actions at the provincial level using a diversity of approaches to reduce greenhouse gas (GHG) emissions. This presentation discussed doctoral research looking at the differences in climate change policy capacity among provinces and the different paths that exist for climate change capacity building.

Graduate Students' Research

The School of the Environment is pleased to have students enrolled in its collaborative graduate programs in Environmental Studies and Environment & Health who are conducting interesting and important research. Pages 6-9 contain condensed abstracts of theses or research papers of 2012-13 alumni and listings of research topics of 2012-13 new and continuing students.

Environmental Studies Program (noted below as ES)

Doctoral Students: 2012-13 Alumni

GABRIEL EIDELMAN, Ph.D., June 2013, Political Science/ES. Supervisor: Richard Stren, Political Science. ***Landlocked: Politics, Property, and the Toronto Waterfront, 1960-2000.*** Despite three extensive revitalization plans in the second half of the 20th century, Toronto's central waterfront, an area roughly double the city's central business district, has remained mired in political gridlock for decades. This thesis argues that above and beyond political challenges typical of any major urban redevelopment project, issues of public land ownership were pivotal in defining the scope and pace of waterfront planning and implementation in Toronto. From 1961 to 1998, no less than 81% of all land in the central waterfront was owned by one public body or another, dispersed across a fragmented patchwork of public agencies, corporations, and authorities within multiple levels of government, thus adding a layer of complexity which effectively crippled implementation efforts.

KATE MOSS GAMBLIN, Ph.D., June 2013, Curriculum, Teaching and Learning (OISE)/ES. Supervisor: Dennis Thiessen, OISE. ***Becoming a Sustainability Chef: An Empirical Model of Sustainability Perspectives in Educational Leaders.*** This study explored adult engagement with sustainability learning practices in EcoSchools-certified secondary schools in Canada, Lithuania and Sweden. The study design was initially based on an interest in revealing specific practices of sustainability education as a means of improving the relationship between environmental impact and wealth. Primary data collected in 2006 were recorded semistructured interviews. Findings may provide some insight into a means of shaping a sustainable future through an individual's sustainability perspective: a living responsiveness based on a sense of connection, supported by improved sustainability cognition, and realized through sustainability practice and considered engagement.

PETER RELAVIC, Ph.D., June 2013, Forestry/ES. Supervisor: Tat Smith, Geography. ***Evaluating the Greenhouse Gas Mitigation Potential and Cost-Competitiveness of Forest Bioenergy Systems in Northeastern Ontario.*** This study evaluated the magnitude and temporal variation of ecosystem carbon stock changes resulting from harvest of roadside residues and unutilized whole trees for bioenergy using the Carbon Budget Model and Biomass Opportunity Supply Model. Forested landscape was found to be a net sink for carbon following the 20th year of roadside residue harvest, compared to whole-tree harvest, where the forested landscape remained a net source of carbon over the 100 year rotation. The cumulative ecosystem carbon loss from whole-tree harvest was 11 times greater than from roadside residue harvest. One finding of net GHG reduction analysis conducted found 67% and 16% reduction when roadside residues and whole trees were used to displace coal, respectively. For GHG mitigation, the study recommends bioenergy deployment strategies focus on utilization of roadside residues.

JENNIFER WEAVER, Ph.D., November 2012, Geography UT Mississauga/ES. Supervisors: Tenley Conway, Geography UTM; Marie-Josée Fortin, Ecology and Evolutionary Biology. ***Invasive Species Distribution Models: An Analysis of Scale, Sample Selection Bias, Transferability and Prediction.*** This research examines distributions of mute swans in parts of their native range of Britain and their non-native range of Ontario by studying environmental variables at spatial scales which best explain

distribution in its non-native range, predictive accuracy when species distribution models are built using varying ranges of environmental variables and applied to broader spatial extents, and the potential for and limitations of model transferability between native and non-native regions. Two modelling approaches and three climate change and land use change scenarios were used to predict future habitat suitability.

XIANMING ZHANG, Ph.D., Nov 2012, Chemistry/ES. Supervisor: Frank Wania, Physical and Environmental Sciences, UT Scarborough. ***Passive Air Samplers for Semivolatile Organic Compounds: Experiments, Modeling, and Field Application.*** Although passive air samplers have been widely used for monitoring semivolatile organic compounds in air, chemical mass transfer processes involved in passive air sampling have not been fully understood. While many studies have investigated factors potentially influencing passive sampling rate, many of those influences could not be explained or predicted with the understanding of the mass transfer processes that was prevalent in prior research studies. In order to fill these knowledge gaps and to gain further insight into the mechanism of passive air sampling and into the factors that may influence passive air sampling rates, a series of studies combining controlled laboratory experiments, mass transfer process modeling, with a field sampling campaign was conducted in this research.

Doctoral Students: Continuing

Ramsey Rasheed Affifi, Adult Education and Community Development, OISE/ES, supervisor: Eric Bredo, OISE. *Ecologizing education research.*
Simon Appolloni, Religion/ES, supervisor: Stephen Scharper, Anthropology UTM/Environment. *Christian thinkers and the environmental and liberationist ethic.*

Graham Carey, Electrical and Computer Engineering/ES, supervisor: Edward Sargent, ECE. *Colloidal quantum dot photovoltaics.*

Aurel Cristian Ches, Geography UT Scarborough/ES, supervisor: William Gough, Physical and Environmental Sciences, UT Scarborough. *Climate change policy in Canada.*

Beth Jean Evans, Political Science/ES, supervisor: Steven Bernstein, Political Science. *Sustainable development aspect of the Clean Development Mechanism.*

Muhammad Ferhan, Forestry/ES, supervisor: Mohini Sain, Forestry. *Enzymatic treatment of lignin and characterization, bark or lignin based polyurethane foam.*

Columba Gonzalez, Anthropology/ES, supervisor: Hilary Cunningham, Anthropology. *Political ecology analysis in El Vizcaino Biosphere Reserve in Baja California, Mexico.*

Mark Hathaway, Adult Education and Community Development, OISE/ES, supervisor: Stephen Scharper, Anthropology UTM/Environment. *Ecological worldviews education and action for sustainability.*

Shaik Hossain, Forestry/ES, supervisor: John Caspersen, Forestry. *Branch and crown dynamics in tolerant hardwood forests.*

David Houle, Political Science/ES, supervisor: Grace Skogstad, Political Science. *Climate change policy in Canadian provinces: multi-level and regional governance.*

Smita Kothari, Religion/ES, supervisors: Christoph Emmrich, Religion; Stephen Scharper, Anthropology UTM/Environment. *Dana and Dhyana in Jaina Yoga: a case study of Prekṣādhyanā and the Terāpanth.*



Ph.D. candidates in the Environmental Studies collaborative program present their research at Research Day (see page 5) and in the Environment Seminar Series (page 22). **LEFT:** Simon Appolloni (Religion) speaks on his research on Christian thinkers and the new environmental and liberationist ethic. **MIDDLE:** David Houle (Political Science) compares Canadian provinces' policy on climate change in his research talk. **RIGHT:** Heather Wheeler (Cell and Systems Biology) speaks about plant cell wall deposition and the future of biofuels.

Pradeep Kumar, Forestry/ES, supervisor: Shashi Kant, Forestry. *Payment for forest ecosystem services.*

Zen Mariani, Physics/ES, supervisor: Kimberly Strong, Physics. *High Arctic radiation and trace-gas variability from infrared emission measurements.*

Joseph Mendonca, Physics/ES, supervisor: Kimberly Strong, Physics. *Exchange of carbon between the Earth's surface and the atmosphere.*

Justin Mok, East Asian Studies/ES, supervisor: Richard Guisso, East Asian Studies. *Humans and the environment in Chinese history.*

Amy Bliss Mui, Geography/ES, supervisor: Yuhong He, Geography. *Examining Blanding's turtle habitat using remote sensing and GIS approach to habitat suitability modelling.*

Renata Ramasra, Geography/ES, supervisor: Thembele Kepe, Geography. *Role of tourism in conservation schemes, La Fortuna, Costa Rica.*

Keven Roy, Physics/ES, supervisor: Richard Peltier, Physics. *The impact of continental ice sheet on the rotational state of the Earth: simulations under climate change.*

Javad Sameni, Forestry/ES, supervisor: Mohini Sain, Forestry. *Bonding mechanism of modified lignin on lignocellulosic fibers.*

Daniel Weaver, Physics/ES, supervisor: Kimberly Strong, Physics. *Atmospheric water vapour in the High Arctic environment.*

Cynthia Whaley, Physics/ES, supervisor: Kimberly Strong, Physics. *The trace gas time series of the Toronto Atmospheric Observatory.*

Heather Wheeler, Cell and Systems Biology/ES, supervisor: Malcolm Campbell, CSB. *Development of the plant secondary cell wall and potential application in the production of sustainable biofuels.*

Rachel York-Bridgers, Curriculum Studies and Teacher Development, OISE/ES, supervisor: John Wallace, OISE. *Eco-literacies and media: the process and student engagement.*

put an end to the oppression resulting from large scale environmental destruction perpetuated by war.

TAYLOR BINNINGTON, M.Sc., March 2013, Geography/ES. Supervisor: Danny Harvey, Geography. ***Optimal Siting of Distributed Wind Farms in Ontario, Canada.*** Increasing wind penetration adds to the importance of enhancing the reliability of wind, to mitigate the magnitude and frequency of changes in electricity generation. This work addresses how improvements can be made to reliability through the geographic dispersal of wind farms in Ontario using modeled North American Regional Reanalysis data. Optimal configurations of wind farm locations by selecting combinations of wind farms that maximize the difference between the energy price and the cost of electricity, and minimize the coefficient of variation in the aggregate output. This study found that there are no wind regimes in Ontario that match demand sufficiently for a viable development strategy, but that combinations of as few as three locations can reduce the coefficient of variation by over 30%, compared to a single region.

JONATHAN FUNG, M.Sc., Geography/ES. Supervisor: Jing Chen, Geography. ***Atmospheric Inversion of the Global Surface Carbon Flux with Consideration of the Spatial Distributions of US Crop Production and Consumption.*** Carbon dioxide is taken up by crops during production and released back to the atmosphere at different geographical locations through respiration of consumed crop commodities. In this study, spatially distributed county-level US cropland net primary productivity, harvested biomass, changes in soil carbon, and human and livestock consumption data were integrated into the prior terrestrial biosphere flux generated by the Boreal Ecosystem Productivity Simulator. A global time-dependent Bayesian synthesis inversion with a nested focus on North America was carried out based on CO₂ observations at 210 stations.

BRANDON LAW, M.Sc.Pl., November 2012, Planning Program, Geography/ES. Supervisor: Pierre Desrochers, Geography UT Mississauga. ***Eco-cluster Initiatives: Benefits and Best Practice.*** The last decade has witnessed the emergence of dozens of private sector initiatives around the world that attempt to harness the benefits of clusters in order to catalyze eco-innovation. So far, these Eco-Cluster Initiatives (ECIs) have shown great promise, however, they are far from realizing their full potential. Moreover, few guidelines and best practices have been established for the field, leaving far too much up to trial and error. This report outlines 15 recommendations that hope to improve the productivity of new and existing ECIs and also to assist in the development of formal best practices for the field. These include: build on existing regional compe-

Master's Students: 2012-13 Alumni

MARYAM ADRANGI, M.Ed., June 2013, Adult Education and Community Development Program OISE/ES. Supervisor: Angela Miles, OISE.

(Un)Critical Understanding of the Environment: The Canadian War at Home and Abroad Fueled by the Tar Sands. This paper argues that because Alberta Tar Sands are directly connected to North American military operations, movements to oppose Tar Sands projects should not be separated from a larger imperial project of war, militarization and displacement. It argues that because environmental stewardship often relies on individual behaviour rather than collective responsibility, Tar Sands opponents may not develop critical and systemic analysis of environmental destruction and which industries may be doing the most damage. By developing a more critical understanding of environmental issues, environmental stewardship can create movements for justice that

Continued on page 8...

Environmental Studies Program

Continued from page 7.

tencies; start extremely specialized; strategically select members; and involve business, universities, and government in their initiatives. The report also recommends that a quantitative analysis should be conducted on each technique ECIs are currently using to stimulate eco-innovation.

SEAN LEMON, M.Sc.Pl., June 2013, Planning Program, Geography. Supervisor: Danny Harvey, Geography. ***An Evaluation of Ontario's Global Adjustment Mechanism (GAM): Evidence from 2011-12.*** In Ontario the commodity cost of electricity includes two charges: the hourly Ontario energy price (HOEP) and the Global Adjustment (GA). From 2005 to 2010, the GA was collected from Ontario consumers using a volumetric allocation methodology, i.e. a customer's share of the GA was proportional to their consumption. In 2011, the provincial government introduced the Global Adjustment Mechanism (GAM) that separated customers into either Class A or B depending on their average peak consumption. This paper evaluated the GAM and its intended policy objectives, short-term and long-term objectives, and what direction future research should take. Results suggest that the GAM has made significant progress in achieving three of its policy objectives (reducing peak demand, improving the efficiency of the price signal, and providing cost relief to large volume electricity users).

LIVIO NICHILLO, M.Eng., June 2013, Mechanical and Industrial Engineering/ES. Supervisor: Kim Pressnail, Civil Engineering. ***The International Development of Building Integrated Photovoltaics (BIPV) and its Potential Application in the City of Toronto.*** Building integrated photovoltaics (BIPV) is a new renewable energy technology that allows for many innovative ways to capture the sun's energy for electricity generation while also performing the important functions of standard building materials. A case study of the Harbourfront Centre in Toronto demonstrates that improvements in the way glazing is designed and integrated into the overall building system can lead to significant energy and interior comfort benefits. An understanding of all of the important roles that the building skin will play in a building's performance and aesthetics, along with initiatives in the area of education, training, policy and financial programs are needed in order to integrate BIPV in future City of Toronto projects.

HARLEEN PANESAR, M.Sc.Pl., June 2013, Planning Program, Geography/ES. Supervisor: Deb McGregor, Geography. ***First Nations Communities and Source Water Protection Planning in Ontario.*** This research examined the challenges and opportunities of a shared decision-making framework for

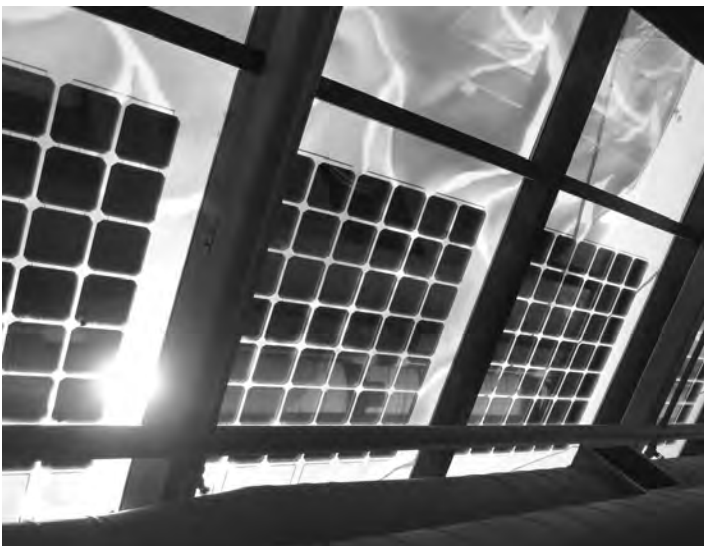
water governance in Ontario, as there have been ongoing efforts by both First Nations peoples and non-First Nations stakeholders to improve relationships and more effectively combine traditional knowledge (TK) and Western knowledge systems. Water quality issues, such as frequent drinking water advisories, continue to pose serious health concerns for 84% of First Nations communities in Ontario. A key objective of the study was to identify linkages among Indigenous peoples, TK and public policy in Ontario regarding source water governance by focusing on existing and developing legislation, policies, and regulations. Although First Nations participation in environmental decision-making and the inclusion of TK is mandated, results indicate that little progress has been made to operationalize this mandate. Furthermore, issues pertaining to power and justice need to be addressed in developing a shared model of decision-making, in which the rights and knowledges of First Nations peoples are equitably considered.

NAZMUS SAADAT, M.Sc., November 2012, Forestry/ES. Supervisor: Paul Cooper, Forestry. ***Factors affecting distribution of borate to protect building envelope components from biodegradation.*** Borate can be a potential candidate to protect building envelope components from biodegradation as it has low toxicity and can penetrate wood without pressure treatment, even in the refractory species commonly used in construction industries as structural components. In this research, wood moisture content, grain direction, formulation and species that affect the diffusion of borate in refractory species were investigated. Two highly concentrated formulations were applied and a novel approach (borate bandage) was used to keep the preservative on the surface and enhance the diffusion by reducing surface drying. Grain directions and moisture content were found to be significant factors. A mould test was performed, the diffusion co-efficients were calculated and some recommendations were made about the quantity required to protect a specific volume of wood considering the distance moved by diffusion and volume treated in different directions.

RAMONA SANSAT, M.I., June 2013, Information/ES. Supervisor: Matt Ratto, Information. ***Understanding the Environment Through the Lens of Development: A Critical Discourse Analysis of Environmental Education Materials Written for Ghanaian Public School Students.*** This paper examines the ideological influence of development discourses on the teaching and learning practices of environmental education in a contemporary Ghanaian public university. It argues that the environmental education learning materials that are available support ideological assumptions that naturalize the power relations and social inequality between "developed countries" and "developing countries". It outlines the socio-historical processes that have allowed international governmental organizations and nongovernmental organizations to play a significant role in Ghana's public education system, and evaluates the discursive features of environmental education texts. It suggests that the pervasive influence of development discourses and practices in the teaching and learning of environmental education in Ghana limits alternative solutions to solving local environmental problems.

DANIEL TRAYNOR, M.A., November 2012, English/ES. Supervisor: Stanka Radovic, English. ***Imagining Cities with Nature: An Experiential Study in Working towards Urban Sustainability.*** This paper is based on summer internship work done at Evergreen, a charity that seeks to reconnect urban communities with nature. This paper argues that the organization's mandate is important for both the present and future of urban planning and ecological stability as 80% of the current Canadian population resides in urban areas, a figure that translates to more than 50% on a global scale. With 60% of the entire human population expected to be an urbanized population by the year 2030 (United Nations), Evergreen's assertion that "Cities Need Nature" has never been as imperative as it is today. This paper discusses Evergreen's work and headquarters at the Brick Works in Toronto, Canada's first ever large-scale community environmental centre, and the internship projects undertaken, in order to shed light not only on a growing environmental organization, but on the nature of environmental education itself.

STEPHANIE VANTHOF, M.Sc., November 2012, Geography/ES. Supervisor: Danny Harvey, Geography. ***Future Heat Stress in Urban Areas Based on Maximum Wetbulb Temperatures.*** This research assessed the maximum



L. Nichillo

wetbulb temperature for five global cities. This temperature is the lowest that can be reached by evaporating water into the air and can be used as a threshold for human adaptability to heat stress. Wetbulb temperatures were calculated for Toronto; Istanbul, Turkey; Harare, Zimbabwe; Bangkok, Thailand; and Buenos Aires, Argentina. Results indicate that Toronto could face increased risk of heat stress resulting from increased wetbulb temperatures and both Bangkok and Buenos Aires have projected wetbulb temperatures that are within the survivability limit used in this study. Aside from the health-related impacts, these wetbulb temperatures could also have an impact on work productivity. Though passive and active cooling techniques may be used for adaptation, preventative measures should be taken now to reduce CO₂ concentrations and associated temperature increases.

Master's Students: Continuing

Susan Beazley, M.I., Information/ES, supervisor: Nadia Caidi, Information. *Use of GIS in environmental assessments.*

Jessika Berns, M.A., Political Science/ES, supervisor: Victor Falkenheim, Political Science. *Environmental refugees.*

Ryan Burke, M.Sc., Anthropology/ES, supervisor: Shawn Lehman, Anthropology. *Edge effects and interspecies competition: case of two microcebus species in Ankarafantsika, Madagascar.*

Meagan Curtis, M.F.C., Forestry/ES, supervisor: John Caspersen, Forestry. *Ecological restoration.*

Bryan Dale, M.A., Geography/ES, supervisor: Scott Prudham, Geography/Environment. *La Via Campesina, food sovereignty and climate justice.*

Beth Denaburg, M.A., Geography/ES, supervisor: Lino Grima, Geography. *Virtual water savings from international agricultural trade: the water-energy food nexus.*

Martyn Forde, M.A., Geography/ES, supervisor: D. Harvey, Geography. *Renewable energy & tourism in small island developing states.*

Joel Fridman, M.A., Geography/ES, supervisor: Harriet Friedmann, Geography. *Food system and governance in the City of Toronto.*

Kelsey Gerbrandt, M.A.Sc., Chemical Engineering/ES, supervisor: Brad Saville, Chemical Eng. *Adding value to cellulosic ethanol biorefineries: xilolol co-product production & analysis with life cycle assessment.*

Jessica Gibson, M.A., Adult Education & Community Development, OISE/ES, supervisor: Jennifer Sumner, OISE. *Food as a tool for personal and community transformation.*

Matt James Hodgson, M.A., History & Philosophy of Science & Technology/ES. *How scientific theory-construction and modelling impact social values.*

Arndis Johnson, M.I., Information/ES, supervisor: Matt Ratto, Information. *The position of nature in the Internet of things.*

Afeefa Karim, M.A., Political Science/ES, supervisor: Victor Falkenheim, Political Science. *Regulating hydraulic fracturing in Ontario: lessons from across Canada.*

William Kurth, M.A., Adult Education and Community Development, OISE/ES, supervisor: Jack Quarter, OISE. *Social economy and environmental corporate social responsibility.*

Michael Modeste, M.A., Adult Education & Community Development, OISE/ES, supervisor: Jack Quarter, OISE. *Socially responsible investment in a pension plan: a case study of the Ontario Teachers' Pension Plan.*

Michael Pickering, M.Sc.Pl., Planning (Geography)/ES, supervisor: Alana Boland, Geography. *Marine spatial planning in the UNESCO Cat Ba Biosphere, Vietnam.*

Daniela Serodio, M.A.Sc., Earth Sciences/ES, supervisor: Miriam Diamond, Earth Sciences. *Fate of novel flame retardants in the urban environment.*

Vishma Lisa Singh, M.Eng., Chemical Engineering/ES, supervisor: Timothy Bender, Chemical Eng. *Physical and chemical processes affecting air quality, in natural environments and processes of treatment.*

Jiamin Su, M.Eng., Chemical Engineering/ES, supervisor: Charles Jia, Chemical Engineering. *Waste water treatment, water purification, and water resource management.*

Daniel Vandervoort, M.A., Adult Education & Community Development, OISE/ES, supervisor: Roxanna Ng, OISE. *The social organization of ecological agriculture knowledge.*

Ge Wang, M.A., Economics/ES. *Environmental regulations and companies' competitiveness.*

Ning Yin Zhou, M.I., Information/ES. *Green information technology.*

Environment & Health Program

Doctoral Students: 2012-13 Alumni

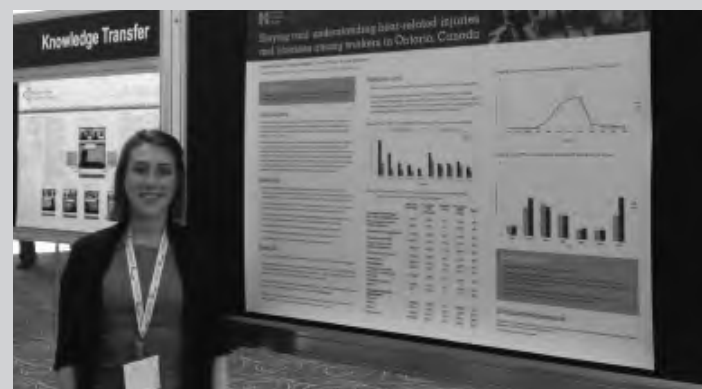
BENITA TAM, Ph.D., November 2012, Geography/E&H. Supervisor: William Gough, Physical and Environmental Sciences, UT Scarborough.

The Effects of Weather and Climate Variability on the Well-Being of a Rural and Urban Aboriginal Group in Ontario. This study explored the role of weather and climate variability on the health of Aboriginal people in Fort Albany and Toronto. First Nations may be more vulnerable to climate change because their health, culture and land use practices are closely intertwined with the environment. Changes in the environment have affected harvesting and community infrastructure, and thus increased health risks in First Nations, who have exhibited adaptation.

Doctoral Students: Continuing

Dolon Chakravarty, Ph.D., Public Health/E&H, supervisor: Donald Cole, Public Health. *Pathways delineating potentially higher environmental exposures among visible minority women in Canada.*

Isaac Darko, Ph.D., Humanities, Social Sciences and Social Justice Education (OISE)/E&H, supervisor: George Dei, OISE. *Environmental stewardship and indigenous African philosophies: implication for school and health in Ghana.*



Master's student Melanie Fortune (Public Health/Environment & Health) presents her research poster on occupational heat stress at the Partners in Prevention Conference & Trade Show in Toronto.

Master's Students: 2012-13 Alumni

Practicum/Coursework Program (M.P.H. with Public Health):
Emily Groot, Social and Behavioural Health Sciences.

Research Program:

MELANIE FORTUNE, M.P.H., June 2013, Public Health/E&H. Supervisor: Shelly Harris, Public Health. *Spatial Variation of Heat-Related Injuries and Illnesses Among Workers in Ontario.* This study examined spatial variation of injury and illness arising from excess heat exposure in the Ontario labour force. Cases of emergency department visits for work-related heat stress were interpolated to census division using spatial overlay and weighting based on the underlying labour force. Heat-related illness and injury rates exhibited a spatial pattern, which may correlate to underlying variation of occupational characteristics or weather patterns.

Master's Students: Continuing

Practicum/Coursework Program (M.P.H. with Public Health):
Morris Komakech, Social and Behavioural Health Sciences Program.

Michelle Ng, Epidemiology program.

David Paterson, Social and Behavioural Health Sciences Program.

Research Program:

Gillian Lee, M.A., Geography/E&H, supervisor: Dana Wilson, Geography, UT Mississauga. *Crime youth health and well-being in the Region of Peel.*

Renata Musa, M.P.H., Public Health/E&H, supervisor: Shelley Harris, Public Health. *Environmental etiologies of breast cancer.*

Message from the Academic Associate Director

BY DOUGLAS MACDONALD

FOR MORE INFORMATION:

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

I am pleased to serve as the School's new Academic Associate Director from July 1, 2013, a new position co-ordinating both undergraduate and graduate programs and course offerings. Thanks to **Karen Ing**, former Undergraduate Coordinator, and **Don Jackson**, former Interim Director and Graduate Director.

The School of the Environment's undergraduate programs continue to witness healthy enrolment numbers with 619 students in our two core programs and 252 in our collaborative programs in 2012-13; and over 3000 students taking our ENV courses, both offered at the School and by other units on our behalf. A total of 70 students were enrolled in our graduate collaborative programs (*see page 15*).

During the past year we strengthened our continued commitment to experiential

learning opportunities both inside and outside the classroom. Some options include internships, work placements, and volunteer opportunities in the ENV 440H **Professional Experience course** and ENV 421Y **Environmental Research course** (*see page 13*), as well as **international course opportunities** in Australia, Ecuador, Germany, Israel, and Singapore. Newly offered in 2013, the **Australian Environment, Wildlife, and Conservation course** (ENV 396Y) is our second collaboration with Summer Abroad at Woodsworth College (*see page 12*). We also sent two students to a month-long **renewable energy course** offered by the University of Bonn, Germany. A **Transboundary Water Conflict Resolution course** was successfully launched in the summer of 2012 with Hebrew University of Jerusalem and we anticipate offering two new summer field courses in 2014 on the diversity of ecosystems in the Middle East.

With the launch of the new School last year, we took the opportunity to re-engage with the larger University community to



collectively review ongoing and emerging research and teaching interests around the environment. The results brought changes to our core Environmental Studies major and to the newly named Environmental Science B.Sc. major (*see article below*). We are making corresponding changes to the Environmental Science B.Sc. minor.

One of the primary objectives of the new School is to offer stand-alone Masters and Ph.D. programs. As a first step, we have begun planning for a stand-alone Masters of Environmental Studies program and we now look forward during the coming year to working with students, faculty and other units to make this a reality.

Douglas Macdonald is Senior Lecturer at the School of the Environment. (See p. 27.)

Changes to undergraduate core program offerings

New Environmental Science major created with University engagement

BY KAREN ING

The launch of the School of the Environment in July 2012 served as an opportune time to review its two existing core programs. The consultation process with individuals and cognate departments was extensive and supported and led by the Faculty of Arts and Science (FAS) through the efforts of **Vice Dean Sandy Welsh**.

Environmental Studies B.A. Major

With only minor modifications, the Environmental Studies major now consists of a series of second year core courses to provide students with a common preparatory background, a minimum single course in each of three core areas (environmental policy, law & society; environmental thought & ethics; environmental science), and 3.5 FCEs (Full Course Equivalents) of electives from an approved list of environment related courses offered through the School and other environment related departments within FAS.

Environmental Science B.Sc. Major

More extensive discussions and revisions were done in the Environmental Science major program. These discussions resulted in the creation of new courses, and revised admissions and core course requirements. New courses include:

- a Physics course designed to integrate physics concepts and methods with environmental science issues: **ENV 237H/238H Physics of the Changing Environment**, new in 2013-14);
- a course that examines how the chemistry of the Earth system has changed through geologic time: **ENV 233H Earth Systems Chemistry**, newly offered in 2013-14);
- a course in laboratory and field methods techniques commonly used by environmental scientists: **ENV 316H1 Laboratory and Field Methods in Environmental Science**; and
- two new fourth year seminar courses: **ENV 432H1 Urban Ecology** and **ENV 452H1 Environmental Science Seminar**.

In summary, the review of our undergraduate programs and extensive consultation process has allowed us to tweak an already successful B.A. program and reinvigorated interest and commitment to undergraduate environmental science teaching. We are looking forward to building upon this momentum to further explore opportunities for new courses and collaborations.

Karen Ing is Senior Lecturer and former Undergraduate Coordinator (2010-13), School of the Environment. (See p. 27.)

Undergraduate Programs

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

Core Programs:

The School of the Environment offers three core interdisciplinary undergraduate programs:

1. **NEW:** Environmental Science (B.Sc. Major)
2. Environment and Science (B.Sc. Minor)
3. Environmental Studies (B.A. Major or Minor)

Collaborative Programs:

The following collaborative programs combine the School's interdisciplinary core with a set of discipline-specific courses:

Specialist Programs:

1. Environmental Chemistry (B.Sc., with the Department of Chemistry)
2. Environmental Geosciences (B.Sc., with the Dept. of Earth Sciences)
3. Environment and Health (B.Sc., with the Human Biology Program)
4. 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. Environmental Geosciences (B.Sc., with the Dept. of Earth Sciences)
3. Environment and Health (B.Sc., with the Human Biology Program)

Minor Programs:

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

Directed Minors:

The following directed minor programs are offered by other departments and are for students interested in acquiring a limited body of knowledge in a specific discipline.

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

Undergraduate Courses

2013-14 School of the Environment undergraduate offerings and instructors.
For profiles of Faculty, Instructors and Sessional Lecturers, see pages 26-33.

ENV 100HF	Introduction to Environmental Studies (Stephen Scharper, Anthropology UT Mississauga/Environment)
SII 199HF	Debating and Understanding Current Environmental Issues * (Faculty of Arts and Sciences, FAS, first-year seminar course)
SII 199HS	Sustainable and Just Futures: Environmental Politics in an Age of Global Warming * (FAS first-year seminar course)
ENV 200HS	Assessing Global Change: Science and the Environment (Romila Verma, sessional)
ENV 221HF	Multidisciplinary Perspectives on Environment (David Pond, sessional)
ENV 222HS	Interdisciplinary Environmental Studies (Douglas Macdonald, Environment)
ENV 223HF	Fundamental Environmental Skills (Christian Abizaïd, Geography/Environment)
ENV 233HS	Earth Systems Chemistry NEW (Bridget Bergquist, Earth Sciences; and Jessica D'eon, Chemistry)
ENV 234HY	Environmental Biology (Hélène Cyr, Ecology & Evolutionary Biology)
ENV 237/8HS	Physics of the Changing Environment NEW (Kaley Walker, Physics)
JGE 236HY	Human Interactions with the Environment *
ENV 299Y	Research Opportunity Program (Brad Bass, sessional)
ENV 307HS	Urban Sustainability (David Sider, sessional)
ENV 320HF	National Environmental Policy (Douglas Macdonald, Environment)
JGE 321HS	Multicultural Perspectives on Environmental Management (Joint course with Geography; Christian Abizaïd, Geography/Environment)
ENV 322HS	International Environmental Policy (Erich Vogt, sessional)
ENV 323HS	Ontario Environmental Policy (Russ Houldin, sessional)
JGE 331H1S	Resource and Environmental Theory (Scott Prudham, Geography/Environment)
ENV 333HF	Ecological Worldviews (Mark Hathaway, PhD candidate, OISE)
ENV 334H1S	Environmental Biology: Applied Ecology (Hélène Cyr, EEB)
ENV 335HS	Environmental Design (Sheila Waite-Chuah, sessional)
ENV 336H	Ecology in Human Dominated Landscapes *
ENV 341HF	Environment and Human Health (Clare Wiseman, Environment)
ENV 346HF	Terrestrial Energy Systems (Ian Sinclair, Civil Engineering sessional)
ENV 347HF	The Power of Economic Ideas (Russ Houldin, sessional)
ENV 350HF	Energy Policy and Environment (Keith Stewart, sessional)
ENV 395Y	Special Topics Field Course. Ecology and Conservation in the Amazon, Galápagos, and Andes (See article on p. 12 ; Barbara Murck & Monika Havelka, Geography UT Mississauga)
ENV 396Y	Australian Environment, Wildlife and Conservation (See article on p. 12 ; offered by the University of New South Wales)
ENV 399Y	Independent Experiential Study Project *
ENV 421HY	Environmental Research (See article on page 13 ; David Sider, sessional)
ENV 422HF	Environmental Law (Paul Muldoon, sessional)
ENV 430H	Environment and Health of Vulnerable Populations *
ENV 431H	Urban Sustainability and Ecological Technology *
ENV 440HF	Professional Experience Course (See article p. 13 ; David Sider, sessional)
ENV 451HS	Current Environmental Debates (Erich Vogt, sessional)
JEH 455HS	Current Issues in Environment and Health (Ron Wilson, Human Biology Program, New College)
ENV 481/2H	Special Topics in the Environment I/II *
ENV 492/3H	Independent Studies Project (See page 13 ; staff)

Students on a Summer Abroad

Undergraduates study ecology and conservation in Australia and Ecuador

BY ROSALIE CHAPPLE, BARBARA MURCK, MONIKA HAVELKA



ENV 395Y students studying ecology and conservation, and having fun in the Andes and Galápagos. **LEFT:** Lilly Woodbury and other students while climbing Chimborazo Volcano in the Andes. **RIGHT:** Students snorkelling at Kicker Rock in the Galápagos.

The School of the Environment is pleased to offer enriching field courses in the University of Toronto's Summer Abroad Program. For more information, please visit www.summerabroad.utoronto.ca.

NEW IN SUMMER 2013: Australian Environment, Wildlife and Conservation

ENV 396Y: June 21 - July 26, 2013

Summer 2013 Instructors: Rosalie Chapple, Institute of Environmental Studies, University of New South Wales; Brad Nesbitt and Geoff Ross of New South Wales National Parks and Wildlife Service.

Hosted by the University of New South Wales (UNSW), this 5-week course was the first offering of U of T's Summer Abroad program in Australia, providing an unparalleled opportunity for 16 U of T students, and 28 students from the U.S. and an introduction to Australia's environment and wildlife by local experts.

Starting in Darwin, at the 'Top End' of Australia, it included a three-day camping expedition to the World Heritage-listed Kakadu National Park to experience its spectacular scenery and its distinctive plants and animals. Students then journeyed to the World Heritage-listed Blue Mountains National Park to explore the ancient

ENV 396 students from U of T and the U.S. at the lookout of World Heritage-listed Blue Mountains National Park in Australia.



R. Chapple



Left: Sarah Latimer; Right: Shuhong Luo

and dramatic landforms, flora and fauna of the area. Weeks three and four were based at UNSW, located 20 minutes from downtown Sydney. While there, they went to a University field station north of Sydney where students immersed themselves in the bush and surveyed wildlife. The course then moved to the tropical far north of Australia with a stay in the Daintree Rainforest, the only place in the world where reef meets rainforest. The course then concluded in Cairns with an exploration of the Great Barrier Reef.

For more information, please visit the Summer Abroad website above or contact Dr. Chapple at r.chapple@bmwhi.org.au.

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

ENV 395Y: May 16 - June 16, 2013

Summer 2013 Instructors: Barbara Murck and Monika Havelka, Senior Lecturers, Dept. of Geography, U of T Mississauga (see pages 31-32).

This year was the eighth run for this field course and our second time as instructors. This year's group of 28 students was different from last year's, but every bit as fantastic.

Starting with a brief orientation at Universidad San Francisco de Quito, we had day tours of Quito and a visit to the Equator at Mitad del Mundo. Then the three main field segments of the course took us to the Andes, the Amazon, and the Galápagos islands.

But nature has its own way of doing things. This year we missed seeing the giant armadillo, tapir, ocelot, and pygmy marmoset at Tiputini Biodiversity Station – but we made up for it with multiple sightings of pink freshwater dolphins, Brazilian wandering spiders, and howler monkeys. In the Galápagos, instead of hammerhead sharks again, we saw white-tipped reef sharks, huge schools of eagle rays, and breaching whales, in addition to the ubiquitous sea lions, marine iguanas, giant tortoises, sea turtles, blue-footed boobies, and penguins. And instead of only a few vicuñas (wild relative of llamas and alpacas) spotted from a distance last year in the Andes, we saw at least 40 of them in packs.

Next year the course will stay the same – and it will be completely different. We are looking forward to it already.

For more information, please contact the instructors at barbara.murck@utoronto.ca or monika.havelka@utoronto.ca.

Students study urban sustainability

Undergraduate course provides group research experience on topical issues

BY DAVID SIDER

ENV 421H Environmental Research

2012-14 Instructor: David Sider, Sessional Lecturer (see p. 32); david.sider@utoronto.ca.

In 2012-13, senior undergraduate students carried out group research projects on five topics relating to urban sustainability in Toronto: community gardens, green spaces, environmental health, sustainable buildings and urban transportation. Nineteen students, working in small groups, conducted background literature and internet searches and undertook primary research in the form of interviews, surveys, and use of primary documents. At the final meeting of the class in late March, groups presented their research projects to the rest of the class.

The research groups generated important and interesting findings. For instance, besides greening urban spaces, community gardens were found to have benefits such as increased physical, social and psychological well-being for participants; increased social cohesion within communities; and greater access to fresh produce. Nonetheless, it

was apparent that many garden initiatives face multiple challenges or barriers such as lengthy bureaucratic processes, limited land availability and expense of soil testing or securing ongoing funding.

City green spaces were found to contribute ecologically, socially and economically to urban sustainability. In particular, increasing adoption of green roofs, protection of the ravine system from development and investment in new green spaces, like Rouge National Urban Park, were seen as important strategies to ensure ecological processes and access to nature.

The environmental health group created an online survey to ascertain the level of public awareness about two types of urban air pollution: smog and dioxins. Findings revealed a good awareness of air pollution and knowledge of sources, while familiarity with air quality measurement tools (e.g., Air Quality Index) and relevant government policies was limited. The group identified a need for more preventative public health initiatives, such as educational programs

aimed at reducing exposure air pollutants, especially in vulnerable populations.

The sustainable buildings group found that municipal policies such as the Toronto Green Standard and Green Roof Bylaw are promising steps towards more sustainable forms of building in the city. However, they also found that the policy environment needs to become more enabling, such as through greater provision of incentives or the introduction of a carbon tax, which may reinforce the energy cost savings of green buildings and increase adoption.

The fifth research group studied the UP Express, the rail link between Union Station and Pearson International Airport under construction and slated for completion for the Pan American Games in 2015. Although less environmentally friendly, it appears political pressure to have the link ready for the Games may have been a factor in the decision in using diesel-powered instead of electric trains. The group recommends electrification following the Games.

Independent research projects & professional experience

ENV 440H Professional Experience Course

2012-14 Instructor: David Sider, Sessional Instructor (see page 32).

This course provides an opportunity for students to gain practical work experience in the environmental field through placements with various organizations and agencies. The course has an academic component as well that is geared towards reflection on the placement experiences of students from a broader perspective.

The Fall 2012 class had 42 students who had summer or fall placements at non-profit organizations (e.g. Access Alliance Multicultural Health & Community Services, Evergreen, Foodshare, High Park Nature Centre, ICLEI Local Governments for Sustainability, Toronto Green Community, Toronto Renewable Energy Cooperative, and Sustain Ontario), government agencies (e.g. Toronto Environment Office, Ministry of the Environment), private sector (National Silicates, Zizzo Allan), and U of T units (Dig In! Campus Agriculture Network, Sustainability Office).

ENV 492/493H Independent Studies Project

Independent research projects completed in 2012-13:

Daniel Arancibia, Environmental Studies, Ecology and Evolutionary Biology. 1) *Freshwater Mussel Population Assessment in the Rouge River and Little Rouge Creek*. 2) *Historical and Geomorphological Context of Freshwater Mussel Distribution in Rouge River Watershed*. Supervisor: Hélène Cyr, Ecology and Evolutionary Biology.

Emma Cancelliere, Specialist in Biological Anthropology, minor in Environmental Studies. 1) *Community Development and Primate*



Bachelor's Student Emma Cancelliere with children in Uganda where she completed an independent project and participated in an internship with the Jane Goodall Institute of Canada (see page 21).

Conservation. 2) *Conservation and Development: Changing Perspectives Towards Primates in Uganda*. Supervisor: Ingrid Stefanovic, Philosophy.

Julia Ercolani, Major in Biology, and Minors in Psychology and in Environmental Studies. *Rainforest Conservation in Peruvian Amazon: Are Stage, NGO and Private Actors Unified to Protect Tropical Ecosystems and Those That Depend on Them?* Supervisor: Christian Abizaid, Geography and Environment.

Undergraduate Students' Awards

FOR MORE INFORMATION:

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

Congratulations to the latest recipients of the following School of the Environment undergraduate awards.

(n.b.: Environmental Policy & Practice and Environment & Society programs indicated are no longer offered and have been replaced by the Environmental Studies program.)

Frances L. Allen Scholarship: Awarded to second or third-year students in a School of the Environment specialist or double major program. The recipient was **Jennifer Robinson** (Environment and Science).

Chachra Family Scholarship in Environment and Science: Awarded to students in a School of the Environment B.Sc. specialist or major program. Recipient was **Carolyn Franklin** (Environment and Science).

Dr. Stanley Allan Cord Scholarship in Environmental Studies: Awarded to School of the Environment students in their third or fourth year. The recipient was **Alexandra Robertson** (Environmental Ethics).

Jane Goodall Scholarship: Awarded to one or more outstanding undergraduate students enrolled in a School of the Environment program. Preference is given to students studying environment and development. The recipient, awarded at a presentation in April 2013 (see p. 21), was **Meghan Babin** (Environmental Policy & Practice).

Peter John Hare Memorial Scholarship in Environment: This is awarded to students in a School of the Environment specialist or major program. The recipient was **Wenjie Zeng** (Environment and Science).

Robert Hunter Scholarships: These are awarded to outstanding School of the Environment students in memory of Robert Hunter, journalist and co-founder of Greenpeace. The recipients, recognized at the 2013 Hunter Memorial Lecture (see page 23), were **Frances Tufford** (Environmental Studies), and **Alison Greey** (Environmental Studies).



TOP: Douglas Pimlott's granddaughter Jolise Beaton and daughter Jan Pimlott (left) join award recipients Lily Woodbury, Usman Javed, Alissa Saieva, Amy Kikuchi, and presenter and WWF President Emeritus Monte Hummel (back far right).

BOTTOM: Professor Stephen Scharper (far left) joins Hunter recipients Frances Tufford and Alison Greey, Bill Allison (speaker), and Bobbi Hunter and Will Hunter (far left) at the Hunter Memorial Lecture.

New scholarships in memory of Rodney White and Skip Willis

In memory of the late **Professor Rodney White** who passed away in July, 2012 and served for 10 years as Director of the former Institute for Environmental Studies (predecessor of the School), his family and the School have established a new scholarship in his name. Rodney was an internationally renowned authority on transdisciplinary and international research in urban and environmental infrastructure and management, adaptation to climate change and environmental liability and the insurance industry. The inaugural **Rodney White Environmental Scholarship** will be awarded in 2014 to a third year student enrolled at the School, with preference given to those studying topics relating to environment and international development.

As a founding member of the Environmental Finance program at the former Centre for Environment (predecessor of the School), **Errik (Skip) Willis** helped the Centre develop a link to the business community and a role in the carbon finance niche (see pages 18-20). He was a much sought-after consultant as Principal of the Willis Climate Group and passed away in January 2011. The inaugural **Skip Willis scholarship** was awarded in December, 2013 to Bachelor's student **Laura Heintzman** (Environmental Studies and Psychology majors). The award is for an undergraduate student at the School with demonstrated interest in adaption and mitigation of climate change in Canada, market based instruments, and carbon offset projects.

Jane Joy Memorial Scholarship for Excellence in Environmental Sustainability: This is awarded to a student specializing or majoring in Environmental Science at the School of the Environment who has demonstrated involvement in sustainability issues. The recipient was **Rachel Bokhout** (Environment & Health Specialist).

Douglas Pimlott Awards and Scholarships: Awarded to School of the Environment students with excellent levels of academic achievement and a commitment to social involvement in environmental issues. The recipients, recognized at the 2013 Pimlott Lecture (see page 23), were:
Pimlott Award: Alissa Saieva, Emily Sykes, and Lilly Woodbury (Environmental Studies);

Pimlott Entrance Scholarship: Usman Javed (Environment and Science) and Amy Kikuchi (Environmental Studies).

Pimlott Graduating Scholarship: Ben Normand (Environmental Policy & Practice), Indra Noyes (Food Security/Environmental Studies).

Kathryn S. Rolph Scholarship: Awarded to outstanding School of Environment students who have achieved a high mark in a specific course on environmental issues. The recipient was **Rylee Raeburn-Gibson** (Environmental Studies).

Sidney and Lucille Silver Scholarship: Awarded to a third-year student in a School of the Environment or Geography specialist or major program. Recipient was **Lisa Nick Smith** (Environmental Geography).

School of the Environment Undergraduate Student Award: Awarded to a School of the Environment student and is based on financial need and academic achievement. The recipient was **Evelyn O'Rourke** (Environmental Ethics).

Collaborative Graduate Programs

Graduate Program Director:
DOUGLAS MACDONALD,
 Associate Academic Director, School of the Environment

The School of the Environment offers two collaborative programs at the Master's and Doctoral level: 1) Environmental Studies, and 2) Environment and Health (see article below). Students who are admitted to a "home" unit 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 work in the field of the environment.

Environmental Studies Collaborative Program

One of the compelling strengths of this program is the interdisciplinary environment in which teaching and research is conducted. In this program, students are both able to specialize in an area of environmental research and gain exposure to a wide range of intellectual and methodological disciplines focused on environmental issues.

The Environmental Studies program currently has students from across the disciplinary spectrum. In 2012-13, the School was pleased to add the Master of Global Affairs offered by the Munk School of Global Affairs to its collaborating units and programs which include Adult Education and Community Development program (OISE/UT), Anthropology, Chemical Engineering and Applied Chemistry, Chemistry, Ecology and Evolutionary Biology, Economics, Earth Sciences, Forestry, Geography, Information, Management, Philosophy, Physics, Program in Planning (Geography), Political Science, Religion, Sociology, Sociology in Education program (OISE/UT), and Women and Gender Studies.

Students may also be admitted from other units on an individual basis. For example, this past year, we welcomed new students from such diverse home units as Cell and Systems Biology, Electrical and Computer Engineering, and English. We also currently have students enrolled in Chemical Engineering, East Asian Studies,

FOR MORE INFORMATION:

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

History and Philosophy of Science and Technology, Mechanical and Industrial Engineering, and Social Work, and have a recent alumna who was also enrolled in South Asian Studies.

Program requirements vary with each home unit or program. Along with a core course in Environmental Decision Making (ENV 1001H), students are typically required to take an elective course and conduct research on an environmental topic which also fulfills the requirements of their home unit (i.e. thesis or research paper). Non-thesis Masters students are required to also complete an internship and Doctoral students are also required to present a seminar on their research.

In 2012-13, the School of the Environment was pleased to have 16 alumni graduate from this collaborative program (5 Ph.D. and 11 Masters). The School also welcomed 19 new students (5 Ph.D. and 14 Masters), bringing the total number students enrolled last year to 61, including alumni. *(See pages 6-9 for abstracts of alumni theses and papers and for continuing students' research topics.)*

It is our goal to continue to uphold and strengthen the tradition, which goes back to establishment of the initial Institute for Environmental Studies in the 1970s, of providing a home for graduate students and faculty engaged in interdisciplinary environmental studies research and teaching. One of the primary objectives of the new School is to offer **stand-alone Masters and Ph.D. programs**. As a first step, we have begun planning for a stand-alone **Masters of Environmental Studies program** and we now look forward during the coming year to working with students, faculty and other units to make this a reality.

Environment and Health Collaborative Program

BY CLARE WISEMAN

The School's collaborative graduate program in Environment and Health is offered in conjunction with various graduate degree programs at the University. In 2012-13, the **doctoral program offered by Physical Sciences and Environmental Sciences at U of T Scarborough** was recently added to its collaborating programs. Others include doctoral and masters programs offered by Geography and Planning, Medical Science, Public Health, and Women and Gender Studies.

The program 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, as well as the social, policy and ethical dimensions of environment and health issues.

The public Environment and Health Seminar Series and Spring term core course (ENV 4001H) seek 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. Topics which were discussed as part of last year's series, for instance, ranged from how air

pollution impacts the respiratory health of urban cyclists to the role of environmental factors in contributing to increased rates of obesity among children. *(See page 26 for seminar abstracts).*

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 9 for more on research conducted by 2012-13 alumni and continuing students.)*

Dr. Clare Wiseman is Assistant Professor and Coordinator of the Environment & Health Program (see p. 29).

Graduate Faculty

The following individuals currently have graduate faculty appointments at the School of the 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*
 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*
 Michael Bunce, *Social Sciences, UTSC*
 Jing Chen, *Geography*
 Tenley Conway, *Geography, UT Mississauga*
 Paul Corey, *Public Health*
 Sharon Cowling, *Earth Sciences*
 Hilary Cunningham, *Anthropology*
 Amrita Daniere, *Geography*
 George Dei, *OISE Leadership, Higher and Adult Education*
 Donald Dewees, *Economics*
 Miriam Diamond, *Earth Sciences*
 Maria Dittrich, *Physical & Environ. Sci., UTSC*
 Birsen Donmez, *Mechanical and Industrial Eng.*
 Steve Easterbrook, *Computer Science*
 Elizabeth Edwards, *Chemical Engineering & Applied Chemistry*
 Mark Engstrom, *Ecology & Evol. Biology/ROM*
 Greg Evans, *Chemical Eng. & Applied Chemistry*
 Nick Eyles, *Phys. & Environ. Sci., UTSC*
 Roberta Fulthorpe, *Physical & Env. Sci., UTSC*
 William Gough, *Phys. & Env. Sci., UTSC*
 Mart Gross, *Ecology & Evolutionary Biology*
 L. Danny Harvey, *Geography*
 D. Linn Holness, *Public Health*
 Ken Howard, *Physical & Env. 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 Leadership, Higher and Adult Education*
 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, *Earth Sciences*
 Eric Miller, *Civil Engineering*
 Carl Mitchell, *Physical & Envir. 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/Environment*
 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 Mississauga/Environment*
 Barbara Sherwood Lollar, *Earth Sciences*
 Frances Silverman, *Medicine*
 André Simpson, *Physical & Environ. Sci., UTSC*
 Myrna Simpson, *Physical & Environ. Sci., UTSC*
 Grace Skogstad, *Social Sciences, UTSC*
 C. Tattersall Smith, *Geography*
 Sandy Smith, *Forestry*
 Mark Stabile, *Management; Public Policy & Governance*
 Ingrid Leman Stefanovic, *Philosophy*
 Kimberly Strong, *Physics*
 Susan Tarlo, *Medicine*
 Ross Upshur, *Medical Science*
 Willem Vanderburg, *Civil Engineering/Environment*
 Sarah Wakefield, *Geography*
 Denis Walsh, *Philosophy*
 Frank Wania, *Physical & Environ. Sci., UTSC*
 Peter Wells, *Pharmacy*
 Kathi Wilson, *Geography, UT Mississauga*

Associate Members

Christian Abizaid, *Geography/Environment*
 Kerry Bowman, *Bioethics*
 Andrew Green, *Law*
 A.P. (Lino) Grima, *Geography*
 Paul Helm, *Ont. Ministry of the Environment*
 H. Roland Hosein, *Public Health*
 Marney Isaac, *Physical & Environ. Sci., UTSC*
 Andy Kenney, *Forestry*
 Douglas Macdonald, *Environment*
 Barbara Murck, *Geography, UT Mississauga*
 Dennis O'Hara, *St. Michael's College*
 Matthew Ratto, *Information*
 Beth Savan, *Environment*
 Helene Wagner, *Ecology & Evolutionary Biology*
 Clare Wiseman, *Environment*
 Cindy Woodland, *Pharmacology*

Members Emeriti

Paul Aird, *Forestry*
 Terry Blake, *Forestry*
 Frances Burton, *Social Sciences, UTSC*
 Philip Byer, *Civil Engineering*
 Catherine Chalin, *Public Health*
 Frank Cunningham, *Philosophy*
 Brian Greenwood, *Physical & Env. Sci., UTSC*
 William Michelson, *Sociology*
 Edmund O'Sullivan, *OISE Leadership, Higher and Adult Education*
 Henry Regier, *Environment*
 D.N. Roy, *Forestry*
 Richard Stren, *Political Science*
 Wayne Sumner, *Philosophy*
 Joseph Whitney, *Geography*
 Dudley Williams, *Physical & Env. Sci., UTSC*
 G. Ronald Williams, *Biochemistry*

Graduate Courses

2013-14 School of the Environment graduate course offerings and instructors. For profiles of Faculty, Instructors and Sessional Lecturers, please see pages 28-33.

For more information, please visit www.environment.utoronto.ca or contact Pavel Pripa, pavel.pripa@utoronto.ca.

Core Courses

ENV 1001HF Environmental Decision Making (D. Macdonald, Environment and B. Raboy, Ecology & Evol. Biology)
 ENV 4001HS Seminars in Environment and Health (C. Wiseman, Environment)

Other Courses

ENV 1002HS Environmental Policy (D. Macdonald, Environment)
 ENV 1004H Urban Sustainability and Ecological Technology*
 ENV 1005H Business and Environmental Politics*
 ENV 1008HS Worldviews and Ecology (S. Scharper, Anthropology UTM/Environment)
 ENV 1444HS Capitalist Nature*
 ENV 1701HF Environmental Law (P. Muldoon, sessional)
 ENV 1703HS Water Resources Management and Policy (A.P. Grima, Geography; retired)
 ENV 1704HS Environmental Risk Analysis and Management (C. Ollson, sessional)
 ENV 1707HF Environmental Finance and Sustainable Investing (J. Ambachtsheer, S. McGeachie, sessionals)
 JEI 1901H Technology, Society and Environment*
 JEI 1902H Technology, Society and Environment II*
 JGE 1212H Fate of Contaminants in the Environment*
 JPV 1201H Politics, Bureaucracy and the Environment*
 JGE 1413H Environmental Assessment*
 JGE 1420H Urban Waste Management: An International Perspective*
 JGE 1425HF Livelihoods, Poverty and Environment in Developing Countries (C. Abizaid, Geography/Environment)
 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*
 ENV 3000H Special Topics: Environment and Health
 ENV 4002H The Environment and Health of Vulnerable Populations *

* Not offered in 2013-14

Graduate Students' Awards



LEFT: Labatt Graduate Fellowship recipients from left: Simon Appolloni, Christian Ches, Beth Evans, Heather Wheeler, Sean Lemon, Peter Ralevic, Rachel York-Bridgers, with Interim Director Don Jackson. **RIGHT:** Michael Leman presents Sean Lemon with the Alexander B. Leman Award.

Congratulations to the latest recipients of School of the Environment graduate awards, most presented at Research Day on April 17, 2013 (see page 5).

John Brown Prize

This prize was established in memory of the late John R. Brown, Professor of Environmental Health and Medicine. This year's recipient was **Natalia Mykhaylova**, Ph.D. student in the Dept. of Chemical Engineering. Her research is on the design of portable personal devices for monitoring air pollution and using this data to improve environment and occupational health.

Sperrin Chant Award in Toxicology

This award is given to a School of the Environment graduate student doing research in toxicology. This year's recipient was **David Paterson**, Master's student, Public Health and the School's Environment and Health program. He is studying the effect of mercury contamination on marginalized populations in Latin America.

GreenSaver Fairweather Award

This award was established in memory of Alastair Fairweather, a member of the Board of Directors of GreenSaver. This year's recipient was **Jessika Berns**, a Master's student in the Dept. of Political Science and the School's Environmental Studies program. Her research focuses on China's environmental governance system and its environment and public health quality.

Eric Krause Graduate Fellowship

This fellowship is in memory of the late Eric Krause, a U of T Masters graduate of Geography and Environmental Studies and is presented at a Memorial Lecture held annually in the Spring (see page 23). This

year's recipient was **Renata Ramasra**, Ph.D. student in the Dept. of Geography and the School's Environmental Studies program, researching the role of tourism and tourists to conservation in La Fortuna, Costa Rica.

Arthur and Sonia Labatt Fellowships

These fellowships were established through a generous donation from Arthur and Sonia Labatt. This year's recipients, all in the School's Environment Studies program, were: **Simon Appolloni** (Ph.D. student, Religion), **Christian Ches** (Ph.D. student, Geography), **Beth Evans** (Ph.D. student, Political Science), **Sean Lemon** (M.Sc.Pl. student, Geography's Planning Program), **Harleen Panesar** (M.Sc.Pl. student, Planning), **Peter Ralevic** (Ph.D. student, Forestry), **Heather Wheeler** (Ph.D. student, Cell and Systems Biology), and **Rachel York-Bridgers** (Ph.D. student, Curriculum Studies and Teacher Development, OISE).

George Burwash Langford Prize

This prize is awarded to a School of the Environment graduate student who best

FOR MORE INFORMATION:

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

combines excellence in research and contribution to the work of the School. This year's recipient was **Mark Hathaway**, Ph.D. student in Adult Education and Community Development (OISE) and the School's Environmental Studies program. His research is on ecological worldviews, transformative learning, and engagement for sustainability.

Alexander B. Leman Award

This inaugural award was established in memory of Alexander B. Leman, an architect and urban planner. This year, it was presented by **Michael Leman**, Alexander's brother, to **Sean Lemon**, a M.Sc.Pl. student in Planning program (Geography) and Environmental Studies program. His research evaluates policy implications of Ontario's Global Adjustment Mechanism.

LEFT: Brown Prize recipient Natalia Mykhaylova and presenter Professor Clare Wiseman.

RIGHT: Chant Award recipient David Paterson and Interim Director Professor Don Jackson.



Online Distance Education Programs

FOR MORE INFORMATION:

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

The School of the Environment offers unique and completely online distance learning courses and certificate programs. The applied and professional programs are developed in collaboration with industry experts and taught by leading industry practitioners ensuring current and leading edge knowledge and skills. Courses are developed for mid-career professionals and entrepreneurs who need to enhance their expertise, internationally educated professionals augmenting credentials for the Canadian context and recent college and university graduates seeking to advance their careers.

Graduates of the certificate programs may be eligible to apply for the Environmental Professional in Training designation, EPt, under ECO Canada's national certification program for Canadian environmental professionals.

Programs and Course Offerings

The following is a list of 2013-14 course offerings and Fall 2013 and Winter 2014 instructors. Please visit the website for course schedules and descriptions. For profiles of course instructors, please see page 33.

Certificate in Environmental Management

Environmental management includes impact assessment, and also involves other strategies and tools, such as adaptive management, risk assessment, environmental site audits, assessments, remediation and conflict resolution. The objectives of this program are to develop an understanding of environmental management and to provide insight into the systems approach which can be employed to mitigate a wide range of environmental problems. Grounded in a holistic approach to sustainable development, it aims to develop strategic and inclusive solutions to resource and management case studies. It also covers the complexity of risk management in addressing health, economics and conservation.

- CEM 400 Fundamentals of Environmental Management (*David Sider*)
- CEM 401 Urban Water Issues (*Lucy Sportza*)
- CEM 402 Strategies in Environmental Management (*Lucy Sportza*)
- CEM 403 Environmental Risk Assessment
- CEM 404 Environment and Human Health (*David Sider*)
- CEM 405 Global Environmental Change and Human Health
- CEM 406 Climate Change and Human Health (*David Sider*)

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 program are to build a foundation for understanding of GIS and Remote Sensing theory and techniques, and develop GIS software skills to solve practical tasks related to environmental management.

- 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 (*M. Govorov*)

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. In this program students will explore historical and current perspectives on forms of renewable energy, their current usage in developed and developing nations, drivers in forming markets, and political will. The interdisciplinary approach challenges students to pursue an interdisciplinary view of the impact of renewable energy on the current global energy picture. It aims to develop strategic, consensual, and inclusive solutions to the renewable energy and environmental management case studies.

- CRE 400 Principles of Renewable Energy (*Lucy Sportza*)
- CRE 401 Biofuels (*Ian Sinclair*)
- CRE 402 Wind Energy
- CRE 403 Urban Energy Systems (*Ian Sinclair*)
- CRE 404 Solar Energy (*Ian Sinclair*)

Certificate in Carbon Finance

This certificate provides a thorough grounding in a new field which aims to help society meet its need to reduce greenhouse 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.

- ECF 400 Environmental Finance (*Oliver Bussler*)
- ECF 401 Carbon Finance (*Oliver Bussler*)
- ECF 402 Environmental Finance Case Study: European Union Emissions Trading System
- ECF 403 GHG Reporting and Accounting (*Tom Johnson*)

Certificate in Water Resource Management

Renewable water resources at both the global and local levels will undergo marked changes in our lifetime. Population growth in urban centres, climate change and an increasingly dependent energy infrastructure on water creates a dynamic and challenging context for ensuring adequate financing and responsible development for use of water. This new certificate program aims to increase participants' "water IQ", as well as provide a basis for learning about current and emerging water issues at the global, regional and local scale.

- WRM 400 Water Resource Management (*Lucy Sportza*)
- CEM 401 Urban Water Issues
- CEM 405 Global Environmental Change and Human Health
- CRE 400 Principles of Renewable Energy (*Lucy Sportza*)
- GEM 400 Introduction to GIS for Environmental Management (*Michael Govorov*)

Professional courses and events

Presented in collaboration with leading businesses and organizations



Bryan Conacher (Toronto Regional Director, Offsetters Director of Business Development for Ledcor Renew) instructs participants in a GHG Inventory, Accounting and Reporting course, held in Toronto.

Greenhouse Gas (GHG) Courses: GHG Inventory, Accounting and Reporting

2012-13: Toronto, Calgary and Vancouver

2014: Toronto: January 20-21, March 18-19;

Calgary: May 1-2; Vancouver: June 5-6 (subject to change)

Instructor: **Bryce Conacher**, Toronto Regional Director, Offsetters; Director of Business Development, Ledcor Renew.

One of the challenges organizations will face is how to determine the competency and credentials of staff and/or consultants engaged to compile greenhouse gas (GHG) inventories or provide GHG professional services. A Certified GHG Quantifier Professional mitigates these concerns by engaging professionals.

The School of the Environment has partnered with CSA group to offer a course designed to prepare students to undertake the globally recognized CSA GHG Inventory Quantifier Certification examination that will demonstrate competence to develop, quantify, assess and report GHG inventories. CSA Standards is a leading North American developer of standards, codes and personnel certification programs.

FOR MORE INFORMATION:

<http://learn.environment.utoronto.ca> or contact

Donna Workman, Manager, Program & Partnership Development, 416-978-7077, d.workman@utoronto.ca

Greenhouse Gas Reduction Strategies: ISO 14064-2

2013: October 24-25, Toronto; 2014: February 25-26, Toronto

Instructor: **Bryce Conacher** (see above)

Developed by CSA Group and delivered by the School of the Environment, this two-day course provides the fundamentals of greenhouse gas (GHG) project quantification, monitoring and reporting concepts and techniques. Participants explore projects that reduce emissions and enhance emission removals. Also reviewed is ISO 14064-2, which specifies the requirements and provides guidance for quantification, monitoring and reporting of activities intended to cause GHG emission reductions or removal.

Energy Courses:

Implementing Energy Management Systems: ISO 50001

2013: April 25-26, June 20-21, October 3-4, Toronto

2014: February 18-19, June 2-3, Toronto

Instructor: **Ian Sinclair**, consultant focusing on the built environment.

With current and anticipated regulations, as well as voluntary corporate and association commitments to sustainability, energy consumers and producers are compelled to develop greenhouse gas management plans to minimize production/use costs and reduction of greenhouse gas emissions. Topics covered are an overview of ISO 50001, energy management systems requirements, policy & planning, implementation & operations, checking, monitoring and auditing and management Review.

New Energy Courses offered in 2014:

- Energy Strategies for Optimizing Building Operations: Recommissioning (ReCx): Feb 21, 2014
- Renewable Energy Systems: March 7 and June 13, 2014

Continued on page 20....

Greenhouse Gas Inventory, Accounting and Reporting Advisory Committee

The School of the Environment established an Advisory Committee of experts in the carbon and energy sectors who provide expertise and strategic guidance to the program to ensure that students have an outstanding learning experience in the Greenhouse Gas (GHG) Inventory, Accounting and Reporting Certificate Program.

The committee also oversees the curriculum development to ensure that it meets and exceeds CSA's learning objectives to prepare students for the GHG Inventory Quantifier exam, while preparing learners to succeed as internationally recognized Carbon Professionals. Members are as follows:

- **Brian Bower**, Manager, Education Partner Programs

- **Bryce Conacher**, Regional Director, Offsetters; and Director of Business Development, Ledcor Renew
- **Barbara Hendrickson**, Counsel, Miller Titerle LLP
- **Tom Johnson**, Project Manager, GHG Emission Reduction Program, Ontario Ministry of the Environment
- **Bryan Karney**, Professor, Dept. of Civil Engineering, U of T
- **Valerie Madarasz**, Business Development Manager, CSA group
- **Katie Sullivan**, Canadian Director, International Emissions Trading Association

Please visit <http://learn.environment.utoronto.ca>

or contact: **Donna Workman**, Manager, Program & Partnership Development, 416-978-7077, d.workman@utoronto.ca

Continued from page 19.

New Energy Courses Offered in 2014 (cont'd):

- Energy Management I: Energy Management Process: April 24, 2014
- Energy Management II - Energy Reduction Strategies: May 30, 2014

Water Courses:

Sustainability Skills Lab: Water Footprinting

October 10, 2013, Mississauga

Instructors: Ian Sinclair (see above) and David Wilcox, Project Manager, Water Resources, Partners in Project Green

The School collaborated with Partners in Project Green to offer a new workshop on mapping and managing your water footprint. Participants learned how to develop a water management process to help develop a baseline, benchmark their consumption and understand their stormwater impact, and learn best practices to help reduce their overall water footprint.

Water Auditing

2013: May 30-31, October 17-18, Toronto

2014: January 28-29, June 19-20, Toronto

Instructors: Ian Sinclair (see above) and Bryan Karney, Professor, Dept. of Civil Engineering and Chair, Division of Environmental Engineering & Energy Systems, University of Toronto.

An expanding population, urbanization, escalating standards of living and climate change all place pressure on the world's water resources. This two-day course provides a background to understand and manage issues facing the world's water supply, including current best practices to manage and reduce a water footprint.

Water Finance: How Blue is Your Bottom Line?

October 18-19, 2013, Toronto

Instructors: Lois Corbett, Ont. Min. of Environment; Joanna Barrington and Eric Mysak, WWF; Renee Chu and Kimberly Wright, City of Toronto; Andrew Dooner, BMO Financial Group; Kerry Freek, Water Canada; Faisal Mirza, then with Tangerine Tango; Prof. Bryan Karney, Civil Engineering, U of T; Tim Nash, Strategic Sustainable Investments; Nicholas Parker, Blue Economy Initiative; Jeff Stal, Fileco/ Teknion; Carla Stevens, Stratos; Christine Zimmer, Credit Valley Conservation.

This two-day certificate course was presented by the School in collaboration with Water Canada magazine and Tangerine Tango. Participants learned how water affects their business' bottom line and how risks can be mitigated. They were provided with tools to develop opportunities associated with water scarcity and learn how to build a proactive and engaging water strategy.

Environmental Finance Events:

These seminars and workshops are offered to promote dialogue on leading edge initiatives in sustainable investment opportunities.

Producing Fossil Fuels with Hydraulic Fracturing:

Evaluating Global and Local Risks, & Opportunities of Fracking
April 18, 2013, Toronto

Moderator: Mike Barrett, Partner, Bennett Jones LLP.

Speakers: Wally Braul, lawyer, Bennett Jones LLP; Professor Andrew Miall, Dept. of Earth Sciences, U of T; and Aaron Miller, Northern Canada and Natural Gas, Canadian Association of Petroleum Producers.

This seminar brought together representatives of industry, finance, academia and environmental non-governmental organizations to discuss the facts and issues associated with hydraulic fracturing (or "fracking") which makes available seemingly limitless quantities of low priced and arguably "cleaner" natural gas, but is accompanied by debates on its environmental impacts, including groundwater contamination of groundwater and use of scarce water resources.



Often referred to as the "father of carbon futures", Dr. Richard Sandor presented the keynote address at a special panel discussion "2014 and Beyond: Is Your Business Ready" in December, 2013.

2014 and Beyond: Is Your Business Ready?

December 4, 2013, Toronto

Keynote Speaker: Dr. Richard Sandor, author of "Good Derivatives: A Story of Financial and Environmental Innovation"

Moderator: Susan McGeachie, EY's Sustainability Services.

Speakers: Toby Heaps, Corporate Knights; Paul Dickinson, The Carbon Disclosure Project; Erik Haites, International Climate Finance; Ed Waitzer, Stikeman Elliott LLP.

This panel discussed the development of environmental finance and management as they identified Canadian actions to mitigate risks and capitalise on opportunities. It offered a review of the successes and failures of the global environmental markets, efforts to resolve carbon pricing, financing mechanisms for sustainable solutions, and innovative opportunities for business and society.

Environmental Finance Advisory Committee

The School of the Environment is pleased to have members of the business community plan professional events and courses designed to promote dialogue on leading edge initiatives relating to environmental business risks and opportunities.

- **Michael R. Barrett**, Partner, Corporate, Bennett Jones LLP
- **Alex Chamberlain**, Managing Partner, Investeco Capital
- **Elisabeth (Lisa) DeMarco**, Partner, Norton Rose Fullbright
- **Julie Desjardins**, Advisor, Canadian Institute of Chartered Accountants
- **Toby Heaps**, President and Co-Founder, Corporate Knights
- **Barbara Hendrickson**, Counsel, Bax Securities Law
- **Peter Johnson**, Senior Manager, Environmental Risk, TD Bank
- **Patricia A. Koval**, Partner, Torsys LLP
- **Sonia Labatt**
- **Todd Latham**, President, Actual Media
- **Rosemary Martin**, Chief Sustainability Officer, First Capital Realty
- **Susan McGeachie**, Market Leader, Climate Change and Sustainability Services, Ernst & Young (**Committee Chair**)
- **Susan McLean**, Director, GreenEdge Capital
- **Kimberly Strong**, Director, School of the Environment
- **Katie Sullivan**, Director, North America Policy and International Climate Finance, IETA
- **Gray Taylor**, Partner, Corporate, Bennett Jones LLP
- **Bill Tharp**, CEO, Climate Change Infrastructure Corporation
- **Donna Workman**, Manager, Program & Partnership Development, School of the Environment

For more information, visit <http://learn.environment.utoronto.ca> or contact Donna Workman, 416-978-7077, d.workman@utoronto.ca

Jane Goodall Institute

Partnership with the School provides various learning opportunities for students

BY SANDRA PIMPAO

Founded in 1994 in Montréal, JGI Canada has seen tremendous growth since it moved its offices to Toronto in 2007 with the support of a partnership with the School of the Environment at the University of Toronto. Although the survival of chimpanzees in the wild is at the heart of our work, the Jane Goodall Institute's mission acknowledges that, to protect chimpanzees and other wildlife, we must also help people to live more sustainably and empower our youth to become better environmental stewards of our planet.

Our success this past year in expanding our community-centred conservation work in Africa to work with people to live more sustainably, and the broadening reach of our education program, has been in part to our continued partnership with the School. Our connection to U of T continues to grow every year, with more students and faculty getting involved in our programming.

We are embarking on an exciting new phase of growth and development as we welcome **Andria Teather**, the new CEO of JGI Canada effective August 2013.

Emma Cancelliere (Bachelor's student, Biological Anthropology, Environmental Studies) and **Mark McKay** (Master's student, Forest Conservation) participated in JGI Canada's first field internship opportunity in the summer of 2012, assisting with an assessment of our conservation and development initiatives in western Uganda. **Emma** has presented her findings to various U of T audiences and continues to be an engaged contributor to JGI's **Change is in You blog** (janegoodallcanadablog.org).

Also new this year was JGI's collaboration with U of T Scarborough to train nine student volunteers to deliver *Let's Talk Science* to engage youth in classrooms.



Dr. Jane Goodall addresses students and faculty at University of Toronto Mississauga in 2012.

In April, 2013, the **Jane Goodall Undergraduate Scholarship** was awarded to **Meghan Babin**, (Environmental Policy & Practice) at the joint School and JGI Environment and Development Seminar. The panel on primate and community-centred conservation featured **Professor Shawn Lehman** and **Travis Steffens** (Ph.D. Student) of the Dept. of Anthropology, and Emma Cancelliere.

JGI also hosted a number of Environment work study students throughout the year. For example, **Michelle Mockus** who started in work study then continued beyond her placement. Also **Sarah Samwel** volunteered with JGI and is an active member of JGI's Youth Leadership Council.

JGI was pleased that U of T Mississauga (UTM) hosted Dr. Jane Goodall during her

FOR MORE INFORMATION & VOLUNTEER OPPORTUNITIES:

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

Fall 2012 tour as part of its Snider Lecture Series. Dr. Goodall returned to U of T in October, 2013 to present her lecture **Reason for hope: Exploring the Role of Youth in a Changing Climate**, co-presented by student group U of T Environmental Action and the School. JGI Program Coordinator **Sara Hsiao** also presented a lecture to UTM Anthropology students in February, 2013 on primate conservation and engagement through volunteering and research.

We look forward to continuing a long and fruitful partnership with the University, to work on our conservation, development and education programs in Africa, and engagement of students in education, conservation and community development.

Sandra Pimpao is Director, Development & Marketing, JGI Canada.



LEFT: Emma Cancelliere (Bachelor's student) and Travis Steffens (Ph.D. student) present their research at the Environment and Development seminar. **RIGHT:** Don Jackson, Interim Director of the School of the Environment, presents Meghan Babin (Environmental Policy & Practice Major) with the Jane Goodall Undergraduate Scholarship.

Environment Seminar Series

The following seminars were presented in this series in 2012-13. Condensed presenters' abstracts are included below.

Coordinated by Donna Workman, Manager, Program & Partnership Development

FOR MORE INFORMATION:

www.environment.utoronto.ca/Events.aspx or contact Donna Workman, 416-978-7077, d.workman@utoronto.ca

SIMON APPOLLONI, Ph.D. Candidate, Dept. for the Study of Religion and School of the Environment, U of T. *When Other Worlds Are Taken Seriously: Identifying a New Typology in the Religion-Science Nexus*. Within context of deepening global poverty and a planetary ecological crisis, some Christian thinkers have formulated what this talk argued represents a new typology in the religion-science nexus. This presentation described its key features.

LEA BERRANG FORD, Assistant Professor, Department of Geography, McGill University. *Tracking Adaptation: Climate Change, Global Health, and the Methodological Messiness of the Adaptation Challenge*. There has been relatively little attention given to methods for tracking adaptation at a global scale, which is constrained by the complexity of defining what adaptation looks like in practice and identifying indicators of success.

DON DEWEES, Professor Emeritus, Department of Economics, U. of Toronto. *Energy, Environment and Economics: When is Green Energy Affordable?* Concern about the environmental consequences of burning fossil fuels, particularly coal, to generate electricity has led to policies that encourage the use of renewable energy. This talk discussed an economic framework for evaluating green power projects and how it applies to the energy choices that Ontario faces.

STEVE EASTERBROOK, Professor, Dept. of Computer Science, University of Toronto. *Systems Thinking and Climate Change: Understanding the Dynamics of Societal Inertia*. To the general public, solutions to climate change are typically presented either as a set of personal behavioral changes or a question of global governance. This talk explored this problem using the conceptual toolkit of systems thinking with examples.

RUSS HOULDIN, Former Policy Advisor, Ontario Energy Board. *Understanding Your Electricity Bill: An Archaeology of Policy Failure*. This talk examined Ontario's electricity system, and its failed policies. The bill reflects "electricity restructuring" which used to be known as "deregulation, competition and privatization". Policies have

created a "hybrid market" which created an electricity bill that is largely incomprehensible.

HOWARD HU, Director and Professor, Dalla Lana School of Public Health, University of Toronto. *The Environment & Public Health in a Research-Intensive University: Opportunities for Scholarship*. This talk explored the opportunities for new initiatives and collaborations with the Dalla Lana School of Public Health and the establishment of the new School of the Environment.

BRYAN KARNEY, Professor, Dept. of Civil Engineering, University of Toronto. *Balancing Conflicting Demands at a Major Hydro Facility: Mist, Flow, Tourism and Power, and Niagara Falls*. Almost all large scale-water projects have created a complex set of interacting benefits and costs. This talk examined the division of water between power production and the visual appearance of Niagara Falls which influences the rates of rock erosion and the production of mist.

GAIL KRANTZBERG, Professor, Dept. of Civil Engineering; Director, Centre for Engineering and Public Policy, McMaster University. *Great Lakes Great Responsibilities*. This talk examined the Canada-US Great Lakes Water Quality Agreement which is committed to the restoration and maintenance of the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem.

YUJUN LI, Associate Professor and Director, Dept. of Environmental Economics and Management, Chinese Academy of Social Sciences. *The Growing Problem of Garbage: What Should We Do? — from Beijing to*

David Schindler, Killam Memorial Professor of Ecology at the University of Alberta, discusses the dilemma of controlling eutrophication of lakes in Canada and elsewhere in the world.



Toronto. Beijing is facing a major garbage crisis. This talk discussed ways to reduce Beijing's volume of solid waste and a study of waste management strategies currently used in Toronto. (*Visiting Professor; see page 25.*)

DAVID SCHINDLER, Killam Memorial Professor of Ecology, Department of Biological Sciences, University of Alberta. *The Dilemma of Controlling Cultural Eutrophication*. This talk argues that recent studies finding that nitrogen as well as phosphorus must be controlled in order to reverse eutrophication of lakes are erroneous, because they are based on short-term approaches. New results of whole lake experiments were presented, and a new summary of how climate change and increased human activity in the watershed have combined to cause the rapid eutrophication.

SAPNA SHARMA, Assistant Professor, Dept. of Biology, York University. *The Impacts of Climate Change and Invasive Species on Aquatic Ecosystems: A Landscape Perspective*. This talk examined three potential impacts of climate change on aquatic ecosystems: the spread of invasive species, the extirpation of native species, and alterations in lake ice dynamics. This talk provided evidence that climate change has impacted lakes and forecasted the impacts on the spread of invasive species and the loss of biodiversity.

BARBARA SHERWOOD LOLLAR, University Professor, Dept. of Earth Sciences, University of Toronto. *Emerging Trends in Stable Isotope Investigations for Environmental Forensics and Microbiology*. This talk examined Compound Specific Isotope Analysis (CSIA), the characterization of stable isotope compositions of individual contaminant compounds dissolved in groundwater. CSIA provides a novel method for investigation of both abiotic and biotic remediation potential at contaminated sites. Recently, coupling of both carbon and hydrogen isotope effects is providing deeper insight into microbiological remediation of contaminants through information of microbial activity levels and enzymatic efficiency.

KIMBERLY STRONG, Professor, Department of Physics, University of Toronto. *Up in the Air: Understanding Our Changing Atmosphere*. Air quality, climate change, ozone depletion, and extreme weather are all issues that receive considerable attention, given their potential impact on the economy and public health. Accurate and timely measurements of trace gas concentrations are crucial to understanding the chemical and physical processes that drive atmospheric change. This talk provided an overview of some of the current challenges in atmospheric science, and described how measurements of trace gases may be used to address them.

Memorial Lectures

The following Memorial Lectures were presented in March, 2013 in conjunction with special student awards and scholarships. For photos and details of awards presented, please see pages 14 and 17. For more information, please contact Donna Workman, Manager, Program and Partnership Development, at d.workman@utoronto.ca.

Robert Hunter Memorial Lecture

*This annual lecture is held in memory of the late **Bob Hunter**, co-founder of Greenpeace and former Ecology Specialist at CityTV.*

WILLIAM ALLISON, Aquatic Biologist and Renewable Natural Resource Manager. ***Implications of Rapid Global and Local Change for the Maldivian Atoll System.*** The continued existence of the Maldivian islands, located in the Indian Ocean, continues to depend upon coral reef growth matching or exceeding erosion, especially in a time of sea level rise. This talk discussed the global and local forces inhibiting coral reef growth and their implications. Global forces include greenhouse gas driven global warming and ocean acidification. Local forces include sewage discharge, groundwater pollution and seepage, sediment loading, coral mining, inappropriate coastal development, and quite likely pesticide use. Once the growth of a coral community has been sufficiently inhibited by such factors, erosion exceeds growth, the reef's sea defense capacity is impaired, and islands erode.

Eric Krause Memorial Lecture

*This annual lecture is held in memory of **Eric Krause**, a U of T alumnus in Geography and Environmental Studies and former environmental planner at the City of Toronto.*

ERIC MILLER, Professor, Department of Civil Engineering, University of Toronto. ***Towards Urban Transportation Sustainability: The Third Urban Revolution.*** Prior to the Industrial Revolution, cities were compact, limited by how far a person could walk or a horse could travel in a reasonable period of time. Steam railways, followed by electric streetcars and subways revolutionized the urban landscape. The automobile brought a second revolution that has permitted the almost-unlimited growth of our cities. This auto-based city has very low density, single-use neighbourhoods which are becoming increasingly dysfunctional. The 21st-century revolution requires a cultural and political shift in how we view our cities and a re-think of how we design and build them, in order to create more sustainable, attractive "homes" for people and firms.

Douglas Pimlott Memorial Lecture

*This annual lecture is held in memory of **Dr. Douglas Pimlott**, first Director of the former Environmental Studies Program, Innis College.*

BECKY RABOY, Assistant Professor, Department of Ecology & Evolutionary Biology, U of Toronto. ***Small Monkeys, Big Problems: Golden-Headed Lion Tamarins' Prospects for Surviving in the Complex Agricultural Landscape of Southern Bahia, Brazil.*** Golden-headed lion tamarins are small-bodied Neotropical primates restricted to the Atlantic forest of Southern Bahia, Brazil and are threatened by extreme habitat loss and fragmentation. This talk discussed transdisciplinary population, ecological and behavioural studies, and Dr. Raboy's research which places emphasis on spatially and temporally explicit approaches to predicting future population trends. The need for proactive conservation measures was stressed, such as the protection of forest in key areas to serve as future habitat linkage, reforestation in areas lacking current connectivity and managed translocation to maintain gene flow.

Environmental Career Day

An annual spring event for university and community college students

BY DAVID POWELL

The School of the Environment was pleased to co-present Environmental Career Day, an annual spring event open to all registered university and college students, at U of T and elsewhere.

The co-presentation with the Toronto Undergraduate Geography Society (TUGS), the Forestry Union of Students (FUS), and the Environmental Students' Union (ENSU) was held on March 2, 2013 in the Hart House Great Hall with 250 students in attendance. It included a career expo with 21 exhibitors from government, consulting and non-governmental organizations, and U of T graduate programs, who provided students with information, career advice and many potential career, job and volunteer opportunities.

In addition to the career expo, the day also included presentations by speakers from various sectors in the environmental field. They discussed and answered questions from students, in particular, the key next steps leading up to and after graduation for advancing one's career; how students should prepare for future opportunities, and how to stay positive and focused in a difficult job market.

Speakers included U of T alumna **Josephine Archbold**, Environmental Health Policy and Research Consultant, Toronto Public Health; **Dr. Bryan Karney**, Professor of Civil Engineering, U of T; **Dr. Ray Clement**, President, EnviroAnalysis; **Jessica Kaknevcicus**, Program Development Manager, Ontario Forestry



Association; **Glen Matadeen**, Career Educator, U of T Career Centre; and **Claire Westmacott**, fourth year undergraduate student.

The School of the Environment looks forward to continuing to offer this event, which assists our students as they plan their futures.

David Powell is the School's Undergraduate Student Advisor and Placement Coordinator. For more information, please email him at david.powell@utoronto.ca.

Environment & Health Seminar Series

The following seminars were presented in this series in 2012-13. Condensed presenters' abstracts are included below.

MONICA CAMPBELL, Director, Healthy Public Policy, Toronto Public Health. ***Healthy Toronto by Design: The Making of a More Walkable and Equitable City.*** Toronto Public Health is playing a leadership role in influencing the development of healthy public policies that integrate social, environmental and economic factors in building a healthier, more equitable and liveable city. This presentation highlighted the research findings and policy implications for three major initiatives of the Healthy Toronto By Design framework: 1) The Walkable City: Neighbourhood Design and Preferences Travel Choices and Health, 2) The Road to Health: Improving Walking and Cycling in Toronto, and 3) The Toward Healthier Apartment Neighbourhoods.

DAVID FISMAN, Associate Professor, Dalla Lana School of Public Health, University of Toronto. ***It's Gettin' Hot in Here: Climate Change and Implications for Communicable Disease Control.*** Direct links between the physical environment and infection are readily observable in low-income countries with limited health-enhancing infrastructure. As climate and weather continue to shift, an improved understanding of the impact that climate change may have on infectious disease dynamics in both high- and low-income countries is needed. This seminar discussed the concerns and methodological tools that relate to change in the epidemiology of vectorborne diseases, food- and waterborne illnesses, and the health implications of climate change for already-vulnerable populations.

ELISABETH GALARNEAU, Research Scientist, Air Quality Research Division, Environment Canada. ***Air Toxics in Canada (ATiC): Assessing Hazardous Air Pollutants in Canadian Air.*** Compounds known as air toxics or hazardous air pollutants (HAPs) are implicated in a variety of adverse health effects and have been assessed most notably in the U.S. through the National Air Toxics Assessment (NATA) program. No analogous program existed in Canada before the recent initiation of Environment Canada's Air Toxics in Canada (ATiC) project which found that several pollutants exceed or approach



Monica Campbell of Toronto Public Health presents a seminar on the City of Toronto's initiatives to make Toronto a more walkable and equitable city.

guideline values. Priorities for future work were discussed with special emphasis on two new projects underway this year.

KRYSTAL GORDI, Post-Doctoral Fellow, Dept. of Chemical Engineering and Applied Chemistry, University of Toronto. ***Air Pollution Cocktail: Which Pollutants Are Responsible for Health Effects?*** Long-term exposure to poor air quality is strongly associated with the onset of various chronic cardio-respiratory diseases. Isolating the biological mechanisms which underpin these diseases is challenging from a toxicological perspective. This talk discussed a synthetic cell-free model was developed to replicate the antioxidant-rich fluid that coats the lung and acts as the airway's first defence against radical-generating airborne pollutants. This toxicity metric was designed to quantify the airway's ability to tolerate pollutant exposures and to predict acute oxidative stress responses.

BRUCE LANPHEAR, Professor, Faculty of Health Sciences, Simon Fraser University. ***Crime of the Century: The Failure to Prevent the Lead Pandemic.*** Over the past century, the use and environmental dissemination of lead has increased sharply. Lead toxicity is one of the leading public health problems, but its contributions are often ignored or under-appreciated. Lead is a risk factor for the development of ADHD, has been linked with the rise and decline of violent crimes over the past century, and is a largely unrecognized risk factor for cardiovascular disease, but the focus has been on drug therapy, incarceration, and lifestyle choices, respectively.

JOHN MCLAUGHLIN, Professor, Dalla Lana School of Public Health, University of Toronto. ***Rebalancing the Focus to Achieve Impact***

in Studies of Environmental and Genetic Causes of Cancer. Research in recent decades has yielded unprecedented advances in the understanding of the human genome and factors related to cancer progression and treatment. However, gains have been more modest regarding the effects of environmental factors and ways to improve disease prevention. This seminar explored reasons behind this dichotomy and new approaches for research on health effects of the environment.

BLAKE POLAND, Associate Professor, Dalla Lana School of Public Health, University of Toronto. ***Community Resilience in the Face of an Uncertain Future: Understanding an Emerging Landscape of Transition Towns in Canada.*** Originating in 2004 in the UK and spreading rapidly around the world, the Transition Town movement seeks an integrated and community-based response to economic instability, climate change, peak oil, environmental degradation and the erosion of community. Movement leaders argue that successful transition to a low-carbon society requires grassroots action to build community resilience. There are now over 20 Transition Towns in Canada and another 65-70 at earlier stages of development. This presentation reported on preliminary findings of a study on the emergence of the movement in Canada.

SUE WATSON, Research Scientist, Watershed Hydrology and Ecology Research Division, Environment Canada. ***Algal/Cyanobacterial Odour Compounds in Surface Water: Chemical Communication or Chemical Waste*** The water industry has tended to treat algal odour compounds (AOCs) as metabolic waste, with a focus on their identification, sources and removal. Yet AOC outbreaks still remain highly unpredictable. This talk presented recent work that shows that some AOCs play active roles in ecological processes, functioning at microscale levels in grazer guts or in biofilm matrices. This has major applied implications, and demonstrates a fundamental need to adopt a more mechanistic approach to algal-derived odours in freshwater ecosystems.

KUE YOUNG, Professor, Dalla Lana School of Public Health, University of Toronto. ***Health and Environment in Circumpolar Indigenous People.*** This talk discussed the circumpolar region, overall health status of its indigenous populations in terms of several key comparable indicators, highlighting the substantial disparities that exist across populations and regions. Environmental health problems can be broadly divided into "old" problems such as sanitation, water supply, solid waste disposal and housing. Superimposed on these are "new" ones such as the long-range transport of contaminants and warming of the Arctic from which health impacts are difficult to assess.

Coordinated by Professor Clare Wiseman (see page 29).

FOR MORE INFORMATION:

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

Post Doctoral Fellow Joanne Moyer

University of Manitoba alumna studies faith-based organizations in Canada

BY JOANNE MOYER

I came to the School of the Environment in January 2013 with a two-year SSHRC-funded post-doctoral fellowship. The broad focus of my research is faith-based organizations doing environmental work in Canada, exploring their role in the environmental movement and ways in which learning for sustainability is transferred through the organizations to their target audience. I am working under the supervision of **Professor Stephen Scharper** of the Department of Anthropology at University of Toronto Mississauga, and the School of the Environment.

During the first months of my fellowship, I spent time getting to know the School and planning my research. I observed and participated in Dr. Scharper's Worldviews and Ecology graduate class (ENV 1008H), during which a highlight was a visit to the Evergreen Brick Works, a community environmental centre in Toronto.



J. Moyer

I have also been finishing some papers from my Ph.D. thesis at the University of Manitoba. Two papers are now in review: "Learning for sustainability among faith-based organizations in Kenya", and "Faith-based sustainability in practice: case studies

from Kenya". In April 2013, I presented at the School's Research Day (*see page 5*), describing both my PhD research and the research I intend to pursue for my post-doc.

I returned to Winnipeg for the summer of 2013, where I taught a course, The Study of Voluntary Simplicity, at Menno Simons College. I also conducted research on an event planned by the Mennonite community in Winnipeg for Earth Day last year.

In Fall 2013, I helped teach the Ecological Worldviews undergraduate course (ENV 333H) with Dr. Scharper, and continued with my main research project. This entails connecting with faith-based organizations doing environmental work across Canada by interviewing leaders and participants in their programs, and observing and participating in some of their programs.

To contact Dr. Moyer, please email her at joanne.moyer@utoronto.ca.

Visiting Professor from Beijing

Yujun Li studies Canadian environmental policy and Toronto waste management

BY YUJUN LI

I was pleased to receive funding to be a Visiting Professor at the School of the Environment from August, 2012 to January, 2014. At the Chinese Academy of Social Sciences in Beijing, I am an Associate Professor and Director of the Department of Environmental Economics and Management at the Institute for Urban and Environmental Studies.

One of my research interests is Canadian environmental policy and Toronto municipal waste management. Being here gave me an opportunity to do a comparative study of Toronto and Beijing. The School of the Environment provided an excellent place for my research, given related interests of some of its appointed faculty, and also faculty members from other units at the University.

While at the University, I participated in several courses and also presented a seminar in the School's Environment Seminar Series (*see page 22*) on the growing problem of garbage in Beijing. I met with managers and engineers in the City of Toronto offices of Solid Waste Management Services, and Engineering and Construction Services.

I also visited several facilities such as the Dufferin Garbage Transfer Station which is an organic processing and also a recycling facility, the Disco Road Green Bin Processing Facility, and the Green Lane Landfill. I now have a general idea of the whole process of solid waste management in Toronto.



Y. Li

My main general research interests are in environmental policy, sustainable development, municipal solid waste management, environmental management, environmental impact assessment, and environmental standards. I have led over 20 research projects and published 35 papers, particularly relating to China and Japan.

To contact Ms. Li, please email her at jenny9166@hotmail.com.

Bill Vanderburg retires

Engineer passionate about preventing environmental problems

BY PHIL BYER, BRYAN KARNEY AND BARRY ADAMS



The retirement of **Professor Willem (Bill) Vanderburg** in June 2013 from Engineering and the School of the Environment leaves a big hole in teaching and research in preventing environmental problems rather than trying to fix them after they occur. Bill was among the

first engineers to study the interactions of technology, society and the biosphere and the development of preventive approaches in engineering design.

Bill joined the University in 1978 after completing degrees in mechanical engineering at the University of Waterloo, and post-doctoral studies in science-technology-society interactions at the University of Bordeaux. He was among the first to teach courses on the social impacts of technology, and in 1986 he established the Centre for Technology and Social Development within the Faculty of Applied Science and Engineering, and was its Director until his retirement. In 1991, he became cross-appointed to the Institute for Environmental Studies (IES), a predecessor of the School of the Environment.

Bill has been a passionate promoter for engineers, educators and students to understand and address environmental and social issues up front, not after decisions

have been made. With his knowledge and passion, he was an inspiring teacher to a generation of students, and was one of the first recipients of Engineering's Faculty Teaching Award. His courses on the social and environmental implications of technology have been taken by thousands of engineering and environmental students.

Bill was Editor-in-Chief of the *Bulletin of Science, Technology and Society*. Among his numerous scholarly addresses and writings, he authored four books published by University of Toronto Press, including the recent book *Our War on Ourselves: Rethinking Science, Technology and Economic Growth* (2011).

Although Bill has retired, his passion and inspiration continue through the numerous students and colleagues he has touched.

Phil Byer and Barry Adams are Professors Emeriti, and Bryan Karney is Professor in the Department of Civil Engineering.



Christian Abizaid

Assistant Professor, Dept. of Geography and School of the Environment.

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Licenciatura (International Relations), Iberoamericana, Mexico; M.A. and Ph.D. (Geography), McGill.

2013-14 Instructor of ENV 223H Fundamental Environmental Skills, JGE 321H

Multicultural Perspectives on Environmental Management, and JGE 1425H Livelihoods, Poverty and Environment in the Developing Countries (joint course with Geography).

Research Interests: Human-environment interactions, environmental conservation and development, cultural ecology, peasant livelihoods in tropical forests, environmental change, human responses to natural hazards and vulnerability, human-induced environmental change, land use & land cover change, 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, which are likely to change the prospects for economic livelihood in my study area. Building on my earlier research, I document long-term livelihood responses to river channel dynamics in a socioeconomic context that is rapidly changing.

Community Location, Geographical Poverty Traps, and Community-based Programs.

This project is in collaboration with Yoshito Takasaki (University of Tsukuba), Oliver Coomes (McGill University) and Pablo Arroyo (McGill). It uses remote sensing imagery and community/household surveys to study the determinants and implications of geographical location of rural settlements in the Peruvian Amazon as a new approach that promises to improve our understanding of geographical poverty traps and community-based conservation and development.

Recent Publications:

Takasaki, Y., O.T. Coomes, C. Abizaid, and S. Brisson. 2013. An efficient nonmarket institution under imperfect markets: labor sharing for tropical forest clearing. *American Journal of Agricultural Economics* (In press.)
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*. 17:513-521.
Coomes, O.T., C. Abizaid and M. Lapointe. 2009. Human modification of a large meandering Amazonian river: genesis, ecological and economic consequences of the Masisa cutoff on the central Ucayali, Peru. *Ambio* 38(3): 130-34.

Karen Ing

Senior Lecturer, School of the Environment.

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karen.ing@utoronto.ca

M.Sc. (Zoology), Toronto.

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

On sabbatical leave July 1/13 to June 30/14.

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.

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 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 from 1994 to 1997.

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.

Douglas Macdonald

Senior Lecturer and Academic Associate

Director, School of the Environment.

Office: School of the 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.

2013-14 Instructor of:

ENV 222H Interdisciplinary Environmental Studies, ENV 320H National Environmental Policy, ENV 1001H Environmental Decision Making, ENV 1002H Environmental Policy.

Research Interests: Politics of Canadian environmental policy making; waste and pollution policy; the business firm and trade association as environmental policy actors, Canadian national, federal-provincial climate-change policy; environmental legitimacy as a source of political power; distributive effects, conflict and justice norms associated with the transition to a low-carbon economy.

Research Projects: (See page 4 for details.)

Governance Innovation and the Transition to a Low Carbon Economy (Carbon Management Canada, 2010-13; with **James Meadowcroft** and **Glen Toner** of Carleton University). This project is concerned with innovation

in governance practices to address climate change and accelerate the transition towards a low carbon Canada. It addresses the particular issue of distributional conflicts, focussing on three dimensions of climate-related political conflict: regional/inter-governmental, industrial, and social. It examines innovative measures for such things as mobilizing capital for low-carbon investment being implemented in leading European jurisdictions.

Allocating Canadian Greenhouse Emission Reductions Amongst Sources and Provinces: Learning from the European Union (EU) and Germany (SSHRC, 2009-12; with **Jochen Monstadt** from Technische Universität, Darmstadt, Germany and **Kristine Kern**, Wageningen Universiteit, The Netherlands.)

This project studies the failure of the Canadian federal government and provinces to reach agreement on one effective, coherent national climate change policy stating the portion borne by each province and studies lessons learned from Germany and the EU. (See page 4 for details on the final project report.)

Carbon Province, Hydro Province: The Tragic Failure of Canadian National Climate Policy.

This is the working title of a book examining the effort by Canadian federal and provincial governments to develop co-ordinated national climate-change policy from 1992 to 2002 and the subsequent unco-ordinated policy making by all fourteen Canadian governments.



Recent Publications:

Macdonald, D. and M. Lesch. 2013. Competing visions and inequitable costs: the national energy strategy and regional distributive conflicts. *Journal of Environmental Law and Practice* 25: 1-17.

Macdonald, D. 2012. State interest as an explanatory factor in the failure of the soft-path energy vision. *Energy Policy* 43 (April 2012): 92-101.

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



W. Scott Prudham

Professor, Department of Geography and School of the Environment.

Office: Dept. of Geography, Room 5007, 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. & B.Sc., McMaster; M.A. (Geography), Victoria; Ph.D. (Energy and Resources), California, Berkeley.

2013-14 Instructor of JGE 331H Resource & Environmental Theory (joint with Geography)

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

Recently Completed Research Project: *Double Movements: A Political Ecology of Land, Labour and Livelihoods in British Columbia* (SSHRC, 2008-12). This project examined the inter-connected political, ecological, economic and cultural aspects of commodification in British Columbia's forest economy. The goals were 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.

Current Projects:

1. A themed collection of journal articles (with **Mike Ekers**, Department of Human Geography, U of T Scarborough), dealing with the concept of socio-ecological "fixes" for capitalist crises and crisis tendencies, drawing on and extending the work of David Harvey and Neil Smith;
2. An article length conceptual development of the notion of socio-ecological crises of

capitalism and their (temporary?) resolutions (with Mike Ekers); and

3. A book project on the historical political ecology of neoliberalism with **James McCarthy**, Department of Geography, Penn State University.

Recent Publications:

- Prudham, S. 2013. Men and things: Karl Polanyi, primitive accumulation, and their relevance to a radical green political economy. *Environment and Planning A* 45(7) :1569-1587.
- Prudham, S. 2012. Pimping climate change: Richard Branson, global warming and the performance of green capitalism. In: S. Eldon et al (eds.) *Environment and Planning: Five Volume Set*. Volume 1: Cities and Regions.
- Prudham, W.S. 2012. The political economy of a crisis. In: N. Castree and D. Gregory (eds.) *Human Geography*. Volume 4. Sage Publications, Thousand Oaks, California.
- Prudham, S. and W. Coleman. 2011. Introduction: Property, autonomy, territory, and globalization. In: W. Coleman (ed.) *Property, Territory, Globalization: Struggles Over Autonomy*. University of British Columbia Press, Vancouver. Pages 1-28.
- Prudham, S. 2011. Making forests "normal": Sustained yield, improvement, and the establishment of globalist forestry in British Columbia. In: W. Coleman (ed.) (See above.) Pages 80-100.



Stephen B. Scharper

Associate Professor, Department of Anthropology, U of T Mississauga and School of the Environment.

Offices: 1) School of the Environment, Room 2103, 33 Willcocks St., Toronto, ON, M5S 3E8; tel: 416-978-7433; fax: 416-978-3884; 2) Dept. of Anthropology, U of T Mississauga, Rm 118, 3359 Mississauga Rd. N., North Building, Mississauga, Ont. L5L 1C8; tel: 905-569-4912; fax: 905-828-3837; stephen.scharper@utoronto.ca; http://www.environment.utoronto.ca B.A. Hons., Toronto; M.A. (Theology), Toronto; Ph.D. (Religious Studies), McGill.

2013-14 Instructor of ENV 100H Introduction to Environment and ENV 1008H Worldviews and Ecology.

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

Research Projects:

Water: From Resource to Elemental Foundation of Life (with **Tim Leduc** (Environmental Studies, York University). Investigates the importance for environmental thought and policy of reflecting on water not just as a precious resource, but as a vital element, foundational to all life.

Cosmological Underpinnings of Urban Sustainability. This research has explored some of the cosmological and spiritual presuppositions that lie behind the integration of urban ecological thought and planning, involving the work of wildlife biologist Aldo Leopold and cultural historian and Passionist priest Thomas Berry.

Religion and Ecology: Exploring the Interconnection of Liberationist and Ecological Theologies (recently completed SSHRC project). On the integration of liberation theology and newer religious approaches to environmental questions, such as the new cosmology of Thomas Berry. While much of the religious conversation

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. 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 focussed on the theology of liberation, a theology that takes poverty, and increasingly, ecological destruction, seriously.

Recent Publications:

- Scharper, S. B. and H. Cunningham. Lifeform, livelihood and lifeway: reflections on urban and planetary futures. In D. Nonini (ed). *The Future of Cities*, Blackwell Publishers. (Forthcoming.)
- Scharper, S. B. 2013. *For Earth's Sake: Toward a Compassionate Ecology*. Toronto: Novalis. 224 pages.
- Stefanovic, I.L. and S.B. Scharper (eds.) 2012. *The Natural City: Re-envisioning the Built Environment*. University of Toronto Press. 356 pages.
- Scharper, S. B. 2012. From community to communion: the natural city in biotic and cosmological perspective. In *The Natural City: Re-envisioning the Built Environment* (see above), pages 89-103.

Kimberly Strong

**Professor, Department of Physics
Director, School of the Environment.**

Office: School of the Environment,
Room 1020, 33 Willcocks St., Toronto,
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http://www.atmosp.physics.utoronto.ca/
people/strong/strong.html

B.Sc. (Physics), Memorial; D. Phil.
(Atmospheric Physics), Oxford.

Research Interests: Atmospheric remote sounding using ground-based, balloon-borne, and satellite instruments for studies of stratospheric ozone chemistry, climate, and air quality. Founder of the University of Toronto Atmospheric Observatory; Theme Leader for the Canadian Network for the Detection of Atmospheric Change, which runs the PEARL facility in the high Arctic; Co-I on the ACE and Odin satellite missions; PI of the Canadian FTIR Observing Network, and Director of the NSERC CREATE Training Program in Arctic Atmospheric Science.

Featured Research Projects:

Arctic Atmospheric Science. Our group has been making measurements at Eureka, Nunavut since 1999 and were involved in establishing the Polar Environment Atmospheric Research Laboratory (PEARL) in

2005. In 2013, the PEARL team was awarded funding from NSERC's Climate Change and Atmospheric Research program for the project "Probing the Atmosphere of the High Arctic (PAHA)" to support our science activities for another five years. PEARL houses about 20 instruments, four of which are run by students and postdocs in my group. I am leader of the Composition Measurements theme, which is acquiring trace gas time series to improve our understanding of processes and trends related to the carbon cycle; ozone depletion; biomass burning; and clouds, aerosols, and precipitation.

The Canadian FTIR Observing Network (CAFTON). With support from the Canadian Space Agency, we are establishing a network of Fourier transform infrared (FTIR) spectrometers that will serve as a "ground-based satellite" for atmospheric measurements over Canada. Measurements of a suite of chemical species are being integrated with models to characterize atmospheric composition, determine transport pathways, and identify pollution sources. In 2013, we signed a ten-year loan agreement with Environment Canada for four new instruments.

Satellite Remote Sounding. We are involved in the Odin/OSIRIS and ACE satellite missions, both of which have been making global observations of the atmosphere for over a decade. We have contributed to the development of new methods for deriving,



validating, and interpreting geophysical data from these missions. Most recently, this has resulted in new data products, including NO density profiles in the upper atmosphere.

Recent Publications:

Mariani, Z., K. Strong, et al. 2013. Year-round retrievals of trace gases in the Arctic using the Extended-range Atmospheric Emitted Radiance Interferometer. *Atmos. Meas. Tech.*, 6, 1549-1565.

Whaley, C., K. Strong, et al. 2013. Using FTIR measurements of stratospheric composition to identify mid-latitude polar vortex intrusions over Toronto. *J. Geophys. Res. Atmos.*, 118 (2): 12766-12783.

Clare Wiseman

**Assistant Professor and Coordinator,
Environment and Health Collaborative
Graduate Prog., School of the Environment.**

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

2013-14 Instructor of ENV 341H Environment and Human Health and ENV 4001H Graduate Seminars in Environment and Health.

Research Interests: Metal emissions in urban environments and their human health impacts, contaminants and urban gardening, environmental health of vulnerable populations.

Featured Research Projects:

Urban Gardening & Airborne Particulate Matter: Exploring the Fate of Traffic-Related Emissions and the Effectiveness of Risk Reduction Measures. This research examines the fate of traffic-related metal emissions in the urban environment, their uptake by commonly cultivated plants and the effectiveness of soil remediation measures. Since 2010, different plant species have been cultivated at several locations in Toronto, with variable traffic densities to assess the

soil accumulation and fate of metal emissions over time, their bioaccessibility and potential health risks of consumption. The research was expanded in 2013 to include several other gardens cultivated by Foodshare and U of T's student-run group Dig In! Campus Agriculture. (See page 3 for more info.)

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 environmental concentrations have increased over time. Potential human exposures and health impacts are also assessed using simulated lung fluids to determine the bioaccessibility of PGE associated with airborne particulate matter sampled in Germany. Toronto soil and road dust samples were collected in June 2013 to examine PGE concentrations in a large Canadian urban centre, which has not yet been documented.

Children and Contaminants in Public Settings: Assessing Dermal Exposure Levels and Risks. Preliminary research is underway to assess the feasibility of dermal wipe techniques to determine contaminant exposures in children playing in public parks and playgrounds. Focus of the study is on metal exposures from local emission sources and through contact with various construction materials in Toronto.



Recent Publications:

Zereini, F and C.L.S. Wiseman (Eds.) 2014. *Platinum Elements in the Environment*. Springer, Berlin (Forthcoming.)

Wiseman, C.L.S., F. Zereini, W. Püttmann. 2013. Traffic-related trace element fate and uptake by plants cultivated in roadside soils in Toronto, Canada. *Science of the Total Environment* 442: 86-95.

Zereini, F., C.L.S. Wiseman, W. Püttmann. 2012. In vitro investigations of platinum, palladium and rhodium mobility in urban airborne particulate matter (PM10, PM2.5 and PM1) using simulated lung fluids. *Environmental Science & Technology* 46(18): 10326-10333.

PROFILES: OTHER INSTRUCTORS & SESSIONAL LECTURERS

GRADUATE INSTRUCTORS/SESSIONALS



Mercer

Jane Ambachtsheer

Adjunct Professor and 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 in developing the principles for responsible investment, and is a global advisor to the carbon disclosure project and sits on the investment committee of the Toronto Atmospheric Fund.



C. Ollson

Christopher Ollson

Sessional Lecturer
ENV 1704 Environmental Risk Analysis and Management
Dr. Ollson is VP Strategic Development with Intrinsik Environmental Sciences, Mississauga. He has been practicing in the field of environmental risk and toxicology for 15 years and has an active research program in the oral bio-availability of contaminants and potential health effects associated with living in proximity to wind turbines. He is also Adjunct Assistant Professor, Royal Military College of Canada.



M. Diamond

Miriam Diamond

Professor, Dept. of Earth Sciences, U of T
JGE 1212H Contaminants in the Environment (2012-13)
Dr. Diamond is interested in chemical contaminants from source to health effects, including measuring and modelling sources, fate and exposure of the plasticizers phthalates indoors to advancing methods in Life Cycle Impact Assessment, policy and practice for minimizing exposure to contaminants. She also taught the undergraduate course JGE 236H Human Interactions with Environment.



D. Pond

David Pond

Sessional Lecturer
ENV 1001H Environmental Decision Making (2012-13)
Dr. Pond teaches environmental politics, Canadian politics and public policy in the Department of Political Science at U of T, at both the Mississauga and St. George campuses. His most recent publication is a comparative study of the federal Commissioner of the Environment and Sustainable Development and the Environmental Commissioner of Ontario (Canadian Study of Parliament Group, 2010).



A.P. Lino Grima

Associate Professor (retired), Geography, U of T
ENV 1703H Water Resource Management and Policy
Dr. Grima has taught environmental/water resources management at the University of Toronto 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.



B. Raboy

Becky Raboy

Assistant Professor, Department of Ecology and Evolutionary Biology, U of T
ENV 1001H Environmental Decision Making (2013-14)
Dr. Raboy's research spans ecology, behaviour, landscape ecology, and conservation biology. She uses Geographic Information Systems, Population Viability Analysis (PVA), simulation modeling and field work to study the ecology of endangered species (particularly the primates of Brazil) and their habitats towards the development of sustainable management plans.



S. McGeachie

Susan McGeachie

Adjunct Professor and Sessional Lecturer
ENV 1707H Environmental Finance and Sustainable Investing
Ms. McGeachie is the Central Canada leader of EY's Climate Change and Sustainability Services practice. She advises companies on managing risks associated with environmental, social and governance issues, as well as developing appropriate governance and management models. She is chair of the School of the Environment's Environmental Finance Advisory Committee (see page 20).



S. Wakefield

Sarah Wakefield

Associate Professor, Department of Geography and Programme in Planning, U of T
JGE 1413H Workshop in Environmental Assessment
Dr. Wakefield's current research explores community and policy responses to food insecurity and food system sustainability concerns at a variety of scales, from the local to the global. She is interested in critical social theory and its application to food system and environmental health/justice issues.



P. Muldoon

Paul Muldoon

Adjunct Professor and Sessional Lecturer
ENV 1701H Environmental Law
Mr. Muldoon is Vice-Chair of the Environmental Review Tribunal, a body that adjudicates appeals, applications and referrals under 12 statutes. He is the former Executive Director of the Canadian Environmental Law Association. He has graduate degrees from McMaster University and McGill University and has written and co-written books and articles on Canadian environmental law and policy.

UNDERGRADUATE INSTRUCTORS/SESSIONALS



S. Appolloni

Simon Appolloni

Ph.D. candidate, Religion/Environment
ENV 222H Interdisciplinary Environmental Studies (2012-13)
 Mr. Appolloni is a doctoral candidate in the Dept. for the Study of Religion and the School of the Environment. His doctoral dissertation investigates how Christian thinkers are engaging with “new science” in order to unite a liberationist agenda with an environmental ethic. He also teaches a course on religion, ethics and environment for his department, and has taught tourism ethics at Brock University.



M. Hathaway

Mark Hathaway

Ph.D. candidate, OISE UT/Environment
ENV 333H Ecological Worldviews
 Mr. Hathaway is a Ph.D. candidate in Adult Education and Community Development (OISE/UT) and the School of the Environment. He researches the relationship between adult transformative learning, ecological worldviews, and engagement for sustainability. He co-wrote *The Tao of Liberation* (Orbis, 2009). He has extensive experience in social and ecological justice issues in Canada and Latin America.



Brad Bass

Sessional Lecturer
ENV 299Y Research Opportunity Program
 Dr. Bass is a member of the Environment Canada’s Great Lakes Nutrient Initiative team. His research interests include best management practices and policies for limiting phosphorus loads from urban areas, green infrastructure, modelling phosphorus flows with fuzzy cognitive maps, ecological and socio-economic simulation with emergent computing, and community energy systems planning.



S. Liu

Monika Havelka

Senior Lecturer, Environment Programs, University of Toronto Mississauga
ENV 395Y Special Topics Field Course. Ecology and Conservation in the Andes, Western Amazonia & Galápagos
 Dr. Havelka received her Ph.D. in Zoology at the University of Western Ontario. She has taught a wide variety of courses in evolutionary biology, ecology and environmental science, and field courses in Ecuador, Ontario, and the Arctic. She was twice a semi-finalist and once a finalist in the TVO Best Lecturer Competition.



www.es.utoronto.ca

Bridget Bergquist

Assistant Prof., Dept. of Earth Sciences, U of T
ENV 233H Earth Systems Chemistry NEW
 The primary aim of Dr. Bergquist’s research is to increase our understanding of biogeochemical cycles of metals that are important for life on Earth and how these cycles have evolved over time through the use of trace metal and stable isotope geochemistry. Specifically, she researches the iron cycle of the ocean, mercury biogeochemical cycling and bioaccumulation, and calcium weathering and transport.



R. Houldin

Russ Houldin

Sessional Lecturer
ENV 323H Ontario Environmental Policy
ENV 347H Power of Economic Ideas
 Mr. Houldin has worked in the Ontario Public Service for over 30 years. He recently retired as senior adviser to the Ontario Energy Board. He continues to work as an energy and environment consultant. His interests include environmental and ecological economics, sustainable electricity systems, environmental and economic regulation, and Ontario environmental policy.



www.eeb.utoronto.ca

Hélène Cyr

Associate Professor, Dept. of Ecology and Evolutionary Biology, University of Toronto
ENV 234H Environmental Biology
ENV 334H Environmental Biology: Applied Ecology
 Dr. Cyr’s interests are in the ecology of littoral areas in lakes (spatial and temporal distribution of habitats and benthic communities), foodwebs (feeding interactions in planktonic and benthic communities, especially between invertebrates and algae), and macroecology (body size distribution, allometric relationships, scaling of environmental variability).



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.



www.chem.utoronto.ca

Jessica D’eon

Lecturer, Department of Chemistry, U of T
ENV 223H Earth Systems Chemistry NEW
 Dr. D’eon’s research is on the disposition of xenobiotic chemicals both in the environment and the body. Her focus is on the oxidation of fluorinated alcohols to fluorinated aldehydes via alcohol dehydrogenase (ADH) enzymes in order to better understand the toxicological significance of the fluorinated aldehydes. Her PhD is in Chemistry and the Environmental Studies collaborative program at U of T.



A. Martin

Adam Martin

Post-doctoral Fellow, Faculty of Forestry, U of T
ENV 223H Fundamental Environmental Skills (2012-13)
 Dr. Martin recently completed his Ph.D. in the Faculty of Forestry, University of Toronto. His current research focuses on designing a long-term vegetation monitoring program in southern Ontario, to understand how terrestrial ecosystems respond to changes in climate and land-use. He also maintains active research projects examining tropical forest carbon dynamics.



P. Muldoon

Paul Muldoon

Adjunct Professor and Sessional Lecturer
ENV 422H Environmental Law

Mr. Muldoon is Vice-Chair of the Environmental Review Tribunal, a body that adjudicates appeals, applications and referrals under 12 statutes. He is the former Executive Director of the Canadian Environmental Law Association. He has graduate degrees from McMaster University and McGill University and has written and co-written books and articles on Canadian environmental law and policy.



D. Pond

Keith Stewart

Sessional Lecturer
ENV 350H Energy Policy and Environment

Mr. Stewart has worked as an energy policy analyst and advocate for various non-profit groups for over a decade and currently works for Greenpeace Canada where he promotes the efficient use of renewable energy. He is the co-author of the book *Hydro: The Decline and Fall of Ontario's Electric Empire* and author of numerous articles, reports and op eds on climate change policy and politics.



B. Murck

Barbara Murck

Senior Lecturer, Geography, U of T Mississauga
ENV 395Y Special Topics Field Course. Ecology and Conservation in the Andes, Western Amazonia & Galápagos

Dr. Murck received her undergraduate degree from Princeton U. and her Ph.D. in Geology from U of T. She has focused on international development, through environmental management projects in Africa, China, and SE Asia. She is an award-winning lecturer (President's Teaching Award 2010) and has written many books in geology and environmental science.



R. Verma

Romila Verma

Sessional Lecturer
ENV200 Assessing Global Change: Science & the Environment

Dr. Verma is an Environmental and Physical Geographer. She has worked on Canadian and International issues including Ontario's source water protection plan, impact of weather variables on municipal water use, indicators of environmental change in Lake Simcoe, and hydrological parameters in Mahanadi river basin in India. Current interest is finding a sustainable solution to water crisis in Sahel region of Africa.



J. Nugent

James Nugent

Ph.D. candidate, Dept. of Geography, U of T
JGE 331H Resource & Environmental Theory (2012-13)

Mr. Nugent is a Ph.D. candidate in the Department of Geography at U of T. He examines the responses of trade unions to the current dual ecological and economic crisis viewed through climate change politics and the dawn of the "green economy". He is also interested in biological conservation through an environmental justice lens and in the (re) production of environmental ideologies.



E. Vogt

Erich Vogt

Sessional Lecturer
ENV 322H International Environmental Policy
ENV 451H Current Environmental Debates

Dr. Vogt's interests address the policies and politics of climate change, contemporary international environmental issues and global governance innovations. He has taught at George Washington University and American University in Washington, D.C. and was IUCN's senior multilateral policy advisor and managing editor of World Bank-incubated Development Gateway.



D. Pond

David Pond

Sessional Lecturer
ENV 320H National Environmental Policy (2012-13)
ENV 221 Multidisciplinary Perspectives on Environment
Dr. Pond teaches environmental politics and public policy in the Dept. of Political Science at U of T, at the Mississauga and St. George campuses. His recently published a comparative study of the federal Commissioner of the Environment and Sustainable Development and the Environmental Commissioner of Ontario (Canadian Study of Parliament Group, 2010).



S. Waite-Chuah

Sheila Waite-Chuah

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 at the Ontario College of Arts and Design University.



D. Sider

David Sider

Sessional Lecturer
ENV 307 Urban Sustainability, ENV 421H Environmental Research, ENV 440H Professional Experience Course
Dr. Sider received his Ph.D. in Geography and Environmental Studies 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.



R. Curtha

Kaley Walker

Associate Professor, Dept. of Physics, U of T
ENV 237H Physics of the Changing Environment NEW

Dr. Walker's research group uses spectroscopy and remote sounding techniques to study the composition and chemistry of the Earth's atmosphere. They use instruments on the ground as well as those carried by balloons and satellites. These atmospheric composition measurements are the data needed to investigate stratospheric ozone depletion, tropospheric air pollution and climate change.

DISTANCE EDUCATION INSTRUCTORS



B. Baser

Bob Baser

Distance Education Instructor

CRE 403 Urban Energy Systems

Mr. Baser is an independent consultant providing international business services in market assessment, strategic alliance creation and project management for companies setting up international joint ventures. Since 2003, he has specialized in international Environmental Impact Assessment services for companies in such countries as China, Poland, Nigeria, Serbia, and Trinidad and Tobago.



T. Johnson

Tom Johnson

Distance Education Instructor

ECF 403 GHG Reporting and Accounting

Mr. Johnson has over 13 years of experience in the environmental and greenhouse gas sectors. He has held senior roles related to both GHG accounting and reporting and to carbon finance, and is currently helping the province of Ontario implement its Cap and Trade system. He holds a B.A. in Geography and Environment from McGill University, and is Qualified as an ISO 14964 GHG Auditor by Environment Canada.



O. Bussler

Oliver Bussler

Distance Education Instructor

ECF 400, 402: Environmental Finance and Case Study

Mr. Bussler is Director, Sustainable Development at TransAlta Corporation. He currently leads the group responsible for TransAlta's emissions reporting and compliance programs. He has spent the past decade involved with Canadian environmental policy and has developed a broad skill set in the world of environmental and carbon finance, project development and carbon offset acquisitions.



A. Moser

Anne Moser

Distance Education Instructor

CRE 404 Solar Energy

Ms. Moser is an engineering analyst with a major consulting firm in Ontario, and is involved in developing large scale wind and solar energy projects. She is also completing doctoral research in wind turbine aerodynamics at U of T and has a Master of Applied Science in Chemical Engineering from the University of Erlange-Nuernberg, Germany. She has been teaching in the distance education program for five years.



G. Gienko

Gennady Gienko

Distance Education Instructor

GEM 403: Environmental Remote Sensing

Dr. Gienko is a Professor in the Dept. of Geomatics, School of Engineering at the University of Alaska Anchorage, where he develops and teaches undergraduate and graduate courses in geographic information systems, geospatial image analysis, remote sensing and photogrammetry. He has extensive international experience in geospatial science, geomatics and photogrammetry.



D. Sider

David Sider

Distance Education Instructor

CEM 400 Environmental Management; CEM 401 Urban Water; CEM 405 Global Environ. Change & Human Health

Dr. Sider received his Ph.D. in Geography and Environmental Studies 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.



M. Govorov

Michael Govorov

Distance Education Instructor

GEM 400 - 404: GIS for Environmental Management

Dr. Govorov has instructed in the School'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 eight years and currently teaches and prepares undergraduate and postgraduate courses at the Vancouver Island University.



I. Sinclair

Ian Sinclair

Distance Education Instructor

CRE 403 Urban Energy Systems

Mr. Sinclair works in energy and water management, focusing on the built environment which includes energy and water audits, building retrofits, recommissioning, renewable energy, measurement and verification, green certification, engineering and project management. He also instructs the School's Certificate Programs in Water Auditing and Implementing Energy Management Systems: ISO 50001 (see page 20).



S. Greenberg

Sharonna Greenberg

Distance Education Instructor

CEM 403 Environmental Risk Assessment

Dr. Greenberg is a chemist whose research involved designing new polymers and technologies. These technologies are used in manufacturing electronics, pharmaceuticals and pesticides, and they rely on more environmentally friendly chemical species, eliminating the need for toxic metals. She is currently teaching at the University of Toronto and Ryerson University.



L. Sportza

Lucy Sportza

Distance Education Instructor

CEM 402, 404: Environmental Management, CRE 400, 401: Renewable Energy, WRM 400 Water Resource Management

Dr. Sportza also teaches in the online environment and undergraduate program at the University of Guelph. 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 protected areas as part of urban sustainability.



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Cover photos, clockwise from top left:

1. Undergraduate student Emma Cancelliere in Uganda where she studied conservation and development for an independent research project and internship with the Jane Goodall Institute (*credit: Emma Cancelliere*);
2. Views from Ubirr Rock in northern Australia's World Heritage-listed Kakadu National Park, seen by students in the ENV396Y summer field course (*credit: Rosalie Chapple*);
3. Alpacas at Mount Chimborazo in the Andes seen by students in the ENV395Y summer field course (*credit: Julia Bellehumeur*);
4. Ph.D. candidate Dan Weaver (Physics/Environmental Studies program) measuring atmospheric trace gases in the high Arctic using Fourier transform spectroscopy (*credit: Dan Weaver*);
5. Solar cells at Toronto's Harbourfront Centre were designed and implemented by recent M.Eng. alumni Livio Nichilo in his study of building integrated photovoltaics (*credit: Livio Nichilo*);
6. Students walking in the El Junco highlands of the Galapagos in ENV 395Y summer field course (*credit: Sarah Latimer*).