



School of the Environment
UNIVERSITY OF TORONTO

2014-15 ANNUAL REPORT





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Kate Neville, Assistant Professor, Political Science/
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Stephen Scharper, Associate Professor,
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Paul Helm, Senior Research Scientist,
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Director's Message

BY KIMBERLY STRONG

Director, School of the Environment

The 2014-15 academic year was a busy and productive one at the School of the Environment. I thank everyone who has supported the School over the past year, including faculty, staff, students, alumni, donors, and those with more informal connections. I would also like to thank **Doug MacDonald** for his many contributions as Academic Associate Director.

Last summer, the School was privileged to receive a generous endowment from the **Beatrice and Arthur Minden Foundation**, which is being used to establish two new programs that will be launched in the 2015-16 academic year (*see page 2*). The Beatrice and Arthur Minden Symposium on the Environment will be an annual event intended to 'make a difference' by enabling scholarly and public discussion and debate on environmental issues of the day, particularly those of relevance to Canada. With \$100,000 in matching funds from the Provost's PhD Enhancement Fund, the Beatrice and Arthur Minden Graduate Research Fellowship will be awarded to PhD students enrolled in the School's graduate programs to support their research activities. I would like to express my deep appreciation to the Minden family for their generosity and for choosing the School to honour the memory and philanthropic spirit of their parents.

The School was also recently honoured with a donation by Robena C. Weatherley to establish the **Alan H. Weatherley Graduate Fellowship in Environmental Leadership** in memory of Professor Emeritus Alan H. Weatherley. This fellowship reflects his personal interest, deep concern, and life-long commitment to environmental issues. Starting in 2015-16, it will be awarded annually to one PhD student enrolled in the School's graduate programs who demonstrates exceptional academic and/or practical leadership in the area of environmental issues.

The School's undergraduate programs are thriving, with about 750 students enrolled in our majors, minors, and collaborative programs. The **major in Environmental Studies** is our most popular offering, while the **new major in Environmental Science** is still rolling out. We were excited to offer two new second-year courses in spring 2014, followed by two new third-year courses in fall 2014 (*see*

page 13). These courses were taught by faculty in the Departments of Chemistry, Physics, Earth Sciences, and Ecology & Evolutionary Biology, fulfilling the School's mandate to involve multiple units in offering environmental programs as shared endeavours. Also on the undergraduate front, **Karen Ing** continues to lead our efforts to increase **international opportunities** for our students (*see page 14*). Working with the Centre for International Experience, she visited eight universities in Asia and Europe in 2013-14 to develop collaborations for our students to study abroad. This past year, our students again participated in field courses in the Andes, the Amazon, the Galápagos Islands, and Australia (*see page 15*).

Our **graduate Collaborative Programs (CP) in Environmental Studies and Environment & Health** provide graduate students from many departments with a broad perspective that complements their discipline-based degree (*see page 19*). This past year, the Environmental Studies CP underwent an Internal Quality Review that included consultations with students, faculty, and the Program Committee. One finding was the desire for more ways for students to engage with the program; as a result, the **Graduate Environmental Students' Association (GESA)** was revived in the fall and has since been actively organizing both social and academic events (*see page 22*). A Graduate Program Planning Committee has also been established and is working on the development of a new stand-alone graduate program.

We have had a successful year with faculty recruitment. In July 2015, **Dr. Kate Neville** started as an assistant professor in Environmental Politics, in a joint position with the Department of Political Science. Kate's research interests lie in the geographic, sociological, and historical context of energy and water resource developments in the global political economy. **Dr. Debra Wunch** will be joining us as an assistant professor in Experimental Climate Physics in January 2016, in a joint appointment with the Department of Physics. Debra's expertise lies in the hands-on development of remote-sensing experiments, data acquisition, and analysis for measuring greenhouse gases on both local and global scales.



K. Strong

Our **Professional Development Program** continues to offer in-class and distance courses (*see page 23*), while the School's **Environmental Finance Advisory Committee** had an active year, including a 2014 Arbor Award from the University (*see page 25*). The Committee organized four well-attended events on environmental topics of interest to the business community in 2014, including green bonds, the sustainability performance of Canadian real estate, and the climate change agenda in western Canada. The November 18th **Thought Leadership Event** proved to be a very special evening, combining an in-depth look at the impacts of climate change on the insurance industry with the presentation of two scholarships (*see pages 16 and 26*). The first was the **Rodney White Environmental Studies Scholarship**, which was established in memory of Professor Rodney White, Director of the former Institute for Environmental Studies; Rodney's many accomplishments were described by Joe Whitney, Emeritus Professor in the Department of Geography, and the inaugural scholarship was presented to Francesca Hannan by Sue White. At the same event, the second **Skip Willis Undergraduate Scholarship** was awarded to Alissa Saieva by Kelly Willis. We are very grateful to the families and friends of Rodney White and Skip Willis for their generosity in establishing these two new scholarships for our students.

I am pleased to conclude by introducing **Gray Taylor** as our **inaugural Distinguished Visiting Fellow in Environment**. Gray practices business law including climate change and emission trading, and environmental and sustainability law, and has been making an ongoing and significant contribution to the School as a member and former Co-Chair of the Environmental Finance Advisory Committee. In his new role, Gray will be available for informal mentoring of our students and guest lectures, and will act as an external liaison, giving the School greater visibility in the wider community.

Generous donation to the School

Beatrice and Arthur Minden Foundation establishes symposium and fellowship

BY BARRETT HOOPER, FACULTY OF ARTS & SCIENCE

U of T's School of the Environment has received a huge boost to its educational and research capacities thanks to the vision and generosity of the Beatrice and Arthur Minden Foundation in establishing the Beatrice and Arthur Minden Symposium on the Environment and the Beatrice and Arthur Minden Graduate Research Fellowship.

The symposium will enable the School of the Environment to bring together international researchers and cross-disciplinary scholars on an annual basis to discuss and debate the most urgent environmental issues. "We hope that this annual event will catalyze meaningful new collaborations on key environmental issues, leading to new ideas and insights, proposals for workable solutions and plans for future interactions," says the School's Director, Kimberly Strong.

The graduate research fellowship, meanwhile, will support PhD students by enabling their participation in conferences, summer schools, field work and collaborative visits to research groups across Canada and around the world. "These fellowships are intended to make a real difference to our students," Strong says, "giving them new opportunities to expand and strengthen their research on environmental issues."

The Beatrice and Arthur Minden Foundation was established by Beatrice Minden in honour of her late husband, Arthur, a lawyer and philanthropist who co-founded the Muscular Dystrophy Association of Canada in 1954. Arthur came to Canada from Russia in 1912, when he was only two, and attended U of T (BA 1932) -- the first in his family to go to university -- and Osgoode Hall before setting up his law practice. Well-known for his enthusiasm, good spirit and generous character, he was heavily involved in the community, and in Toronto's arts and Jewish communities, in particular. Following his death in 1966, Beatrice set out to continue his philanthropic work and legacy through the foundation, which has supported a range of activities, from university scholarships in Israel to cultural events and hospitals in Toronto.

After Beatrice passed away in 2009, their children, George, Robert, Jo-Ann and Cynthia continued the work of the



foundation. In each of the four years since their mother's death, the siblings took turns deciding which activities the foundation would support, after which time they decided to find a single cause to support. Earlier last year, they settled on the School.

"We wanted to find a home for the foundation, a way to honour our parents, their spirit and their legacy. We were all excited about the new School of the Environment at U of T and felt this was a great fit: the city in which our parents spent their lives, the university that so inspired our father and the potential to develop cutting-edge solutions to some of the most pressing problems humanity is facing regarding climate change," says Cynthia, whose three siblings attended U of T. "My parents had a passion for education, and my father had a tremendous appreciation for how U of T altered the course of his life in such a profound and significant way. It was pivotal for him to go to U of T and he was always grateful for that opportunity."

Cynthia says that she and her brothers and sister all feel very strongly about supporting solutions to ecological problems. A longtime resident of Denman Island, BC, she's been a concerned citizen who has protested clear-cut logging in Clayoquot Sound and other local causes that spotlight the exploitation of natural resources. "Environmental studies is something that we all support and it is important to us to direct the foundation's capital to where it would have the greatest impact. I think we've found that at U of T."

The School was established in 2012 to leverage the enormous breadth and depth of environmental teaching and



Beatrice and Arthur Minden Foundation

research expertise within U of T's Faculty of Arts & Science. The School offers undergraduate programs in environmental studies and environment and science, and partners with other departments and programs to offer collaborative specialists, majors and minors. At the graduate level, interdisciplinary collaborative programs in environmental studies, and environment and health are offered, with other programs in development.

"We love the idea of supporting new and ongoing research and teaching in this area, especially given the alarming issue of climate change," Cynthia says. "And I'm pretty sure my parents would feel that it's an important cause, as well."

Arthur Minden being awarded Honorary Fire Chief of Toronto in 1955, honouring his work as co-founder and national president of Muscular Dystrophy Association of Canada.



Beatrice and Arthur Minden Foundation

Toronto Cycling Think & Do Tank

Partnership aims to encourage more cycling for short trips in Toronto

BY TRUDY LEDSHAM

The Toronto Cycling Think & Do Tank (www.torontocycling.org) is funded by a SSHRC Partnership Development Grant administered at the School of the Environment since 2012. It combines expert practitioners and academics to address important gaps in knowledge about creating more sustainable cities. Partners are Cycle Toronto, Spacing, dandyhorse magazine, Heart & Stroke Foundation, Charlie's Freewheels, Evergreen, Fourth Floor, Toronto Centre for Active Transportation, Metcalf Foundation, CultureLink Settlement Services, McGill University and Simon Fraser University.

Active transportation has been identified as one of the solutions increasing sustainability and reducing congestion in the Greater Toronto and Hamilton Area. Cycling increases the range of easily accessible trips from 2km for walking to 5-7km for riding. Typically researchers and policy makers focus on physical infrastructure and, while important, it is not the sole driver of cycling participation. Early results have been very promising. Two behaviour change pilot projects were undertaken in the summer of 2013. These projects incorporate sophisticated behavior change strategies including: identification and mapping of cycling behaviour; demographic parameters affecting cycling readiness; and an evidence-based behaviour change toolkit. The *Tool Kit to Accelerate the Adoption of Cycling for Transportation; Mapping Cycling Behaviour in Toronto* was developed from a comprehensive literature review aligning outcomes of documented cycling interventions with specific strategies to increase uptake. The result is an adaptable toolkit that outlines a sequence of steps, with optional activities at each step adaptable to varying circumstances.

In our first pilot project, we partnered with BikeChain, a do-it-yourself educational bike repair shop on the U of campus (<http://bikechain.utoronto.ca>) and with the Charles Street Graduate Residence. For the second pilot, we partnered with CultureLink Settlement Services and focused on newcomers to Canada. Results were startling. Traditional social marketing for behaviour change was used with the Charles St. residents: rates of cycling barely budged. The second project was a mentorship project focused on new Canadians in which bikes were simply the tool used to facilitate social activity and transport. Most participants were motivated by their interest in meeting more established Canadians. These participants increased their cycling by about 500%.

As a result of these early interventions, we were successful in securing funding from the Metcalf Foundation to expand the CultureLink Bike Host program to a new neighbourhood (St. Jamestown) in order to both document and capture the work for replication by other agencies and to understand whether the success rate of 2013 could be replicated in 2014 with more sophisticated and rigorous measurement methods. The summer 2014 project has close to 60 mentees and 22 mentors (two of whom are former M.Sc. Planning students from the project).

In order to gain a fuller understanding of how Canadian Communities can increase cycling for transportation, we are undertaking a new five-year study (2014-2019) funded by a recently awarded SSHRC Insight Grant. **Dr. Beth Savan**, Senior Lecturer Emeritus at the School of the Environment and former Director of the U of T Sustainability Office has partnered with **Dr. Meghan Winters** (Simon Fraser University) and **Dr. Ray Tomalty** (McGill



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.

University) to examine the intersection of policy, infrastructure and behaviour change. **Dr. Paul Hess** (Geography, U of T) and **Nancy Smith Lea** (Toronto Centre for Active Transportation) as well as **Dr. Kevin Manaugh** (Geography, McGill University) are also collaborating on the project. The intent is to provide guidance to interested communities on the most effective suites of interventions. Today, municipalities are eager for the opportunities active transportation offers, but are often unsure of where scarce funds should be most effectively applied. Cycling behaviour generally correlates with infrastructure, but underlying urban form and social and demographic contexts are also contributors (e.g. In Toronto, cycling mode share increased dramatically between 2006 and 2011 while infrastructure for cycling did not). To date, research has not identified reasons for the uneven growth of cycling nor the interaction of policy, infrastructure and social/behavioural factors contributing to it. Our project hopes to change that.

Research work on cycling economies has also been undertaken and the resulting report *Cyclists, Bike Lanes, and On-Street Parking: Economic Impacts* by M.Sc. Planning student **Daniel Arancibia** was a pivotal influence on the Eglinton Crosstown Project: bike lanes are now part of all proposed designs. This work has also been recognized with supportive funding by the Canadian Heart and Stroke Foundation through a Sparks Grant. In partnership with Cycle Toronto the research will be used as a foundation to train cycling advocates to educate Business Improvement Associations regarding the economic benefits cycling infrastructure and participation can bring to main streets.

Cycling is an important solution to a wide range of urban issues. Research in the area is eagerly anticipated by municipal transportation and planning departments, health departments and advocates, environmental organizations, cycling advocates and the media, who frequently interview our researchers. It is an exciting time to be working in the field of active transportation.

Trudy Ledsham is Project Manager of the Toronto Cycling Think & Do Tank. For more information, please visit www.torontocycling.org or contact her at trudy.ledsham@utoronto.ca or **Dr. Beth Savan** at b.savan@utoronto.ca.

Living with environmental change in W. Amazonia: traditional peoples' vulnerability and adaptation

BY CHRISTIAN ABIZAID

For more than a decade now, **Professor Christian Abizaid** (Geography and the School of the Environment) has been studying how rural populations adapt to rapid environmental change in the Peruvian Amazon. With its headwaters in the Andes, people living in this area face serious threats from climate change, yet little research has been done on how Amazonian riverine populations will be affected and their ability to respond.

The main objective of this project is to document river dynamics and their socioeconomic impacts on riverine populations, both in the short and long term. This research, which has been published in *Ambio*, *The Geographical Review* and *Fisheries Management and Ecology*, has helped to document some of the most salient short-term hardships endured by floodplain residents downstream, including higher flood levels that destroyed crops and farmland being washed away by increased riverbank erosion. His research showed very different short-term patterns upstream, where lower flood levels and a shorter river travel route, due to channel straightening, created significant opportunities for subsistence and commercial farming among smallholders.

Currently, Dr. Abizaid is working with some students on field data collected in 2013, with support from the Connaught New Researcher Award, to examine how short-term challenges and opportunities identified earlier play out in the long run to learn more



C. Abizaid

about the dynamic nature of vulnerability and long-term prospects for adaptation. He plans to continue to document how livelihoods evolve in this setting and is planning on expanding this research with studies that examine the links between river dynamics and settlement and the importance of social networks for adaptation.

Also see page 32 for more on Dr. Abizaid.
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Creating a low-carbon future in Canada: how has resistance to a distributive effects approach impacted policy?

BY DOUGLAS MACDONALD

Funded by Carbon Management Canada from 2010 to 2014, this project was part of a larger project with Carleton University's **Dr. James Meadowcroft** (Public Policy and Administration, and Political Science) on *Governance Innovation and the Transition to a Low-Carbon Economy*.

The U of T portion of the project was led by **Dr. Douglas Macdonald**, Senior Lecturer and Academic Associate Director at the School of the Environment. Graduate students included U of T Ph.D. candidates **Jodi Adams**, Political Science; **Cristian Ches**, Geography/Environmental Studies; **David Houle**, Political Science/Environmental Studies; **Matthew Lesch**, Political Science; and Carleton University PhD candidate **Brendan Haley** and York University MES candidate **Madison Van West**.

The research sought to grapple with a significant barrier to the transition to a low-carbon economy -- the distributive effects

of climate change policy which inevitably creates "winners" and "losers," in terms of both economic and psychological impacts. The basic research question was: how has political activity by such losers and winners influenced development of Canadian climate-change policy to date?

We examined eight case studies:

1. the failure of efforts by Canadian governments to develop national climate change and energy programs;
2. differing cost and benefit associated with interprovincial hydro-electricity transmission;
3. local citizen perceptions of distributive fairness as a factor influencing wind-turbine siting in BC, Ontario and Quebec;
4. resistance to the inherently distributive activity of wind-turbine siting in Ontario;
5. coal industry and the end of coal-fired electricity generation in Ontario, compared to expanded use in Alberta;
6. influence of the wind and solar industries

- on electricity policy in Ontario;
7. comparison of Ontario and BC experience in managing resistance to green electricity policy; and
8. successful experience of BC in designing its 2008 carbon tax.

We found that political resistance to climate-change policy motivated by distributive effects currently exists in Canada and is to some extent weakening policy effectiveness. Governments to date have done a poor job (with the exception of the BC carbon tax, from which lessons can be learned) in managing distributive effects resistance. Counter-vailing pressure from renewable energy winners is not yet strong enough to influence Ontario electricity policy, although it has that potential. Results will be published in the academic literature and as a report to Canadian governments.

Also see pages 11 and 33 for more on Dr. Macdonald. Email: douglas.macdonald@utoronto.ca.

What would a critical and normative green political economy look like?

BY SCOTT PRUDHAM

My research interests lie at the intersection of a critical, pluralist political economy on the one hand, and the dynamics of environmental change on the other. I am particularly interested in the capitalism-nature nexus, and in questions concerning how the political and economic character of capitalism shapes and is shaped by environmental change and the politics of environmental justice.

I am interested in the ways in which discrete elements of biophysical nature (including human and non-human life) are produced, circulated, exchanged, and come to be understood or take on meaning as commodities. I also have an ongoing research program on the historical and contemporary dynamics of industrial and alternative forestry regimes in western North America, and an interest in the commercialization of new biotechnologies, including the social regulation of genetically modified organisms.

The following is an abstract of the recently published paper, **Men and things: Karl Polanyi, primitive accumulation, and their relevance to a radical green political economy** (*Environment and Planning A* 2013, 45: 1569-1587).

Now is an important moment to be thinking and talking about a critical and normative green political economy. Whether via attempts to develop effective and socially just climate policies at multiple scales of governance [including REDD (reducing emissions from deforestation and degradation) schemes], or to

develop proliferating and controversial neoliberal instruments for dealing with undesirable environmental change, environmental governance, and environmental change in the context of contemporary global capitalism are on the agenda. What would a critical and normative green political economy for the current moment look like? This paper draws on Karl Polanyi's *The Great Transformation* as a resource for answering that question. In particular, Polanyi's discussion of problematic and dualistic notions of nature and society in early political economy and the role he accords social struggles over land in developing his theory of fictitious commodities, embeddedness and the double movement are revisited. The paper stresses how Polanyi's ideas, at once conceptual and polemical, draw centrally on Marx's theorization of primitive accumulation as an inherent, 'extra-economic' facet of historical-geographical capitalism, a differentiated unity linking the commodification and objectification of human and nonhuman natures as exchange-values. In this respect, Polanyi offers (or seems to offer) a potential reconciliation of a politics of nonhuman and human nature through his emphasis on primitive accumulation as a site of both political struggle and epistemic transformation.

Scott Prudham is Professor in the Dept. of Geography and the School of the Environment. Also see page 34 for more on Dr. Prudham. Email: scott.prudham@utoronto.ca.

For Earth's Sake: Towards a Compassionate Ecology Book challenges us to rethink and repair our relationship with the Earth

BY STEPHEN SCHARPER AND SIMON APPOLLONI

Professor Stephen Scharper's (Dept. of Anthropology, U of T Mississauga and School of the Environment) research and teaching is in the areas of Catholic social ethics, the ethics of violence and nonviolence, environmental ethics, and religious ethics and ecology.

The following is a description of his recent book, **For Earth's Sake: Toward a Compassionate Ecology** (2013, Toronto: Novalis. 224 pages). The book's introduction was written by **Simon Appolloni** (June 2014 PhD alumnus, Dept. of Religion/School of the Environment, see page 7), contextualizing our global situation and Dr. Scharper's work. He also wrote introductions to each of the

three sections, including short questions to ponder at the end of each section.

Each of the three sections consists of short articles written for the *Toronto Star* (with one interview which is the exception) and longer essays as chapters. The shorter articles are interspersed intentionally throughout the section to emphasize certain themes and/or to draw the reader's attention to complementary issues not touched upon in the articles.

Each section represents one of a three-pronged approach, "revealing-reflecting-redeeming", which Dr. Scharper employs to address our ecological challenge and the deepening economic disparity we face. While this cluster



broadly resembles the liberation theology methodology of "see, judge, act", his approach is recast here to emphasize an

undulating motion in time and in space to capture the realities of historical and geographical disparities in economic developments that besmirch our planet, and to highlight the dialectic between past wisdoms – some worthy of upholding, other deleterious to the planet's well-being. It also underlines the challenging task of defining a new ontology and ethic which are still indistinct in nature. This methodology is aptly captured by the prefix 're', which he incorporates in many of his writings.

Also see page 34 for more on Dr. Scharper. Email: stephen.scharper@utoronto.ca

Monitoring contaminants in fish in the Great Lakes Areas of Concern

BY SATYENDRA BHAVSAR AND DONALD JACKSON

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

In 1987, International Joint Commission of the U.S. and Canada identified regions within the Great Lakes that showed severe environmental degradation, termed Areas of Concern or AOCs. Out of 43 AOCs, 12 were within Canada and five were shared by the two countries. Three have been delisted and two have been designated as “in recovery”. Other AOCs are going through an assessment of their current status.

An OMOE-funded project studied was done with **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,



S. Bhavsar

majors in Environment & Science, and Zoology) to access the temporal trends of fish mercury and PCB levels from 1975 to 2011 in the Toronto waterfront AOC.

Results show that fish mercury and PCB levels demonstrated significant decreasing

trends over time in multiple species, and recent mercury levels are well below the current consumption advisory benchmarks. In some cases, PCB levels remain above the current consumption advisory benchmarks and above the levels observed in fish from other AOC and non-AOC regions of the Canadian Great Lakes. The calculations indicate that it may take 8-26 years for PCB concentrations in certain fish species to decrease below the current consumption advisory benchmarks.

The following paper on the research was recently published:

Robinson, J.M., M.R. Neff, and S.P. Bhavsar. 2015. Assessment of contaminant levels in fish from the Toronto waterfront area. *Journal of Great Lakes Research* 41: 228-237.

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 & graduate students

The following presentations were made at Research Day held on April 16, 2014 and April 22, 2015. The annual event showcases research conducted by some of the School of the Environment’s faculty, and graduate students, and other researchers.

Research Day 2016 will be held on April 20. Please visit www.environment.utoronto.ca/ResearchDay.aspx for details.

2014 Research Day:

BRIDGET BERGQUIST, Assistant Professor, Dept. of Earth Sciences; Instructor, School of the Environment. (See page 38.) *Analysis of Mercury Isotopes in Ecosystems in South America: Gold Mining vs. Land Use Change.*

CRISTIAN CHES, PhD candidate, Dept. of Geography and Environmental Studies Collaborative Program. *The Role of Cities in Canadian Climate Change Policy.*

INGRID LEMAN STEFANOVIC, Dean, Faculty of Environment, Simon Fraser University. Former Professor, Dept. of Philosophy, U of T; Graduate faculty member, School of the Environment. *Challenges of Interdisciplinarity: The Case of Environmental Programs.*

RACHEL YORK-BRIDGERS, PhD candidate, Curriculum, Teaching and Learning (OISE) and Environmental Studies Collaborative Program. *Reimagining our Connection to the Natural World: Transformative Environmental Education through the Arts.*

2015 Research Day:

SANDY SMITH, Professor, Faculty of Forestry; Graduate Faculty Member, School of the Environment. *Resiliency in Our Urban*



Forests: The Intersection of Ecological Science and Adaptive Management.

AMY MUI, PhD candidate, Dept. of Geography and Environmental Studies Collaborative Program. *A Remote Sensing Approach to Freshwater Turtle Conservation.*

MARK HATHAWAY, PhD candidate, Leadership, Higher and Adult Education (OISE) and Environmental Studies Collaborative Program. (See page 38.) *Cultivating Ecological Wisdom: Worldviews, Transformative Learning, Engagement for Sustainability.*

GRAY TAYLOR, Barrister and Solicitor, Gray Taylor Law; Adjunct Professor and inaugural Distinguished Fellow in Environment, School of the Environment. (See page 36.) *Reducing Greenhouse Gas Emissions in Ontario: Should Ontario Adopt the Structure of Alberta’s GHG Emission Control System?*

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 7-10 contain titles of theses or research papers of alumni who convoked during the 2013-14 and 2014-15 academic years, as well as listings of research topics of 2013-2015 new and continuing students.

Environmental Studies Program (noted below as ES)

2013-2015 PhD Alumni

SIMON APPOLLONI, PhD, June 2014, Religion/ES. Supervisor: Stephen Schaper, Anthropology UTM and Environment. *Convergent Knowing: Explorations of a Sustained – and ‘Sustainable’ – Theological Reflection on Science, Environment and Liberation.*

SHAIK HOSSAIN, PhD, June 2015, Forestry/ES. Supervisor: John Caspersen, Forestry. *Branch Growth and Crown Dynamics in Northern Hardwood Forests.*

SMITA KOTHARI, PhD, Nov 2013, Religion/ES. Supervisor: Christoph Emmrich, Religion. *Dāna and Dhyāna in Jaina Yoga: A Case Study of Prekṣādhyanā and the Terāpanth.*

ZEN MARIANI, PhD, Nov 2014, Physics/ES. Supervisor: Kimberly Strong, Physics. *Infrared Emission Measurements of Radiation and Trace Gas Variability in the High Arctic.*

CYNTHIA WHALEY, PhD, Nov 2014, Physics/ES. Supervisor: Kimberly Strong, Physics. *Improvements to our Understanding of Toronto-Area Atmospheric Composition.*

RACHEL YORK, PhD, Nov 2014, OISE/UT Curriculum, Teaching, and Learning/ES. Supervisor: Linda Cameron, CTL. *Re-connecting with Nature: Transformative Environmental Education through the Arts.*

New & Continuing PhD Students

(Enrolled in 2013-14 and/or 2014-15.)

Masoud Akhshik, PhD, Forestry/ES. Supervisor: M. Sain, Forestry. *Enhancing cellulosic fibres' thermal property.*

Shaghayegh Armioun, PhD, Forestry/ES. Supervisor: M. Sain, Forestry. *Recycled cellulose fibre reinforced biopolyamide composites.*

FOR MORE INFORMATION:

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

Joaquin Bardallo Bandera, PhD, Political Science/ES. Supervisor: J. Teichman, Political Science. *Natural resource dependence and its social deficits.*

Stephen Berquist, PhD, Anthropology/ES. Supervisor: E. Swenson, Anthropology. *Land use and ontology in Peru.*

Brendan Byrne, PhD, Physics/ES. Supervisor: K. Strong, Physics. *The boreal carbon cycle.*

Graham Carey, PhD, Electrical & Computer Engineering/ES. Supervisor: E. Sargent, ECE. *Colloidal quantum dot photovoltaics.*

Aurel Cristian Ches, PhD, Geog./ES. Supervisor: W. Gough, Physical and Environmental Sci. UT Scarborough. *Climate change policy in Canada.*

Bryan Dale, PhD, Geography/ES. Supervisor: S. Prudham, Geography/Environment. *Movement for climate justice and food sovereignty in Canada.*

Suleyman Mohammed Demi, PhD, Social Justice Education, OISE/ES. Supervisor: G. Dei, OISE. *Food security & environmental conservation in Ghana.*

Beth Jean Evans, PhD, Political Science/ES. Supervisor: S. Bernstein, Pol. Sci. *Sustainable development of clean development mechanism.*

Muhammad Ferhan, PhD, Forestry/ES. Supervisor: M. Sain, Forestry. *Enzymatic treatment of lignin & characterization in polyurethane foam.*

Jennifer Gibson, PhD, Anthropology/ES. Supervisors: S. Satsuka, Anthropology; B. McElhinny, Women & Gender Studies. *Environment land rights in BC.*

Columba Gonzalez, PhD, Anthropology/ES. Supervisor: H. Cunningham, Anthropology. *Political ecology analysis in Baja California, Mexico.*

Continued on page 8...

Ph.D. candidates in the Environmental Studies Collaborative Program present their research at Research Day (see page 6) and in the Environment Seminar Series (pages 28-29). LEFT: GRAHAM CAREY (Electrical & Computer Engineering/ES) presents a seminar on his research on colloidal quantum dot photovoltaics. CENTRE: Recent Physics/ES alumna CYNTHIA WHALEY gives a seminar on her research on atmospheric composition in the Toronto area. RIGHT: At 2014 Research Day, CHRISTIAN CHES (Geography/ES) speaks about his research on climate change policy in Canada.





Ph.D. candidates in the Environmental Studies Collaborative Program present their research at Research Day (see page 6) and in the Environment Seminar Series (pages 28-29). **LEFT:** CATHERINE JIMENEA (Geography) presents a seminar on her research on the barriers of implementing low-cost energy efficient buildings in Bahrain. **CENTRE:** At 2015 Research Day, MARK HATHAWAY (Leadership, Higher and Adult Education, OISE) discusses worldviews and transformative learning, and engagement for sustainability. **RIGHT:** At 2015 Research Day, AMY MUI (Geography) speaks on her research on remote sensing and freshwater turtle conservation.

Continued from page 7.

Sophie Guilbault, PhD, Planning/ES. Supervisor: V. Maclaren, Geography. *Urban flooding in Toronto: implementation of mitigation practices.*

Mark Hathaway, PhD, Leadership, Higher and Adult Education, OISE/ES. Supervisor: S. Scharper, Anthropology UTM/Environment. *Ecological worldviews education.*

Anastasia Hervas, PhD, Geography/ES. Supervisor: S. Prudham, Geography/Environment. *Oil palm expansion in Northern Guatemala.*

Shaik Hossain, PhD, Forestry/ES. Supervisor: J. Caspersen, Forestry. *Branch and crown dynamics in tolerant hardwood forests.*

David Houle, PhD, Political Science/ES. Supervisor: G. Skogstad, Political Science. *Climate change policy in Canadian provinces.*

Milan Ilnyckyj, Political Science/ES. *Pipeline resistance in North America: Keystone XL and the Northern Gateway.*

Pradeep Kumar, PhD, Forestry/ES. Supervisor: S. Kant, Forestry. *Modeling of payment for ecosystem schemes.*

Esther Lambert, PhD, Planning/ES. Supervisor: V. Maclaren, Geography. *Renewable energy policy in island developing states in the Caribbean.*

Amy Hrdina, PhD, Chemistry/ES. Supervisor: J. Murphy, Chemistry. *Surface-atmosphere exchange of aerosol in forests.*

Catherine Jimenea, PhD, Geography/ES. Supervisor: D. Harvey, Geog. *Computer simulation of a potential energy-efficient building in Bahrain.*

Erik Lutsch, PhD, Physics/ES. Supervisor: K. Strong, Physics. *FTIR measurements of biomass burning species in the Arctic.*

John Maiorano, PhD, Social Justice Education, OISE/ES. Supervisor: J. Quarter, OISE. *Organizational barriers to energy efficiency in Ontario hospitals.*

Ximena Martinez, PhD, Social Justice Education, OISE/ES. Supervisor: G. Dei, OISE. *Right's recognition & Indigenous communities in Chile.*

Joseph Mendonca, PhD, Physics/ES. Supervisor: K. Strong, Physics. *Greenhouse gas measurements at high latitudes.*

Ewa Modlinska, PhD, Planning/ES. Supervisor: S. Bunce, Geography. *Public consultations and urban sustainability in Toronto.*

Justin Mok, PhD, East Asian Studies/ES. Supervisor: E. Guisso, East Asian Studies. *Humans and the environment in Chinese history.*

Amy Mui, PhD, Geography/ES. Supervisor: Y. He, Geography. *Multi-temporal examination of Blanding's turtle habitat using remote sensing and GIS.*

Jon Obnamia, PhD, Chemical Eng. & Applied Chem./ES. Supervisors: H. MacLean & B. Saville, Chem. Eng. *Development of renewable fuels and technologies.*

Daniel Pomerantz, PhD, Political Science/ES. *Arctic Ocean governance and Canadian Arctic sovereignty.*

Renata Ramasra, PhD, Geography/ES. Supervisor: T. Kepe, Geography. *Tourism and conservation schemes in La Fortuna, Costa Rica.*

Nasim Ramezani, PhD, Forestry/ES. Supervisor: M. Sain, Forestry. *Lignin purification by biochemical methods.*

Nathan Renner, PhD, Music/ES. Supervisor: J. Pilzer, Music. *Ainu music and environmental activism.*

Eric Rosset, PhD, Political Science/ES. Supervisor: S. Bernstein, Political Science. *Race, class, gender and environment.*

Keven Roy, PhD, Physics/ES. Supervisor: R. Peltier, Physics. *The impact of continental ice sheet on the rotational state of the Earth.*

Javad Sameni, PhD, Forestry/ES. Supervisor: M. Sain, Forestry.

Bonding mechanism of modified lignin on lignocellulosic fibres.

Claudio Sarmiento-Casas, PhD, Planning/ES. Supervisor: P. Hess, Geography. *Grassroots street improvements for pedestrians & cyclists in Mexico City.*

Mumtaz Tarhan, PhD, Adult Education & Community Dev., OISE/ES. Supervisor: M. Vieta, OISE. *Renewable energy cooperative members' consumption.*

Laura Tozer, PhD, Geography/ES. Supervisor: V. Maclaren, Geography. *Cities and global warming: GHG emission reduction through networks.*

Meaghan Weatherdon, PhD, Religion/ES. Supervisor: S. Coleman, Religion. *Nuclear waste disposal in N. Saskatchewan: Indigenous spirituality and resistance.*

Dan Weaver, PhD, Physics/ES. Supervisor: K. Strong, Physics. *Measurement of atmospheric water vapour over Eureka, Nunavut.*

Leslie Mae Wexler, PhD, English/ES. Supervisor: E. Harvey, English.

Environmental consciousness & materiality in the early modern forest.

Heather Wheeler, PhD, Cell & Systems Biology/ES. Supervisor: M. Campbell, CSB. *Application of plant secondary cell wall in production of biofuels.*

Tiffany Young, PhD, Chemical Eng. & Applied Chemistry/ES. Supervisor: Y. Cheng, Chemical Eng. *Environmental determinants of diarrhea.*

2013-2015 Masters Alumni

JESSIKA BERNES, MA, Nov 2013, Political Science/ES. Supervisor: Victor Falkenheim, Political Science. *Ontario Energy Policy: The Case Against Nuclear.*

ANDREW BRINN, MPP, June 2015, Public Policy and Governance/ES. Summer Internship Report (Internship as a Policy Advisor Intern within the Government Affairs and Policy department, General Electric Canada).

EVAN BRANDER, MPP, June 2014, Public Policy/ES. Supervisor: Tat Smith, Geography. *Reflections on an Internship with Agriculture and Agri-Food Canada's Environment Policy Division.*

MEAGAN CURTIS, MFC, March 2014, Forestry/ES. Supervisor: Neera Singh, Forestry. *Normative Economics and Private Land Forestry in Canada.*

BRYAN DALE, MA, Nov 2013, Geography/ES. Supervisors: Scott Prudham, Geography/Environment; and Kundan Kumar, Geography. *A Beautiful Picture of Chaos: La Via Campesina and the Convergence of Food Sovereignty and Climate Justice.*

BETH DENABURG, MA, Nov 2013, Geography/ES. Supervisor: Lino Grima, Geography. *Virtual Water Savings from International Agricultural Trade in the Context of the Water-Energy-Food Nexus.*

YIWEI DING, MFC, June 2015, Forestry/ES. Supervisor: Jay Malcolm, Forestry. *Use of fire indices to understand the long term effect of shelterwood harvesting on eastern red-backed salamanders in central Ontario.*

MARTYN FORDE, MA, Nov 2014, Geography/ES. Supervisor: Danny Harvey, Geography. *Renewable Energy Technology and the Hotel Sector of Small Island Developing States (SIDS): Managing Sustainability Transitions on the Island of Barbados.*

SOMMER FOSTER, MFC, June 2015, Forestry/ES. Supervisor: Sean Thomas, Forestry. *Rock Climbing and Talus Vegetation on the Niagara Escarpment: Impacts and Management Implementations.*

JOEL FRIDMAN, MA, June 2014, Geography/ES. Supervisor: Harriet Friedman, Sociology. *Settlement, Food Lands, and Sustainable Habitation: The Historical Development of Agricultural Policy and Urban Planning in Southern Ontario.*

MINRUI FU, MBA, June 2014, Management/ES June 2014. Supervisor: Douglas Macdonald, Environment. *Impact of Green Energy Act (GEA) on Wind Generation in Ontario Electricity Supply Mix: from May 2009 to October 2013.*

VANESSA FURGIUELE, MGA, June 2014, Global Affairs/ES. Supervisor: Scott Aquanno, Global Affairs. *Enhancing Private Sector Engagement in Climate Change Adaptation: Contributions Of An Integrated, Resilience-Based Risk Management Framework.*

BASMA GABER, MScPl, June 2014, Geography's Planning Program/ES. Supervisor: Virginia Maclaren, Geography. *Recommendations for Urban Climate Adaptation in Cairo, Egypt.*

KELSEY GERBRANDT, MSc, Nov 2014, Chemical Eng/ES. Supervisor: Brad Saville, Chemical Eng. *Cellulosic Ethanol As a Promising Low-Carbon Replacement for Transportation Fuels.*

ROBIN GIBSON, MA, Nov 2014, English/ES. Supervisor: Stanca Radovic, English. *A Need for Change: A Study of Sustainability in Ontario Rural Communities.*

ANIKA HARFORD, MGA, June 2014, Global Affairs/ES. Supervisors: Scott Aquanno, Global Affairs; & Wilson Prichard, Political Science. *Reframing the Gender-Climate Change debate in the Global South.*

MATT HODGSON, MA, June 2014, History & Philosophy of Science & Technology/ES. Supervisor: Brian Baigrie, IHPST. *Scientists as Regulators of Default Inference: Examining the Rule-Evidence Interface in the Siloxane D5 Board of Review.*

JEFFREY IP, MEng, Nov 2014, Chemical Engineering/ES. Supervisor: Charles Q. Jia, Chem. Eng. *Review of Capacitive Deionization.*

ARNDIS JOHNSON, MI, Nov 2013, Information/ES. Supervisor: Matt Ratto, Information. *The Position of Nature in the Internet of Things.*

AFEEFA KARIM, MA, Nov 2013, Political Science/ES. Supervisor: Victor Falkenheim, Political Science. *A Balanced Approach –*

Regulating Hydraulic Fracturing in Ontario: Lessons from Across Canada.

AVET KHACHATRYAN, MGA, June 2014, Global Affairs/ES. Supervisor: Scott Aquanno, Global Affairs. *Towards a Framework for Evaluating Financial Assistance to Developing Countries: Five Principles of Effective Climate Finance.*

ARIANA KEYMAN, MPA, June 2015, Global Affairs/ES. Supervisor: Scott Aquanno, Global Affairs. *Environmental Conflict in the Brazilian Amazon: An Examination of the Systematic Killing of Indigenous Environmental and Land Defenders.*

ROBIN LATTIMER, MScPl, June 2015, Geography and Planning/ES. Supervisors: Virginia Maclaren, Geography; Beth Savan, Environment. *Maximizing the Role of Local Governments in British Columbia's Environmental Assessment Process.*

SULTAN MOLLOY, MGA, June 2015, Global Affairs/ES. Supervisors: Danny Harvey, Geography; Scott Aquanno, Global Affairs. *How are GCC Countries dealing with Oil Demand Pressures?*

GARRETT NORMAN, MA, June 2015, Child Study and Education, OISE/ES. *Outdoor Education – A Literature Review.*

RICARDO POULAT, MFC, June 2015, Forestry/ES. Supervisor: Danijela Puric-Mladenovic, Forestry. *Carbon Offset Markets Towards Conservation of Peri-Urban Forests in Southern Ontario.*

REBECA RAMIREZ, MGA, June 2015, Global Affairs/ES. Supervisors: Jillian Kohler and Scott Aquanno, Global Affairs. *Understanding Development Failures and Waste Systems in the Galapagos.*

DANIELA SERODIO, MSc, March 2015, Earth Sciences/ES. Supervisor: Miriam Diamond, Earth Sciences. *Novel Halogenated and Organophosphate Flame Retardants: Do Novel Flame Retardants Have the Same Environmental Fate as the Compounds They are Replacing?*

GE WANG, MA, Nov 2013, Economics/ES. Supervisor: Professor Nicholas Li, Economics. *Economic Growth and Environmental Degradation in Shandong Province, China: A Panel Data Analysis.*

NING YIN ZHOU, MI, Nov 2014, Information/ES. Supervisor: Matt Ratto, Information. *The Application of Participatory Design in an Environmental Project.*

New & Continuing Masters

(Enrolled in 2013-14 and/or 2014-15.)

Cuyler Borrowman, MSc, Chemistry/ES. Supervisor: J. Abbatt, Chemistry. *Oxidation of surface bound PAH on soot particles by ozone.*
Andrea Brunton, MA, Political Science/ES. Supervisor: V. Falkenheim, Political Science. *Market mechanisms to promote community health & development.*

Kelly Chan, MA, Geography/ES. Supervisor: A. Sorensen, Geography. *Productive green space use in Toronto.*

Alexandre Cursino, MEd, Adult Education & Community Dev., OISE/ES. Supervisor: J. Sumner, OISE. *Interdependence Zen perception to sentient live forms.*

Janet Lynn Damianopoulos, MFC, Forestry/ES. *Biodiversity and biotechnology as it pertains to new green energy system.*

Alexandra del Castello, MEd, Social Justice Education, OISE/ES. Supervisor: M. Todorova, OISE. *Conservation management & regulation through environmental lenses.*

Sommer Foster, MFC, Forestry/ES. *Skills and methods to protect and preserve the trees.*

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Continued from page 9.

Hanya Hemasian Ettefagh, MASc, Chem. Eng & App. Chem./ES. Supervisor: R. Farnood, Chem. Eng. *Energy savings using LCR pulp in folding boxboard production.*

Ronnie Huang, MFC, Forestry/ES. *Management of forestry operations and regimes.*

Virginia Hudson, MFC, Forestry/ES. *Conservation and conservation policy; land redemption and restoration and policy.*

Kandy Kennedy, MEd, Adult Education & Community Development, OISE/ES. *Clan mothers and the environment.*

Paulina Kubara, MA, Geography/ES. Supervisor: S. Prudham, Geography/Environment. *Logging in Algonquin Park: a critical perspective.*

William Kurth, MA, Adult Ed. & Community Dev., OISE/ES. Supervisor: J. Quarter, OISE. *Environmental corporate social responsibility.*

Leo Lepiano, MFC, Forestry/ES. *Oak Savannah in Ontario's settled landscapes.*

Julia Levin, MEd, Adult Education & Community Dev., OISE/ES. Supervisor: J. Sumner, OISE. *Impact of environmental education on sustainability*

Carlos Martelo, MBA, Management/ES. *Environmental sustainability and business management.*

Sameer Masood, MBA, Management/ES. *Management systems business integration.*

Michael Modeste, MA, Adult Ed. & Comm. Dev., OISE/ES. Supervisor: J. Quarter, OISE. *Socially responsible investment in a pension plan.*

Caitlin Mullen, MI, Information, Supervisor: B. Cantwell Smith. *Smart city technologies as a foundation for sustainable urban environment.*

Ellen Murray, MEd, Adult Ed. & Community Dev., OISE/ES. *Sustainable food supply, marginalized communities & consumption inequities.*

Amory Ngan, MFC, Forestry/ES. *Policy and governance, conservation and resource management.*

Robert Pickering, MScPl, Geography/ES. Supervisor: A. Boland, Geography. *Marine spatial planning in the UNESCO Cat Ba Biosphere, Vietnam.*

Daniella Quarrey, MGA, Global Affairs/ES. *Alternative agricultural development: coca crop economies.*

Carol Ramchuram, MI, Information/ES. Supervisor: S. Stevenson, Information. *Global information systems used in energy.*

Malcom Ramsay, MSc, Anthropology/ES. Supervisor: S. Lehman, Anthropology. *Human interactions with the mouse lemur in Madagascar.*

Ramona Reece, MA, Political Science/ES. Supervisor: V. Falkenheim, Pol. Sci. *Ecological jurisprudence from an indigenous perspective.*

Marie-Line Sarrazin, MA, Geography/ES. Supervisor: C. Abizaid, Geography/Environment. *Community-based biodiversity conservation.*

Alyssa Scott, MA, Geography/ES. Supervisor: C. Abizaid, Geography/Environment.) *Aboriginal participation in uranium mining in N. Saskatchewan.*

Jo Anne Tacorda, MA, Adult Ed. & Comm. Dev., OISE/ES. Supervisor: A. Miles, OISE. *Food security and food sovereignty, and community wellness.*

Chieh Tang, MI, Information/ES. *Use of information communication technology to address mitigation and adaptation issues.*

Passawee Udomkaewkanjana, MFC, Forestry/ES. *Relations between forest conservation and human health in South and South-East Asia.*

Madhushree Vemparala, MFC, Forestry/ES. *The change in habitat of aquatic species.*

Ahmad Yahya, MEd, Adult Ed. & Community Development, OISE/ES. *Invasive species: uncertain benefits and garlic mustard.*

Yifan Zhang, MSc, Mechanical & Industrial Engineering/ES. *Global climate change and wetlands.*

Environment & Health Program (noted below as EH)

PhD Students

2013-2015 Alumni

ERIN BRYCE, PhD, Nov 2014, Anthropology/EH. Supervisor: Ted Rogers, Anthropology. *Six Feet Under the Weather: The Short-Term Relationship between Synoptic Weather and Daily Mortality.*

New & Continuing

(Enrolled in 2013-14 and/or 2014-15.)

Dolon Chakravartty, PhD, Public Health/EH. Supervisor: D. Cole, Public Health. *Environmental exposures in visible minority women.*

Angela Day, PhD, Geography/EH. Supervisor: K. Wilson, Geography. *Health impact of environmental change in Galisco, Mexico.*

Robert Joseph Moriarity, PhD, Physical & Environmental Science, UT Scarborough/EH. Supervisor: L. Tsuji, PES. *Impacts of wood smoke in Aboriginal populations.*

Felicity Ni, PhD, Physical & Environmental Science, UT Scarborough/EH. Supervisor: G. Arhonditsis, PES. *Mercury in freshwater ecosystems and human health.*

Ariola Visha, PhD, Physical & Environmental Science, UT Scarborough/EH. Supervisor: G. Arhonditsis, PES. *Contaminants in Great Lakes fish and their economic impact.*

JieLan Xu, PhD, Planning/EH. Supervisor: A. Sorensen and P. Hess, Geography. *Spatial determinants of health and suburban residential development.*

Masters Students

2013-2015 Alumni

SULEYMAN MOHAMMED DEMI, MA, Social Justice Education, OISE/EH. Supervisor: George Dei, OISE. *African Indigenous Food Crops: Their Roles in Combatting Chronic Diseases in Ghana.*

DAVID PATERSON, MPH, Nov 2014, Public Health/ES. Coursework program in Social and Behavioural Health Sciences.

KELLY SCHOONDERWOERD, MEd, June 2015, Leadership, Higher and Adult Education, OISE/EH. Supervisor: Linda Muzzin, OISE. *Why Does Policy On Fracking Vary Across Jurisdictions?*

New & Continuing

(Enrolled in 2013-14 and/or 2014-15.)

Fakhriyeh Asl, MPH, Public Health/EH. Coursework program in Epidemiology.

Joel Kaushansky, MPH, Public Health/EH. Coursework program in Social and Behavioural Health Sciences.

Morris Komakech, MPH, Public Health/EH. Social and Behavioural Health Sciences. **Gillian Lee**, MA, Geography/EH. Supervisor: D. Wilson, Geography. *Crime youth health and well-being in the Region of Peel.*



PhD alumna Erin Bryce presents a seminar in the Environment seminar series (see pages 28-29), on her research on the relationship between synoptic weather and daily mortality.

Mehvish Mehrani, MPH, Public Health/EH. Coursework program in Family and Community Medicine.

Renata Musa, MPH, Public Health/EH. Supervisor: S. Harris, Public Health. *Environmental etiologies of breast cancer.*

Shusmita Rahman, MPH, Public Health/EH. Coursework program in Epidemiology.

Lea Ravensbergen-Hodgins, MA, Geography/EH. Supervisors: R. Buliung & K. Wilson, Geography. *Determinants of childrens' health in Toronto.*

Catherine Slavik, MPH, Public Health/EH. Supervisor: P. Demers, Public Health. *Mapping environmental exposures & cancer risk.*

Academic Associate Director's Message

BY DOUGLAS MACDONALD

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We live in the Anthropocene era, in which for the first time humans are recognized by science as a significant force influencing Earth systems. Each of the seven billion of us living today, individually and through the organizations in which we participate, is busily using fossil-fuel energy to rip resources from the earth, process them and discharge them back as waste and pollution – and the dominant goal of all peoples is to increase that per capita consumption year after year, forever, hoping the square peg of infinitely increasing demand will somehow fit into the round whole of one small, blue planet. I am convinced that the species we are killing off and the environmental harm we are imposing upon the poor, the weak and future generations represent a moral failing akin to the wars, oppression and slavery of the past. I recognize, however, that the bulk of humanity does not share that view and is unwilling to sacrifice other

social goals in the name of environmental protection. That is the real challenge posed by the ecological crisis – the need to bring about major social change, such as abolishing all fossil fuels, on the basis of weak motivation and largely within the framework of the current values and institutions which produced the problem in the first place. Revolution is easy. Managed social change which does not throw out the baby with the bathwater is not.

What can universities do to address this seemingly intractable challenge? First, in our research function we must do all we can to better understand human impacts upon nature, their causes and the full array of possible solutions, including not only the technological but also the social viability of each. In our teaching function, we must strive to produce environmental citizens of the world – graduates who have the passion, empirical knowledge and skills so badly needed today.

Most of that work is done from a disciplinary basis, using the powerful tool of reductionist empiricism. Each faculty member and student is engaged with one part of the puzzle. However, the governments, business firms and social



groups which are acting on environmental issues must put together all of the scientific, technological, legal, economic, political and moral pieces of the puzzle. They want universities to help them with that, which means we on campus cannot speak only with a disciplinary voice. That is why all universities are both studying environment in departments and also through interdisciplinary units like the School of the Environment. As described elsewhere in this annual report, we at the School are working to increase our capacity to act as a hub and meeting place where the different disciplines can meet, connect and work together on shared environmental problems, both in research and in teaching. That is why we exist.

Douglas Macdonald is Senior Lecturer at the School of the Environment. (See p. 33.)

Changes to undergraduate program and course offerings

See page 12 for listings of programs and courses offered.

Environmental Studies B.A. Major and Minor Collaborative specialist, major and minor

Enrolment in the Environmental Studies major and minor programs continues to be strong. In 2014-15, there were 386 students enrolled in the major, and 136 in the minor. Enrolments in our collaborative programs with other departments remains steady, with total enrolment in all collaborative programs of 208 for 2014-15.

Environmental Science B.Sc. Major and Minor

The new Environmental Science major program was initiated in 2013-14 and will continue to be rolled out in 2015-16. New courses (*see p. 13*), also offered in the Minor program, include:

- new in 2013-14: ENV 237H/238H **Physics of the Changing Environment** and ENV 233H **Earth Systems Chemistry**, newly offered in 2013-14;
- new in 2014-15: ENV 316H1 **Laboratory and Field Methods in Environmental Science** and JEE337H1 **Human Interactions with the Environment**; and
- new in 2015-16: two new fourth year seminar courses: ENV 432H1 **Urban Ecology** and ENV 452H1 **Environmental Science Seminar**, the new capstone course for the major.

Doubling some course offerings

As an experiment, with funding from the Faculty of Arts & Science, three high-enrollment courses offered in fall/winter terms (ENV100 **Introduction to Environmental Studies**, ENV200 **Assessing Global Change: Science and the Environment**, and ENV221 **Multidisciplinary Perspectives on Environment**) were offered during Summer 2014. The objective was to see if offering these courses twice, in both the summer and fall/winter terms will reduce enrollments during the academic year. Another experiment was to offer the Environmental Studies capstone course, ENV451 **Current Environment Debates**, in both the fall and winter terms 2014-15. We are interested to see if smaller class sizes can be translated into recognizable improvements in educational quality.

"Big Ideas" Courses: Special Topics Courses

The School of the Environment is introducing four new special topics courses, two of which address the Environment and the Digital World (ENV281H **Is the Internet Green?**; and ENV381H **Social Media and Environmentalism**), and two of which address Energy and the Environment (ENV282H **Technology & Society**; and ENV 2382H **Economics, Politics & Security**). The courses will be team taught and first offered in the 2015-16 academic year.

Undergraduate Programs

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

Core Programs:

The School of the Environment offers two core interdisciplinary undergraduate programs:
 1. Environmental Science (B.Sc. Major or Minor)
 2. 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

2014-15 School of the Environment undergraduate offerings and instructors.
 For profiles of Faculty, Instructors and Sessional Lecturers, see pages 32-40.

ENV 100H	Introduction to Environmental Studies (Summer 2014 and Fall 2014: Stephen Scharper, Anthropology U of T Mississauga/Environment)
SII 199HF	Debating and Understanding Current Environmental Issues (Faculty of Arts & Sciences, FAS, seminar course; Karen Ing, Environment)
SII 199HS	Sustainable and Just Futures: Environmental Politics in an Age of Global Warming * (FAS first-year seminar course)
ENV 200H	Assessing Global Change: Science and the Environment (Summer'14: Romila Verma, sessional; Spring'15: Karen Ing, Environment)
ENV 221H	Multidisciplinary Perspectives on Environment (Summer 2014: David Pond, sessional; Fall 2014: Karen Ing, Environment)
ENV 222H	Interdisciplinary Environmental Studies (Douglas Macdonald, Environment)
ENV 223H	Fundamental Environmental Skills (Anna Stanley, sessional)
ENV 233H	Earth Systems Chemistry (Bridget Bergquist, Earth Sciences; Alex Tevlin, Chemistry)
ENV 234HY	Environmental Biology (Susana Wadgyr, Ecology & Evolutionary Biology)
ENV 237/8H	Physics of the Changing Environment (Kaley Walker, Physics)
ENV 299Y	Research Opportunity Program (Brad Bass, sessional)
ENV 307H	Urban Sustainability (David Sider, sessional)
ENV 316H	Laboratory & Field Methods in Environmental Science (Jennifer Murphy, Chemistry; Andrew Drake, Ecology & Evolutionary Biology; Sarah Finkelstein, Earth Sciences)
ENV 320H	National Environmental Policy (David Pond, sessional)
JGE 321H	Multicultural Perspectives on Environmental Management (Joint course with Geography; Christian Abizaïd, Geography/Environment)
ENV 322H	International Environmental Policy (Erich Vogt, sessional)
ENV 323H	Ontario Environmental Policy (Russ Houldin, sessional)
JGE 331H	Resource and Environmental Theory (James Nugent, sessional)
ENV 333H	Ecological Worldviews (Mark Hathaway, PhD candidate, OISE)
ENV 334H	Environmental Biology: Applied Ecology *
ENV 335H	Environmental Design (Sheila Waite-Chuah, sessional)
ENV 336H	Ecology in Human Dominated Landscapes *
JEE 337H	Human Interactions with the Environment (Joint course with Earth Sciences; Carlos Avendano, sessional)
ENV 341H	Environment and Human Health (Clare Wiseman, Environment)
ENV 346H	Terrestrial Energy Systems (Ian Sinclair, Civil Engineering sessional)
ENV 347H	The Power of Economic Ideas (Russ Houldin, sessional)
ENV 350H	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. 15; Barbara Murck Geography UT Mississauga; & Christoph Richter, Biology, UT Mississauga)
ENV 396Y	Australian Environment, Wildlife and Conservation (See article on p. 15; offered by the University of New South Wales)
ENV 421HY	Environmental Research (See article on page 17; David Sider, sessional)
ENV 422H	Environmental Law (Paul Muldoon, sessional)
ENV 430H	Environment and Health of Vulnerable Populations *
ENV 431H	Urban Sustainability and Ecological Technology *
ENV 440H	Professional Experience Course (See article p. 17; David Sider, sessional)
ENV 451F	Current Environmental Debates (Erich Vogt, sessional)
ENV 451S	Current Environmental Debates (Roberta Rice, sessional)
JEH 455H	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 17; staff)

* Not offered in 2014-15.

New courses in Environmental Science

In collaboration with Departments of Chemistry, Physics, Earth Sciences, and Ecology & Evolutionary Biology

BY CARLOS AVENDANO, JESSICA D'EON, JENNIFER MURPHY, AND KALEY WALKER

As part of the new undergraduate Environmental Science major program, new courses were rolled out in 2013-14 and 2014-15. In 2013-14, two new second year courses were offered: ENV233 Earth Systems Chemistry and ENV237/238 Physics of the Changing Environment. In 2014-15, two new third-year courses were introduced: ENV316 Laboratory and Field Methods in Environmental Science and JEE337 Human Interactions with the Environment.

ENV233H Earth Systems Chemistry

2013-14 Instructors: Bridget Bergquist (Assistant Professor, Dept. of Earth Sciences) and Jessica D'eon (Lecturer, Dept. of Chemistry).

This course examines how the chemistry of the Earth System has changed through geologic time including recent perturbations by humans. The first half of the course covers topics related to the underlying thermodynamic principles that drive natural environmental processes. The second half focusses on the thermodynamic foundation with a discussion of how to use chemical kinetics to determine how fast these processes take place. In addition to presenting students with fundamental chemical and physical principles, the class focusses on the idea that change in the natural world is normal. This overarching concept is used to reinforce the fact that some modern human perturbations of the natural world, such as climate change, are not deviations from a specific desired state but relate instead to the rate at which change is occurring.

In addition, other topics are covered, related to the chemistry of the atmosphere and the ocean, chlorofluorocarbons and ozone depletion, as well as how these scientific concepts are incorporated into predictive models. We believe this will provide students with a solid foundation for the development of practical skills at the third year level in ENV316H Laboratory and Field Methods in Environmental Science, newly offered in 2014-15.

ENV237H/238H Physics of the Changing Environment

Instructor: Kaley Walker, Professor, Department of Physics.

This course covers the basic physics of environmental processes and of measurement techniques in the atmosphere, the ocean, lake-land-forest systems, and other biological systems. It places its work in the context of climate change and other aspects of environmental change, and considers the physical concepts, processes and phenomena that are relevant to understanding our changing environment.

The course covers topics in thermodynamics, fluid mechanics, and the interaction of electromagnetic radiation with matter, with a focus on how we measure environmental parameters in the latter part of the course. The primary goal is to learn how we can describe our environment and its changes quantitatively using physical concepts. The secondary goal is to develop physics skills by making quantitative measurements, analyzing data, and determining physical parameters. Integral to the course are Practicals, in which the class is divided into small groups to perform hands-on investigations. Students also designed and conducted their own experiment to study atmospheric aerosols.

ENV316H Laboratory and Field Methods in Environmental Science

2014-15 Instructors: Jennifer Murphy (Course Coordinator; Associate Professor, Dept. of Chemistry), Andrew Drake (Course Instructor; Dept. of Biological Sciences, U of T Scarborough), and Sarah Finkelstein (Course Developer; Assoc. Professor, Dept. of Earth Sciences).

This course examines the theory and practice of conducting environmental analysis in laboratory and field settings, drawing on themes from environmental chemistry, earth science, ecology, and atmospheric physics.

Students undertake field sampling in each subject area, such as sediment core measurements from a riparian zone, atmospheric sampling from a variety of urban locations, and organism and habitat sampling in an aquatic environment. In each field sampling scenario, the goal is to learn about discipline-specific techniques while applying basic principles of sampling design and recognizing issues related to sampling error. In the last half of the course, students undertake analysis of data collected from field experiments, using laboratory processes such as ion chromatography and inductively coupled plasma mass spectrometry.

A core component is to be proficient in the analysis of laboratory and field data, so students learn how to undertake statistical analysis of environmental data in the software program R. The final project involves analyzing a large environmental dataset and emphasizes overall implications of sound laboratory and field experimental design when drawing conclusions about environmental change.

JEE337H Human Interactions with the Environment

2014-15 Instructor: Carlos Avendano, Sessional Lecturer, School of the Environment.

This course examines how our planet has been exposed to anthropogenic activities during the Holocene, but mostly how it has responded to disturbances since the Industrial Revolution. The first half of the course explores the functioning of our planet without disturbances, under a "natural" mode as understood and explained by Earth Sciences. We explore the applications of Paleoeological sciences in revealing Earth's natural variability, and ecological resilience. We also explore the historical interactions of Ancient Civilizations with their environments, with special emphasis with freshwater resources. The second half focusses on the social aspects of how human groups make choices to manage their natural resources and environments. Case studies are reviewed to discuss human dependency on Earth's functioning for economical and sociological development. Socio-cultural frameworks are explored as the foundation to understand socio-ecological systems and resiliency. Environmental governance is discussed in relationship to commodification and privatization of natural resources, and its counter-proposal of common pool resources Institutions. Other concepts such as capitalism, neoliberalism and monocentric governments are analyzed under the context of the Anthropocene.

Tutorials explore local to global impact of usage of natural resources, experimental designs for ecological studies, and development of grant proposals as tools for funding studies.

International opportunities

Strengthening the School's international partnerships for its undergrad students

BY KAREN ING

FOR MORE INFORMATION:

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

On the occasion of his recent installation address as the incoming 16th president of the University (<http://www.president.utoronto.ca/installation-address>), **President Meric Gertler** identified strengthening international partnership, both in education and research, as one of three strategies for maintaining and advancing the University's global standing while facing some daunting challenges. This strategy resonated at the School of the Environment because of the global scale of many of our most pressing environmental challenges, including climate change and biodiversity loss.

The School has supported this international viewpoint through course offerings such as **JGE 321H Multicultural Perspectives on Environmental Management** and **ENV 322H International Environmental Policy**, and with faculty carrying out and collaborating with researchers in every corner of the world, bringing back those experiences to the students. However to provide students with a truly global perspective, nothing is comparable to providing opportunities for direct international experiences.

By taking a course or term abroad, students are able to pursue academic credits in a foreign environment but within a familiar and safe academic framework, sometimes even with classmates and faculty from home. This not only enriches their learning, but broadens their experiences and perspectives from doing everyday tasks to adjusting to different academic and cultural norms.

Therefore I was happy to spend part of my sabbatical working with the **Centre for International Experience** (<http://cie.utoronto.ca/>) at the University to seek and develop international opportunities for our environment students, particularly with strategic universities to help us further strengthen international partnerships. This has proven as educational and rewarding an experience for myself as I hope it will be for the students who pursue these opportunities.

In 2013-14, I visited eight universities and interacted with colleagues from diverse regions of the world such as Singapore, Hong Kong, Australia, Israel, Germany, Netherlands, Denmark, Norway, and Sweden. We established goals of collaborations ranging from promoting existing summer courses, developing new summer course opportunities, internship/research opportunities, and more immersive and directed term abroad opportunities.

A short list of highlights from which our environment students can now choose to pursue their international interests include: the well-established ecology and conservation summer abroad course in Ecuador (**ENV395Y Special Topics Field Course: Ecology and Conservation in the Amazon, Galápagos, and Andes**) and the more recent addition of a wildlife and conservation summer abroad course in Australia (**ENV396Y Special Topics: Australian Environment, Wildlife and Conservation**). (See page 15.) There are also a growing number of summer credit courses in Germany, Israel, Hong Kong, Singapore, and Vietnam. For students interested in a more immersive cultural experience, there are also a number of term



Students visit the Dead Sea in the Summer of 2012 as part of a course on water sharing issues in the Middle East offered by the Rothberg International School at the Hebrew University of Jerusalem.

abroad opportunities at partner universities with strong environment programs in countries such as Singapore, Hong Kong, Netherlands, Denmark, Norway, and Sweden. All listed opportunities are taught in English and there are generous funding opportunities so that finances need not be a barrier for interested students. More information and a full listing of these opportunities can be found at: <http://www.environment.utoronto.ca/Undergraduate/InternationalOpportunities.aspx>.

International Opportunities: Courses with ENV credit

International opportunities offered directly by the University of Toronto or through partner universities through the Summer Abroad program at Woodsworth College and Student Exchange Program at the Centre for International Experience at U of T (ENV credit equivalency) include:

- **ENV396Y Special Topics: Australian Environment, Wildlife and Conservation**
- **ENV395Y Special Topics Field Course: Ecology and Conservation in the Amazon, Galápagos, and Andes**
- **University of Bonn, Germany: Renewable Energy Policy and Development (ENV3**H credit)**
- **Goethe University Frankfurt: Biodiversity in the Context of Global Change (ENV3**H credit)**
- **Chinese University of Hong Kong: Energy and Green Society (ENV 2**H credit)**
- **Rothberg, Hebrew University of Jerusalem: A Study in Contrast: the Wet (Mediterranean Sea) and Dry (Desert) Ecosystems of Israel and Transboundary Water Cooperation (both ENV 2**H credit)**
- **National University of Singapore: Wildlife Protection in Southeast Asia (ENV 2**H credit)**

The effort to establish and highlight international opportunities is ongoing. We also hope to see an increase in the number of students we send abroad. In this way, the School hopes to contribute to President Gertler's strategic goal of strengthening international partnerships and profile.

Karen Ing is an Associate Professor, Teaching Stream, and former Undergraduate Coordinator at the School of the Environment. (See page 33.)

Students on a Summer Abroad

Undergraduates study ecology and conservation in Australia and Ecuador

BY ROSALIE CHAPPLE, BARBARA MURCK, AND CHRISTOPH RICHTER



ENV 395Y students studying ecology and conservation in the Andes and Galápagos. LEFT: the group on a riverboat on the Amazon River. RIGHT: the group climbs the Chimborazo Volcano in the Andes.



Left: Christoph Richter. Right: Jake D'Onofrio

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.

Australian Environment, Wildlife and Conservation

ENV 396Y: June 20-July 25, 2014; June 18-July 24, 2015

Summer 2014 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) and The Education Abroad Network, this five-week course in 2014 was the second year of U of T's Summer Abroad program in Australia, providing an unparalleled opportunity for 18 U of T and 28 U.S. students to be introduced to Australia's environment and wildlife by local experts.

Starting at the 'Top End' of Australia, it included a five-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 and dramatic

Some ENV 396Y students from U of T, with students from the U.S., at the World Heritage-listed Blue Mountains National Park in Australia.



R. Chapple

landforms, flora and fauna of the area. Weeks three and four were based at UNSW, near 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 World Heritage 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 14-June 14, 2014; May 20-June 13, 2015

Summer 2014 Instructors: Barbara Murck, Senior Lecturers, Geography, U of T Mississauga (UTM) and Christoph Richter, Lecturer, Biology, UTM see p. 38-39.

In the ninth offering of this course in 2014, 28 students led by two instructors had the great good fortune to visit three iconic regions of Ecuador. Explorations began in the capital, Quito, and meetings at the Universidad San Francisco de Quito. We then climbed to the Andean highlands, visited an "elfin" Polylepis forest, hiked on the flanks of the volcanoes Chimborazo and Cotopaxi, and visited the cloud forest at Mindo. Our next trip took us to the Amazon region, where we visited the Tiputini Biodiversity Station in Yasuni National Park, reputed to be the most biodiverse spot in the world.

We then traveled 1000 km out into the Pacific Ocean, to the Galápagos Islands, where we were introduced to its unique and strange flora and fauna such as giant tortoises, ground finches, marine iguanas, where we felt the Earth's heat rising through fumaroles while hiking Volcan Chico.

This course allowed us to explore geology, biology, environmental science, and environmental management to the fullest. As instructors, there is nothing better than being able to offer students an experience that is, for every one of them, inspiring and life-changing. We can't wait to go again next year!

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

Undergraduate Students' Awards

FOR MORE INFORMATION:

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

Congratulations to the recipients of School of the Environment undergraduate awards, presented in 2014 and 2015.

Frances L. Allen Scholarship: Awarded to second or third-year students in a School of the Environment specialist or double major program. The 2014 recipient was **Sean Skinkle** (Environmental Studies) and the 2015 recipient was **Veronica Badali** (Environmental Studies).

Chachra Family Scholarship in Environment and Science: Awarded to students in a School of the Environment B.Sc. specialist or major program. The 2014 recipients were **Chantelle Spencer** (Environmental Studies), and **Rebecca Chan** (Environment & Toxicology) and the 2015 recipients were **Sam Edwards** (Environmental Geosciences) and **Darren Smith** (Environment & Science).

Dr. Stanley Allan Cord Scholarship in Environmental Studies: Awarded to School of the Environment students in their third or fourth year. The 2014 recipient was **Tegan Hansen-Hoedeman** (Environmental Studies) and the 2015 recipient was **Amy Kikuchi** (Environmental Studies).

Jane Goodall Scholarship: Awarded to outstanding students enrolled in a School of the Environment program. Preference is given to students studying environment and development. The 2014 recipients, recognized at a presentation in March 2014 (*see p. 27*), were Environmental Studies major students **Dylan Putzel** and **Frank Xu**. The 2015 recipients were **Christelle Broux** (Environment & Science) and **Nathan Miller** (Environmental Studies), presented at a special breakfast in April 2015 with Dr. Goodall and Canadian artist and naturalist Robert Bateman.

Peter John Hare Memorial Scholarship in Environment: Awarded to students in a School of the Environment specialist or major program. The 2014 recipient was **Victoria Partosa** (Environmental Studies) and the 2015 recipient was **Conrad Pratt** (Environmental 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. Awards are presented at the

At the 2015 Robert Hunter Memorial Lecture in April 2015, Environmental activist Emily Hunter (Bob Hunter's daughter) presents students Appana Lok (left) and Ruth Midgley with the Robert Hunter Scholarship.



Hunter Memorial Lecture (*see page 30*). The 2014 recipients were Environmental Studies major students **Kathryn Macdonald** and **Nathan Miller** and 2015 recipients were **Appana Lok** (Environmental Chemistry) and **Ruth Midgley** (Environmental Studies).

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 2014 recipient was **Kurt Hartung** (Environmental Studies) and the 2015 recipient was **Michelle Lee** (Environmental Science).

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. Awards presented at the Pimlott Memorial Lecture (*see page 30*):

Continued on page 17...

New scholarships in memory of Rodney White and Skip Willis



Left to right: inaugural Rodney White Environmental Studies Scholarship recipient Francesca Hannan, Sue White, Skip Willis Scholarship recipient Alissa Saieva, and Kelly Willis.

The inaugural **Rodney White Environmental Studies Scholarship** was awarded in November 2014 to **Francesca Hannan**, a B.A. student majoring in Environmental Studies and in Economics. This scholarship was established in memory of the late Professor Rodney White who passed away in 2012 and served for ten years as Director of the former Institute for Environmental Studies (predecessor of the School). It is awarded to a third-year student enrolled at the School, with preference given to those studying topics relating to environment and international development. The presentation was made at the Thought Leadership Event on "The Impacts of Climate Change, Adaptation and Resiliency on the Insurance Industry and Business Community" organized by the School's Environmental Finance Advisory Committee (*see page 25*). At the same event, the second **Skip Willis Undergraduate Scholarship** was awarded to **Alissa Saieva**, June 2014 B.A. alumna with majors in Environmental Studies and in Political Science. Errik (Skip) Willis was Principal of the Willis Climate Group and was a founding member of the Professional Development Program's Environmental Finance program (*see pages 24-25*). 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.

Pimlott Awards continued from page 16...

Pimlott Award: 2014 recipients: **Maha Mansoor** and **Alissa Saieva** (Environmental Studies); 2015 recipients: **Shirley Chen** (Environment & Science), **Celine Chloe Lopez** (Environmental Studies), and **Victoria Partosa** (Environmental Studies).

Pimlott Entrance Scholarship: 2014 recipients: **Laura Squires** (Environmental Studies); 2015: **Adriana Shu-Yin** (Environmental Science and Environment & Health), **Alice Xia Zhu** (Environmental Chemistry), and **Elizabeth Willhelm** (Environmental Studies).

Pimlott Graduating Scholarship: 2014 recipients: **Michelle Mockus** and **Claire Westmacott** (Environmental Studies), **Alexandra Robertson** (Environmental Ethics); 2015: **Frank Xu** (Environmental Studies).

Kathryn S. Rolph Scholarship: Awarded to outstanding School of the Environment students who have achieved a high mark in a specific course on environmental issues. The 2014 recipient was **Sundari Wiryomartono** (Environment & Science) and the 2015 recipient was **Holly Anderson** (Environmental Studies and Ethics).

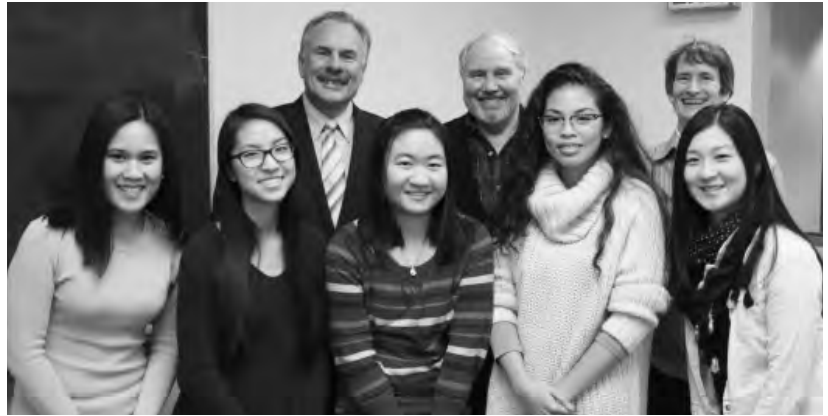
Sidney and Lucille Silver Scholarship: Awarded to a third-year student in a School of the Environment or Geography specialist or major program. The 2014 recipient was **Apanna Lok** (Environmental Chemistry) and the 2015 recipient was **Lesia Kinach** (Environmental Geography).

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 2014 recipient was **Reema Kureishy** (Environmental Studies).

RIGHT: At the 2015 Douglas Pimlott Memorial Lecture in January 2015, back row left to right: **Gord Miller** (Environmental Commissioner of Ontario and speaker), **Monte Hummel** (WWF President Emeritus and award presenter), and **Kimberly Strong** (School Director). Front row, left to right: recipients **Celine Chloe Lopez**, **Adriana Shu-Yin**, **Alice Xia Zhu**, **Valerie Partosa**, and **Shirley Chen**.



TOP: At the 2014 Douglas Pimlott Memorial Lecture in February 2014, left to right, School Director **Kimberly Strong**, award recipients **Alissa Saieva** and **Laura Squires**, award presenter and WWF President Emeritus **Monte Hummel**, recipient **Claire Westmacott**, and **Mark Pimlott** (Douglas Pimlott's son).



Independent research projects & professional experience

ENV 421H Environmental Research

2013-15 Instructor: **David Sider**, Sessional Lecturer (see p. 39). Senior undergraduate students work together in small groups to conduct research related to environmental management and urban sustainability in Toronto. In 2013-14, 34 students did research on commuter cycling, green buildings, invasive species, community-supported agriculture, urban agriculture and health, subway expansion and urban water infrastructure. In 2014-15, 52 students worked on green roofs, solar energy, green spaces, urban transit, and climate change. Students gain experience in conducting research from start to finish, including conceptualizing the topic, carrying out a background literature search, formulating hypotheses, developing a research design, writing a research proposal, submitting the project for an ethics review, undertaking the primary research and, lastly, data analysis and report-writing. Student groups also present their findings in the final class.

ENV 440H Professional Experience Course

2013-15 Instructor: **David Sider**, Sessional Lecturer (see above). The course provides an opportunity for students to gain practical work experience in the environmental field through placements with organizations and agencies, mostly off-campus, which are engaged in a wide range of issues from the local to the global scale. Student placements include activities such as research, policy development, project administration, proposal writing, networking, community organizing, and public education and awareness.

The Fall 2013 class had 53 students who had summer or fall placements at non-profit/charitable groups (e.g., Canadian Parks and Wilderness Society, Evergreen, Foodshare, Jane Goodall Institute), government agencies (e.g., Toronto Environment Office, Ontario Ministry of the Environment, Environment Canada), private sector, and U of T units (Toronto Cycling Think & Do Tank, Sustainability Office). In addition, the academic component is oriented towards reflection on, and analysis of, the placement experiences from a broader perspective. Together, the practical and academic parts of the course are intended to help prepare students for successful careers in the environmental field.

ENV 492/493H Independent Studies Project

Undergraduate independent research completed in 2013-14: **Tegan Hansen-Hoedeman**, Environmental Studies and English. *Relationship of Environmental Management and Aboriginal Self-Government in Nunavut.* Supervisor: Deborah McGregor, Geography. **Azzam Abu-Rayash**, Environmental Science and Neuroscience. *Quantitative Analysis of Drumlin Shapes in Southern Ontario.* Supervisor: Nick Eyles, Physical & Env. Sciences, UT Scarborough. **Kurt Hartung**, Environmental Studies and Geoscience majors. *Analysis of Previous and Current Proposals for Nuclear Waste Storage in Deep Geological Repositories in Canada.* Supervisor: Jim Mungall, Earth Sciences. **Yashwinie Shivanand**, Environmental Studies and Ethics, Society & the Law. *Federal Government and Environmental Science.* Supervisor: Scott Prudham, Geography/Environment.

Backpack to Briefcase (b2B) event

Undergraduates meet with Environment alumni at mentorship dinner

BY CARLO SIOCHI

The Faculty of Arts and Science's Backpack to Briefcase (b2B) events provides opportunities for students to understand their education in a broader context – opening discussions with alumni, faculty members, staff and peers about life after graduation. FAS organizes various types of b2B events throughout the year such as career workshops and panel discussions, conference, networking events and mentorship meals for many FAS academic units.

At a mentorship dinner held on November 3, 2014 at the U of T Faculty Club, School of the Environment undergraduate students met with a panel of alumni invited back to share their education and career experiences and to offer encouragement and advice. Environment alumni included:

- **Rachel Anderson**, Analyst, Strategic Policy, Ontario Energy Board (2009 Environmental Policy & Practice)
- **Kate Fairbrother**, Lawyer, Davies Howe Partners LLP (2010 Environmental Policy & Practice)
- **Rohit Mehta**, Development Assistant, Credit Valley Conservation Foundation (2012 Environmental Management);
- **Jennifer Robinson**, Network Manager, NSERC Canadian Network for Aquatic Ecosystem Services (2012 Environment & Science); and
- **Neda Tocheva**, Project Coordinator, Pure Energies Inc. (2013 Environment and Science).



Left to right: at a Backpack to Briefcase mentorship dinner, School of the Environment students Lucy Cullen, Yushuo Cai, and Victoria Partosa (all doing Environmental Studies major) talk to Environment alumna Neda Tocheva (2013 Environment & Science major alumna, second from right).

For more information, please contact Carlo Siochi, Alumni Relations Officer, Office of Advancement, Faculty of Arts and Science, carlo.siochi@utoronto.ca; www.alumni.artsci.utoronto.ca.

ENSU - undergraduate students' group

Environmental campus group represents the School's undergraduate students

BY MONICA DAIRO

<http://ensu.sa.utoronto.ca>

The Environmental Students' Union (ENSU) is a student-run organization representing the undergraduate students enrolled in the programs at the School of the Environment. In 2014-15, the ENSU executive had two primary goals: firstly, to connect students to the School and to the larger environmental community on campus, and secondly, to become a model of sustainability.

For the first goal, we established ENSU's first newsletter and also held several events, such as the Green Steps to Work career-month. We also encouraged students to get involved with the environmental community on campus by supporting environmental events and initiatives. For the second goal, we developed an environmental policy for ENSU's constitution, and installed two additional executive positions of Sustainability Officers, to ensure ENSU would uphold its mandate to be environmentally responsible. We also lobbied other course unions to include an environmental article in the Arts and Science Students' Union constitution.

Going forward, we hope to more strongly enforce sustainable practices during our events, and hope to maintain a strong connection between students and the School and the environmental community.

2014-15 ENSU Executive:

- President: **Monica Dairo** (Environmental Studies major);
- Treasurer: **Rhea Joseph** (Environmental Studies major);
- Secretary: **Gabriela Ansari-Correa** (Environmental Studies minor);



Environmental Students' Union 2014-15 Executive members left to right: Michelle Newson, Daphne Wang, Ziyi Li, Brendan Rice, Rhea Joseph, Suman Furmah, Gabriela Ansari-Correa, Krysta Lyn, and Monica Dairo.

- Social Media Coordinator: **Michelle Newson** (Environmental Studies major);
- Upper Year Representatives: **Suman Furmah** (Environment Studies minor) and **Brendan Rice** (Environment Studies major);
- Lower Year Representatives: **Ziyi Li** (Environment Studies major);
- **Daphne Wang** (Environmental Science major);
- Webmaster: **Khrysta Lyn** (Environment Studies major).

Collaborative Graduate Programs

Academic Associate Director:

DOUGLAS MACDONALD,

Senior Lecturer, 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. This past year, the program underwent a self-study for the School of Graduate Studies which included consultation with its program committee and graduate students.

The program currently has students from across the disciplinary spectrum. In Fall 2013, the School was pleased to add the Master of Global Affairs (offered by the Munk School of Global Affairs) and the Master of Public Policy (offered by the School of Public Policy and Governance) to its collaborating units and programs which include Adult Education and Community Development program (OISE), Anthropology, Chemical Engineering and Applied Chemistry, Chemistry, Ecology and Evolutionary Biology, Earth Sciences, Forestry, Geography, Information, Management, Physics, Program in Planning (Geography), Political Science, Religion, Sociology, Sociology in Education program (OISE), 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

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or Pavel Pripa, Graduate Student Administrator,
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such diverse home units as Cell and Systems Biology, Electrical and Computer Engineering, and English. We also currently have students enrolled from Chemical Engineering, East Asian Studies, 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 2014-15, the School of the Environment was pleased to have 19 alumni graduate from this collaborative program (4 PhD and 15 Masters). Totalled enrolled were 45 students (18 PhD and 27 Masters). (See pages 7-10 for topics of alumni theses and papers and of new/continuing students.)

Through the generous donation of the Beatrice and Arthur Minden Foundation, we are pleased to announce the establishment of the **Beatrice and Arthur Minden Graduate Research Fellowship** to be launched in 2015-16, to be awarded to one or more PhD students enrolled in the School's graduate programs to provide them with support for their involvement in conferences, summer schools, field work and collaborative visits to research groups across Canada and around the world. Preference will be given to graduate students whose PhD research is specifically focused on environmental issues.

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 September 2013, the **doctoral program offered by Physical Sciences and Environmental Sciences at U of T Scarborough** was added to its collaborating programs which 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) brought 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. Last year's series, for instance, included presentations on the following topics: Healthy Public Policy through an Environmental Justice Lens,

Watersheds as Settings for Health and Well-Being: Ecohealth in Practice, and Health Evidence in Municipal Decision-Making: A Health Impact Assessment of a Proposed Expansion to Billy Bishop Toronto City Centre Airport. **(See page 31 for seminar topics).**

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

Dr. Clare Wiseman is Assistant Professor and Coordinator of the Environment & Health Program (see p. 35).

Graduate Faculty

The following individuals currently have graduate faculty appointments at the School of the Environment. For information on appointments & student supervision, 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*
 Simon Coleman, *Religion*
 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*
 Birsan Donmez, *Mechanical and Industrial Eng.*
 Steve Easterbrook, *Computer Science*
 Elizabeth Edwards, *Chemical Eng. & App. Chem.*
 Mark Engstrom, *Ecology & Evol. Biology/ROM*
 Greg Evans, *Chemical Eng. & Applied Chemistry*
 Roberta Fulthorpe, *Physical & Env. Sci., UTSC*
 William Gough, *Physical & Environ. 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 & Evol. Biology*
 Charles Jia, *Chemical Eng. & Applied Chemistry*
 Shashi Kant, *Forestry*
 Bryan Karney, *Civil Engineering*
 Chris Kennedy, *Civil Engineering*
 Thembele Kepe, *Geography, UT Scarborough*
 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*
 Richard Peltier, *Physics*
 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*
 Shiho Satsuka, *Anthropology*

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, *Economics*
 Kimberly Strong, *Physics*
 Edward Swenson, *Anthropology*
 Susan Tarlo, *Medicine*
 Ross Upshur, *Medical Science*
 Willem Vanderburg, *Civil Engineering*
 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*
 Laura Brown, *Geography UT Mississauga*
 Susannah Bunce, *Geography UT Scarborough*
 Andrew Green, *Law*
 A.P. (Lino) Grima, *Geography*
 Paul Helm, *Ont. Ministry of the Environment*
 Jacob Hirsh, *Management, UT Mississauga*
 Marney Isaac, *Physical & Environ. Sci., UTSC*
 Andy Kenney, *Forestry*
 Igor Lehnerr, *Geography, UT Mississauga*
 Douglas Macdonald, *Environment*
 Barbara Murck, *Geography, UT Mississauga*
 Dennis O'Hara, *St. Michael's College*
 Matthew Ratto, *Information*
 Beth Savan, *Environment*
 Marcelo Vieta, *OISE Leadership, Higher and Adult Education*
 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*
 Ingrid Leman Stefanovic, *Philosophy*
 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

2014-15 School of the Environment graduate course offerings and instructors. For profiles of Faculty, Instructors and Sessional Lecturers, please see pages 32-40. For more information, please visit www.environment.utoronto.ca or contact Pavel Pripa, pavel.pripa@utoronto.ca.

Core Courses

ENV 1001H Environmental Decision Making (D. Macdonald, Environment and B. Raboy, Ecology & Evol. Biology)
 ENV 4001H Seminars in Environment and Health (A. Hyder, sessional)

Other Courses

ENV 1002H Environmental Policy (D. Macdonald, Environment)
 ENV 1004H Urban Sustainability and Ecological Technology*
 ENV 1005H Business and Environmental Politics*
 ENV 1008H Worldviews and Ecology (S. Scharper, Anthropology UTM/Environment)
 ENV 1444HS Capitalist Nature (S. Prudham, Geog/Environment)
 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. Olsson, sessional)
 ENV 1707HF Environmental Finance and Sustainable Investing (J. Ambachtsheer, S. McGeachie, sessionals)
 JGE 1413H Environmental Assessment (V. Maclaren, Geography; B. Savan, Environment)
 JGE 1420H Urban Waste Management: An International Perspective*
 JGE 1425HF Livelihoods, Poverty and Environment in Developing Countries*
 JGE 1609H Cities, Industry and the Environment*
 ENV 2000H Topics in Environmental Studies
 ENV 2002H Special Topics in Environmental Studies
 JVP 2147H Environmental Philosophy*
 JNC 2503H Environmental Pathways (C. Jia, Chemical Engineering)
 ENV 3000H Special Topics: Environment and Health
 ENV 4002H The Environment and Health of Vulnerable Populations *

* Not offered in 2014-15

Graduate Students' Awards

Congratulations to the latest recipients of School of the Environment graduate awards, mostly presented at Research Day events (see page 6).

John Brown Prize

This prize is in memory of the late John R. Brown, Professor of Environmental Health and Medicine. The 2014 recipients were **Josephine Cooper** (MEng student, Chemical Engineering) who is examining the impact of vehicle exhaust emissions in vitro and in vivo, and **Xin Yu Huang** (MPH student, Public Health) who is researching biomarkers of traffic related air pollutant in blood, nasal lavage fluid and urine.

The 2015 recipients were **Nicole Spiegelaar** (PhD student, Physical and Environment Sciences at UT Scarborough and the School's Environment and Health program) whose research is on the role of traditional food systems in Cree psychological resilience, and **Natalia Mykhailova** (PhD student, Chemical Eng.) who is studying low-cost sensor array devices as a method for assessment of exposure to air pollution mixtures.

Sperrin Chant Award in Toxicology

This award is given to a School of the Environment graduate student doing research in toxicology. The 2014 recipient was **Dolon Chakravartty** (PhD student, Public Health/

School's Environment and Health program), who is examining pathways delineating potentially higher environmental exposures among visible minority women in Canada.

The 2015 recipient was **Catherine Slavik** (MPH student, Public Health/Environment and Health program), researching the Ontario's Toxics Reduction Act.

GreenSaver Fairweather Award

This award was established in memory of Alastair Fairweather, a member of the Board of Directors of GreenSaver. The 2014 recipient was **Marie-Line Sarrazin** (MA student, Geography and the School's Environmental Studies program) who is studying gender (in)equity in community-based resources management in Kaa-Iya del Gran Chaco National Park, Bolivia.

The 2015 recipient was **Demi Suleiman** (PhD student, Social Justice/OISE and the School's Environmental Studies program), researching indigenous food production systems and implications to food security and environmental conservation in Ghana.

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. They were presented at the Krause Memorial Lectures (see page 30). The 2014 recipients, all in the School's Environmental Studies

FOR MORE INFORMATION:

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program, were: **Beth Evans** (PhD student, Political Science) studying interactions of domestic and international and environmental policy; **Laura Tozer** (PhD student, Geography) studying greenhouse gas emission reduction policies; and **Cynthia Whaley** (PhD alumna, Physics) studying Toronto-area atmospheric composition.

The 2015 recipients were **Anastasia Hervas** (PhD student, Geography and the School's Environmental Studies Program), who is researching the socioecological implications of increased global biofuel demand in the developing world, and **Alison Mintoff** (JD student, Law and Certificate in Environmental Studies) whose research is on seeking remedies for environmental harms through private international law: case of Chevron Corporation, et al. vs Yaiguaje.

Arthur and Sonia Labatt Fellowships

These fellowships were established through a generous donation from Arthur and Sonia Labatt. The 2014 recipients, students in

Continued on page 22....

TOP LEFT: 2014 Eric Krause Award recipients Laura Tozer, Beth Evans, Cynthia Whaley. **TOP CENTRE:** 2014 GreenSaver Fairweather Award recipient Marie-Line Sarrazin with Gavin Fairweather, son of Alastair Fairweather. **TOP RIGHT:** 2015 GreenSaver Fairweather Award recipient Demi Suleiman and Vladan Veljovic, President and CEO, GreenSaver. **BOTTOM LEFT:** 2015 Krause Award recipient Alison Mintoff and Kim Strong, School Director. **BOTTOM CENTRE:** 2014 Alexander B. Leman Award recipient Robin Lattimer with Ingrid Leman Stefanovic, daughter of Alexander Leman. **BOTTOM RIGHT:** Leman Award recipient Jielan Xu and Michael Leman, Alexander's brother.



GRADUATE PROGRAMS

RIGHT TOP: 2014 Arthur and Sonia Labatt Fellowship recipients left to right: Robin Lattimer, Angela Day, Beth Evans, David Houle, Laura Tozer, with School Director Kimberly Strong.
RIGHT BOTTOM: 2015 Labatt Fellowship recipients left to right: Dolon Chakravartty, Christian Ches, Angela Day, Beth Jean Evans, Columba Gonzalez, Mark Hathaway, Malcolm

the School's Environmental Studies (ES) or Environment and Health (EH) programs were: **Angela Day** (PhD, Geography/EH), **Beth Evans** (PhD, Political Science/ES), **Vanessa Ferguele** (MGA, Global Affairs/ES), **David Houle** (PhD, Political Science/ES), **Robin Lattimer** (MScPl, Planning/ES), and **Laura Tozer** (PhD, Geography/ES).

2015 recipients: **Dolon Chakravartty** (PhD, Public Health/EH), **Christian Ches** (PhD, Geography/ES), **Angela Day** (PhD, Geography/EH), **Beth Jean Evans** (PhD, Political Science/ES), **Columba Gonzalez** (PhD, Anthropology/ES), **Mark Hathaway** (PhD, Leadership, Higher and Adult Education/ES), and **Malcolm Ramsay** (MSc, Anthropology/ES), and **Laura Tozer** (PhD, Geography/ES).

George Burwash Langford Prize

This is awarded to a School of the Environment graduate student who best combines excellence in research and contribution to the work of the School. The 2014 recipient was **John Maiorano** (PhD student, Humanities, Social Sciences and Social Justice Education; and the School's Environmental Studies program), studying sustainability in Ontario hospitals.



The 2015 recipient was **Dan Weaver** (PhD student, Physics/Environmental Studies). His research involves the acquisition and analysis of atmospheric measurements at the Polar Environment Atmospheric Research Laboratory in the Canadian high Arctic.

Alexander B. Leman Award

This award was established in memory of Alexander B. Leman, an architect and urban

planner. The 2014 recipient was **Robin Lattimer** (MScPl student, Geography's Planning Program/Environmental Studies) researching water networks and the social network analysis of source protection.

The 2015 recipient was **Jielan Xu** (PhD Student, Geography's Planning Program/Environment and Health). Her research explores the relation between planning and healthy aging in Kanton region, Japan.

GESA - graduate students' group

Re-established campus group represents the School's graduate students

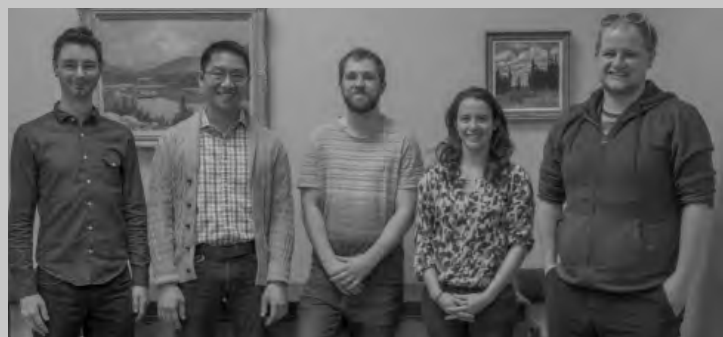
DAN WEAVER

<http://gesa.sa.utoronto.ca>; https://twitter.com/GESA_UofT
In September 2014, the Graduate Environmental Students' Association (GESA) was re-established after being dormant for several years. It seeks to enhance the graduate student experience at the School by creating new opportunities for interdisciplinary thinking and fostering a sense of academic and social community.

GESA has had a wonderfully successful first year, and aims to contribute to the ongoing growth and success of the School for a long time to come. Since restarting, GESA has run regular social events, an academic panel discussion on the nature of environmental studies (vs. environmental science), and regular lunch-time discussions of current environmental issues. GESA also organized a successful event to discuss the impact of neonicotinoids used in agriculture on bee populations. "Bees, Neonics, and Policy" included **Dr. Sheila Colla**, pollinator expert; **Don McCabe**, Ontario Federation of Agriculture; **Dr. Maria Trainer**, Science and Regulatory Affairs at CropLife Canada; and **Julie White**, Ontario Beekeepers Association.

2014-15 GESA Executive:

- President: **Dan Weaver** (Physics/Environmental Studies, ES);
- Vice-President: **Sang-Kyun Bong** (JD, Law and ES certificate);



Some members of GESA's 2014-15 Executive from left to right: Dan Weaver, Jon Obnamia, Andrew Brinn, Julia Levin, and Malcolm Ramsay.

- Secretary: **Julia Levin** (M.Ed., OISE/ES);
- Treasurer: **Jon Obnamia** (Ph.D, Chemical Engineering/ES)
- Events Coordinator: **Malcolm Ramsay** (M.Sc., Anthropology/ES)
- Communications Coordinator: **Mehreen Athar** (MI, Information/ES)
- UTGSU representatives: **Andrew Brinn** (Public Policy & Governance) and **Marie-Line Sarrazin** (MA, Geography);
- Fall 2014 Social Events Coordinator: **Heather Wheeler** (PhD, Cell and Systems Biology/ES).

Online Certificate Programs & Courses

Climate Change Policy and Practice

The Certificate in Climate Change Policy and Practice is designed to prepare professionals with the practical skills to better understand their environmental footprints. The greenhouse gas accounting, reporting and verification aspects of the program are grounded in ISO standards. The combination of practical and theoretical components will provide individuals with the tools required to steer their organizations in the direction of sustainable practices and to meet the challenges of an expanding regulatory framework and the increasing need for sustainable initiatives. Explore the causes and impacts of global warming; government policies and the economics of climate change; strategic planning to respond to and minimize climate change; and the financial, environmental and business aspects of adaptation and mitigation efforts.

It is comprised of three compulsory courses:

- CCP 400 Climate Policy and Corporate Responses
- CCP 401 Sustainability Reporting
- CCP 402 GHG Accounting and Reporting ISO 14064-I
- CCP 403 Greenhouse Gas Validation and Verification

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.

It is comprised of four compulsory courses:

- CEM 400 Fundamentals of Environmental Management
- CEM 401 Urban Water Issues
- CEM 402 Strategies in Environmental Management
- CEM 403 Environmental Risk Assessment

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.

It is comprised of two compulsory courses:

- CRE 400 Principles of Renewable Energy
- CRE 401 Biofuels

And one of the following courses:

- CRE 402 Wind Energy
- CRE 403 Urban Energy Systems
- CRE 404 Solar Energy

Geographic Information Systems (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

The School of the Environment's Professional Development Program offers courses, seminars and workshops 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. (See page 40 for brief profiles of instructors.)

FOR MORE INFORMATION:

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

It is comprised of four compulsory courses:

- GEM 400 Introduction to GIS for Environmental Management
- GEM 401 Advanced GIS for Environmental Management
- GEM 402 Geospatial Technologies for Environmental Mapping with GIS
- GEM 403 Environmental Remote Sensing

Advanced Study in GIS for Environmental Management

This Certificate is designed for professionals who wish to achieve greater conceptual understanding and technical expertise to master the field of GIS.

It is comprised of six compulsory courses:

- GEM 400 Introduction to GIS for Environmental Management
- GEM 401 Advanced GIS for Environmental Management
- GEM 402 Geospatial Technologies for Environmental Mapping with GIS
- GEM 403 Environmental Remote Sensing
- GEM 404 GIS Modeling for Environmental Applications
- GEM 405 Advanced Remote Sensing Techniques for Environmental Applications

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.

It is comprised of three compulsory courses:

- WRM 400 Water Resource Management
- CEM 401 Urban Water Issues
- WRM 401 Water Auditing

And one of the following courses:

- CRE 400 Principles of Renewable Energy
- GEM 400 Introduction to GIS for Environmental Management

In-Class Certificate Programs

FOR MORE INFORMATION:

<http://learn.environment.utoronto.ca> or contact
Donna Nielsen, Manager, Professional Development Programs,
416-978-7077, d.nielsen@utoronto.ca

Greenhouse Gas (GHG)

GHG Accounting - Quantification, ISO 14064-1

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. The School of the Environment has partnered with CSA group (Canadian Standards Association are experts in standards development and product certification) to offer a course designed to prepare students to undertake the CSA GHG Inventory Quantifier Certification examination that will demonstrate competence to develop, quantify, assess and report GHG inventories.

Energy Programs Renewable Energy Systems

As we move into a carbon-constrained era, the use of available sources of carbon-free energy will intensify. However, renewable energy systems are poorly understood and mistakes are made as systems are integrated into buildings and utility systems without proper understanding. This course explores the major renewable energy systems: the technologies, applications, constraints, economics, integration and installation. It is based on Natural Resources Canada's RETScreen analysis tool.

Energy Strategies for Optimizing Building Operations: Recommissioning - ReCx

Recommissioning is a process rapidly growing in popularity that could be the most cost-effective strategy for reducing energy, costs and greenhouse gas emissions in buildings today. This course explores solutions to optimize energy performance for existing buildings.

Energy Management I - Energy Management Process

This course explores broadly the topic of energy management,, allowing participants to pursue best practices to implement energy management strategies within their organization and building portfolio.

Energy Management II - Energy Reduction Strategies

Building on Energy Management I (which focuses on the energy management process), this course helps students to identify energy savings opportunities, to quantify these savings, recognize and account for maintenance impacts, establish budget costs and calculate overall economic impacts of building retrofits.

Sustainability Reporting

In this course participants gain the knowledge to start or enhance their organization's sustainability reporting projects, and learn about sustainability reporting frameworks, best practices, pitfalls to avoid, and ways to ensure their sustainability reporting is meaningful and value-added to their organization. Additionally, participants gain an enhanced ability to assess and evaluate other organization's sustainability reports.

Water Auditing

An expanding population, urbanization, escalating standards of living and climate change all place pressure on the world's water resources. Its treatment, distribution, usage and waste management are all key issues for both urban and rural populations. The ability to understand, manage and then reduce your water footprint will be key to the ability of your business to manage with these risks. This certificate program will provide a thorough background to understand and manage issues facing the world's water supply, including current best practices to manage and reduce a water footprint. In this two-day course, students learn best practices for water consumption management and related resource and waste management issues to ensure your organization is managing its water footprint effectively and economically.

Environmental Finance Events

These educational workshops and events within the field of environmental finance are organized by the Environmental Finance Advisory Committee (see page 25) to promote dialogue among business, industry, government, academia and the private sector.

Green Bonds: Mobilizing Long-term, Climate Change Capital. Real or an Illusion?

May 26, 2014. Nothing says "Environmental Finance" more than "Green Bonds". Developed by early (and continuing) innovator issuers like the World Bank, the International Finance Corporation and the European Investment Bank, green bonds are now rapidly evolving into an asset class, tied loosely or tightly to green infrastructure, projects and activities. Panel members included **Karen Clarke-Whistler** of TD Bank, **Peter Walker** of TD Bank Treasury, **Gray Taylor** of Bennett Jones LLP, **Rod Lever** of Export Development Canada and **William J. Murphy** of KPMG.

Canadian Real Estate & Sustainability Performance September 23, 2014.

Is Canadian real estate a sound investment opportunity for global investors? Or is the sector at risk of losing international investors due to lagging environmental performance and disclosure compared to global peers? This discussion on environmental risks in real estate portfolios included panelists **Michael Brooks** of Real Property Association of Canada, **Ted Kesik** of U of T's Faculty of Architecture, **Anthony De Francesco** of IPD Australia & New Zealand, and **Urs Uhlmann** of Zurich Global Corporate Canada, and was moderated by **Susan McGeachie** of E&Y's Climate Change and Sustainability Services.

Environmental Finance Advisory Committee receives 2014 U of T Arbor Award for volunteer contributions

We are pleased to announce that the School's Environmental Finance Advisory Committee was awarded a 2014 Arbor Award for their volunteer contributions to the School. The award was presented to some members of the Committee at a reception at the University of Toronto President's residence in September, 2014.

The Committee consists of the following 2014 members of the business and university community. It provides a forum for the exchange of innovative ideas in environmental finance between the University and the commercial sector. It organizes educational workshops and programs topics within the field of environmental finance to promote dialogue among business, industry, government, academia and the private sector. *(See box below.)*

- **Michael R. Barrett**, Partner, Corporate, Bennett Jones LLP
- **Alex Chamberlain**, Managing Partner, Investeco Capital
- **Elisabeth (Lisa) DeMarco**, Partner, Norton Rose Fullbright
- **Julie Desjardins**, President, Desjardins & Associates Consulting
- **Toby Heaps**, President and Co-Founder, Corporate Knights
- **Barbara Hendrickson**, Counsel, Bax Securities Law
- **Peter Johnson**, Senior Manager, Environmental Risk, TD Bank
- **Eric Kirzner**, John H. Watson Chair in Value Investing and Professor, Rotman School of Management
- **Patricia A. Koval**, Partner, Torys LLP
- **Sonia Labatt**, Dean's Advisory Board member, Faculty of Arts and Science, University of Toronto
- **Todd Latham**, President, Actual Media
- **Phillip Ludvigsen**, Director, Carbon Advisory Services, KPMG Canada
- **Rosemary Martin**, Chief Sustainability Officer, First Capital Realty
- **Susan McGeachie**, Market Leader, Climate Change and Sustainability Services, Ernst & Young *(See page 36.)*
- **Susan McLean**, Director, GreenEdge Capital
- **Kimberly Strong**, Director, School of the Environment *(Committee Co-Chair)*



Some members of the Environmental Finance committee attended a special reception at U of T President's Meric Gertler's residence to be presented with the Arbor Award. Left to right: Gray Taylor, Katie Sullivan, Bill Tharp, Meric Gertler, Rosemary Martin, Sonia Labatt, Todd Latham, Julie Desjardins, Peter Johnson, and Barbara Hendrikson.

- **Katie Sullivan**, Director, North America Policy and International Climate Finance, IETA
- **Gray Taylor**, Principal, Gray Taylor Law *(2014 Committee Co-Chair)* *(See page 36.)*
- **Bill Tharp**, CEO, Climate Change Infrastructure Corporation *(2015 Committee Co-Chair)*
- **Donna Nielsen**, Manager, Professional Development Programs, School of the Environment
- **Robert Wilson**, Director, Carbon Finance, The Nature Conservancy of Canada

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

THOUGHT LEADERSHIP EVENT:

Impacts of Climate Change, Adaptation & Resiliency on the Insurance Industry & Business Community

November 18, 2014, Toronto. *(See article on page 26.)*

Speaker **Kathy Bardswick**, President and CEO of the Co-operators Group Limited and Chairperson of the Institute for Catastrophic Loss Reduction, addressed the need for insurance companies and the business community to build resiliency into Canadian infrastructure and economic arrangement. A panel discussion was moderated by **Toby Heaps**, Corporate Knights and included **Blair Feltmate**, Associate Professor, University of Waterloo; and **Peter Halsall**, Canadian Urban Institute. The event also included presentations of the inaugural Rodney White Environmental Studies Scholarship and the second Skip Willis Undergraduate Scholarship *(see full article on page 26).*

The Climate Change Agenda: Canada, the Canadian West, Business, Markets and the Future

November 24, 2014, Calgary, Alberta. Co-hosted by the International Emissions Trading Association, three panel sessions were included:

- Canadian and International Issues: with **Julie Gelfand**, Federal Commissioner of the Environment & Sustainable Development;
- Canadian Public & Private Perspectives: with **Kate Rich** and **Andy Ridge**, Alberta Environment and Sustainable Resources Development; **Yvan Champagne**, Bluesource Canada; **Tim Lesiuk**, BC Climate Action Secretariat; **Ed Ma**, Suncor; **Beth Hardy**, Saskatchewan Government.
- The Deep Decarbonization Pathways Project Lens: with **Richard Adamson**, Carbon Management Canada; **Dave Sawyer**, Carbon Management Canada Pathways Group; **Rob MacIntosh**, Green Learning Canada; **Peter Kujawinski**, US Consul General to Canada.

Thought Leadership Event

University-business partnership explores economics of climate change

BY EMILY SMITH, ALUMNI RELATIONS OFFICER, FACULTY OF ARTS & SCIENCE

Canada is the only G8 country without overland flood insurance, something that needs to change quickly, given the rapidly increasing number of catastrophic weather events taking place here, **Kathy Bardswick** told an audience of businesspeople and academics gathered at the U of T Faculty Club on November 18, 2014.

Bardswick, the president and chief-executive officer for the Co-operators Group Limited, was the keynote speaker at the annual thought leadership event hosted by the Environmental Finance Advisory Committee at the School of the Environment. The committee was formed more than a decade ago by Donald Cormack, the former dean of the School of Graduate Studies, the late environmental studies professor, **Rodney White**, and **Donna Nielsen**, the manager of professional development programs at the School of the Environment. It exemplifies a successful university-city partnership by bringing together local businesspeople and faculty concerned about the economics of climate change.

"The committee grew out of Rodney's research interests in environmental research and carbon financing," said Professor Kimberly Strong, director of the School. White led the Institute for Environmental Studies, a forerunner of the new school. "It gathered a high-powered group of business community members with the mandate to talk about ideas in environmental finance."

The thriving committee, which includes U of T faculty members, mounts three or four workshops or seminars each year to promote dialogue with business, industry, government, academia and the



At the Thought Leadership Seminar in November, 2014, Kathy Bardswick, President and CEO of the Co-operators Group Ltd and Chairperson of the Institute for Catastrophic Loss Reduction, addresses the need for the insurance industry and businesses to work with other organizations to build resiliency to the impacts of climate change.

private sector on leading edge environmental initiatives. (See pages 24-25.) They are designed in collaboration with industry experts to transfer innovative ideas in environmental risk management practice to the aforementioned constituencies. While environmental finance is still the major focus, the committee's interests have broadened.

The annual thought leadership event raises money for scholarships named in honour of White and for the late Errick "Skip" Willis, a former committee member. The inaugural Rodney White Environmental Studies Scholarship and the second Skip Willis Undergraduate Scholarship were also awarded at the event. (See page 16.) "Our theory is that if we can get environmental issues in front of the business community, it offers a way for them to see opportunities to avoid risk or do better," said **Gray Taylor**, a Toronto lawyer and the Committee co-chair. "This is an independent, unbiased forum and the ideas we bring forward do make a difference.

"It is also totally consistent with U of T's commitment to good relations in the community where it is located. However, we're not ignoring the rest of the country; the university is helping us with an event in Calgary coming up. U of T is more than a Toronto institution, it's a national institution."

At the event, Bardswick called for a new national conversation about climate change and flood insurance in Canada, and explained that for every dollar of insurance premiums collected, 25 to 30 per cent is now being used to cover catastrophic events and said Canada needs to build greater resilience. "Communities in our country are being devastated, and the numbers don't reflect the emotional and social costs or the long-term economic impacts that play out."

Professor Blair Feltmate, chair of climate change adaptation at the University of Waterloo, and **Peter Halsall**, president and CEO of the Canadian Urban Institute, were invited to offer official commentary. Feltmate agreed that Canada "needs to adapt immediately and decrease risk in the system now," while Halsall suggested the need for "evidence-based policy" and "holding decision-makers accountable for basing their decisions on facts."

"Discussions like this are important for helping to promote dialogue and to show how the various players need to work together to find ways to address the challenges and increase resiliency."

Graduate course introduces students to world of environmental markets

ENV 1707H Environmental Finance and Sustainable Investing

Instructors: Susan McGeachie (Adjunct Professor and Market Leader, Climate Change and Sustainability Services, E&Y) and Jane Ambachtsheer, Adjunct Professor and Partner, Mercer) (See page 36.)

Originally developed by members of the Environmental Finance Advisory Committee, this course introduces graduate students to the world of environmental markets. Students learn access to capital through investment, lending and insurance, environmental risk management, corporate reporting, and investor collaboration. These new mechanisms for transitioning to a green economy build on established financial instruments and practices. Banks, pension funds, corporations and governments are becoming increasingly engaged on the topic in order to manage risks and capitalize on new opportunities. The course explores the environmental, social and governance factors on bottom line financials, using real case examples of how various firms and investors are driving and responding to this strategic area. Each year, students apply what they learn to address an existent environmental challenge facing an organization today, in collaboration with a company representative. Through this opportunity students have worked in financial services, retail, mining and transportation. In the fall of 2014, 15 students were enrolled from a variety of disciplines including business, engineering, science, and global affairs.

Jane Goodall Institute

Partnership with the School provides various learning opportunities for students

BY TARA ALLMAN AND VICTORIA FOOTE

On April 3, 2014, JGI Canada's founder, **Dr. Jane Goodall**, celebrated her 80th birthday. She first became known for her discoveries studying chimpanzees in the 1960s. Today, she is known across the globe for her leadership in conservation and humanitarian work.

Andria Teather, JGI Canada Chief Executive Officer, and JGI staff are working with partners like the School of the Environment at the University of Toronto to strengthen Dr. Goodall's legacy. It continues to offer opportunities to students and faculty alike to learn more about their field research and contribute to the conservation of endangered species and ecosystems. U of T faculty sit on JGI Canada's Board of Directors – **Professor Shawn Lehman** in the Department of Anthropology joined the board in 2013, bringing expertise in primates and conservation.

U of T students volunteer for JGI Canada's Africa Programs and its community outreach initiatives. They have benefitted from seeing practical applications of academic learning in real-world situations while getting workplace experience. JGI Canada deeply appreciates the commitment of undergraduate student volunteers **Glynnis Abell** (French), **Daniel Jose** (Anthropology) and **Kaylah Kranjc** (Environment) who provide ongoing assistance with fundraising and communication efforts in support of important campaigns to protect chimpanzee habitat and community-led conservation projects.

In October 2013, student-led U of T Environmental Action (UTEA) and the



J. McArthur

School of the Environment co-presented Dr. Goodall's lecture, *Reason for Hope: Exploring the Role of Youth in a Changing Climate*. Dr. Goodall then returned to Toronto in March 2014 for U of T Scarborough's 37th Watts Lecture.

At a special reception on March 27, 2014, the Jane Goodall Undergraduate Scholarship was presented by Dr. Goodall and Professor Kimberly Strong, Director of the School of the Environment, to **Dylan Putzel**, a BA student majoring in Environmental Studies and Ethics, Society and Law, and **Frank Xu**, a BA student majoring in Environmental Studies and Psychology.

The 2015 scholarship recipients were **Christelle Broux**, a BSc student majoring

FOR MORE INFORMATION & VOLUNTEER OPPORTUNITIES:

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

in Environment & Science and Physical & Environmental Geography, and **Nathan Miller**, BA student majoring in Environmental Studies and Urban Studies. It was presented at a special breakfast in April 2015 with Dr. Goodall and Canadian artist and naturalist Robert Bateman.

JGI continues to offer opportunities for students and faculty to learn about their field research. Last year, for the fifth year in a row, JGI delivered a guest lecture for Anthropology students at the U of T Mississauga. In addition, **Sara Hsiao** (JGI Conservation, Research and Education Coordinator) and **Dario Merlo** (JGI Democratic Republic of Congo's Field Manager) presented lectures to the U of T St. George campus students.

JGI's connection to U of T grows stronger and it looks forward to continuing to strengthen its partnership.

Tara Allman is Manager of Annual Giving and Events and Victoria Foote is Manager of Communications at JGI Canada.

At a special reception in March 2014, students were awarded the Jane Goodall Undergraduate Scholarship. Left to right: recipient Frank Xu, Jane Goodall, recipient Dylan Putzel, and Kim Strong (Director, School of the Environment).



Environment Seminar Series

FOR UPCOMING SCHEDULE AND ABSTRACTS & SPEAKERS' BIOS OF PAST SEMINARS:

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

2013-2014 Environment Seminar Series:

KERRY BOWMAN, Bioethicist, Joint Centre for Bioethics, U of T. *Ethical Considerations for Early Warning Systems in Relation to Climate Change.*

ERIN BRYCE, recent PhD alumna, Dept. of Anthropology & School of the Environment, U of T. *A New Method for Quantifying Inter-diurnal Weather Movement and Its Application to Predicting Daily Mortality.* (See photo on page 10.)

ISAAC DARKO, recent PhD alumnus, Dept. of Humanities, Social Sciences and Social Justice Education, OISE/UT, U of T. *Environment and Health: An Indigenous African Perspective to Creating Healthy People and Healthy Communities.*

DAN DOLDERMAN, Lecturer, Environmental Psychologist, Dept. of Psychology, U of T. *Mainstreaming Environmental Activism: The Next Step for the Environmental Movement?*

MATTHEW HOFFMANN, Associate Professor, Dept. of Political Science, U of T Scarborough; Co-Director, Environmental Governance Lab, Munk School of Global Affairs, U of T. *The Emerging Revolution in the Global Response to Climate Change?*

CHRIS KENNEDY, Professor, Dept. of Civil Engineering, U of T. *Past Performance and Future Needs for Low-Carbon, Climate-Resilient Infrastructure.*

ZEN MARIANI, recent PhD alumnus, Dept. of Physics & School of the Environment, U of T. *Radiation and Trace Gas Measurements in Canada's Harshest Environment.*

DEBORAH MCGREGOR, Associate Professor, Dept. of Geography, U of T. *Anishinabe Knowledge and Water Governance in Ontario.*

BETH SAVAN, Senior Lecturer Emeritus, School of the Environment, U of T. *Accelerating the Adoption of Cycling for Transportation in Toronto: Tools to Get More People onto Bikes.* (See page 3.)

FELIX VOGEL, Researcher, Climate Research Division, Environment Canada; Laboratoire des Sciences du Climat et de l'Environnement, Paris, France. *What Can the Atmosphere Tell Us about Urban Greenhouse Gas Emissions? A Pilot Study in the Greater Toronto Area.*

KALEY WALKER, Associate Professor, Dept. of Physics, U of T. *Looking at the Atmosphere from Space: Getting a Different View from Orbit.*

FRANK WANIA, Professor, Dept. of Physical and Environmental Sciences, U of T Scarborough. *Making Sense of Human Contaminant Monitoring Data with the Help of Mechanistic Models.*

CYNTHIA WHALEY, recent PhD alumna, Dept. of Physics and School of the Environment. *Toronto Regional Air Pollution: Spectroscopic Measurements and Source Attribution.* (See photo on page 7.)

2014-2015 Environment Seminar Series:

Adapting to a Changing Climate: At Home and on the Streets of Our Cities (Panel discussion in collaboration with Evergreen):

DAVID MACLEOD, Senior Environmental Specialist, City of Toronto Environment and Energy Office; **BLAIR FELTMATE**, Associate Professor, University of Waterloo and Chair, Climate Change Adaptation Project Canada; and **DAN SANDINK**, Manager, Resilient Communities and Research, Institute for Catastrophic Loss Reduction.

LAURA BROWN, Assistant Professor, Dept. of Geography, U of T Mississauga. *Lake Ice: monitoring the present and modelling the future.*

GRAHAM CAREY, PhD Candidate, Dept. of Electrical and Computer Engineering and School of the Environment, U of T. *Colloidal Quantum Dot Photovoltaics: Nanoengineering for Enhanced Solar Energy Capture.* (See photo on page 7.)

ARTHUR CHAN, Assistant Professor, Dept. of Chemical Engineering and Applied Chemistry, U of T. *Understanding Organic Aerosols Through Chemical Characterization.*

ELLIE FARAHANI, Head of Operations, UN Intergovernmental Panel on Climate Change (IPCC), Working Group III - Mitigation of Climate Change, Potsdam Institute for Climate Impact Research, Germany. *IPCC Climate Change 2014 - Mitigation of Climate Change.*

ANDREW GREEN, Associate Professor, Faculty of Law, U of T. *Discretion, Judicial Review and Environmental Policy: Does the*

Continued on page 29...

LEFT: At a panel on *Adapting to a Changing Climate*, with Evergreen: **DAVID MACLEOD**, Senior Environmental Specialist, City of Toronto Environment and Energy Office; **BLAIR FELTMATE**, Associate Professor, Program Director Sustainability Practice, University of Waterloo & Chair Climate Change Adaptation Project Canada; and **DAN SANDINK**, Manager of Resilient Communities and Research, Institute for Catastrophic Loss Reduction. **RIGHT:** Professor **KALEY WALKER** (Physics, U of T) presents a seminar on her research on atmospheric trace gases and aerosols.



Federal Court Constrain Decisions under the Canadian Environmental Assessment Act?

PAUL HELM, Senior Research Scientist, Great Lakes, Ontario Ministry of the Environment and Climate Change; Adjunct Professor, School of the Environment. (See page 36.) *Microplastics: They're in a Waterway Near You.*

JACOB HIRSH, Assistant Professor, Institute for Management & Innovation, U of T at Mississauga. *Environmental Sustainability and Personality Psychology*

CATHERINE JIMENEA, PhD Candidate, Dept. of Geography and School of the Environment. *Simulation of a Potential Energy-Efficient Building for Bahrain and Addressing the Barriers to the Implementation of Low-Energy Building Practices.* (See photo on page 10.)

KATE KIRBY, Postdoctoral fellow, Depts. of Ecology and Evolutionary Biology, and Geography, U of T. *Agrobiodiversity, Cultural Diversity, and Globalization: Insights from a Biodiversity Hotspot in Central America.*

IGOR LEHNHERR, Assistant Professor, Dept. of Geography, UT Mississauga. *Global Action, Local Impact: Mercury Contamination in Arctic Ecosystems.*

JOHN ROBINSON, Professor, Institute for Resources, Environment and Sustainability; Associate Provost, Sustainability, University of British Columbia. *Emergent Dialogue, Municipal Climate Response, and Imaginary*



LEFT: Professor JOHN ROBINSON (Inst. for Resources, Environment and Sustainability; Assoc. Provost, Sustainability, University of British Columbia) speaks on climate change innovation and community engagement. **RIGHT: Professor MATTHEW HOFFMAN** (Political Science, UT Scarborough; Co-Director, Environmental Governance Lab, Munk School of Global Affairs) talks about the emerging response to climate change from cities and corporations around the world.



Worlds: Exploring Climate Change Innovation and Engagement Processes at the Community Scale.

Transportation Planning: Case Studies from the Greater Toronto Area.

NAMRATA SHRESTHA, Senior Landscape Ecologist, Toronto & Region Conservation Authority, and Adjunct Professor, School of the Environment. (See page 36.) *Building Resiliency of Urban Ecosystems through*

ANNA STANLEY, Visiting Professor, Dept. of Geography, U of T, and Fellow, Broadbent Institute. *Making Indigenous Communities "Opportunity Ready": Threats to Mining Capital and Resilient Settler Colonialism in Canadian Environmental Governance.*

Environmental Career Day

An annual spring event for university and community college students

BY DAVID POWELL

The School of the Environment is pleased to co-present Environmental Career Day, an annual event open to all registered university and community college students, at U of T and elsewhere. It has been a collaborative effort with the Environmental Students Union (see page 18), the Graduate Environmental Student's Association (see page 22), the Toronto Undergraduate Geography Society (TUGS), and the Forestry Union of Students.

For the last two years, the event was held on March 7, 2014 and March 13, 2015 in Hart House Great Hall, with up to 250 students in attendance. It included a career expo with exhibitors from government, consulting and non-governmental organizations, and professional graduate programs at U of T, who provided students with useful information, career advice and many potential career, job and volunteer opportunities.

The day also included presentations by speakers from various sectors in the environmental field. They discussed and answered questions from students on what they should be doing now and after graduation to prepare for opportunities and possibilities, and on how to stay positive and focused in a difficult job market. Speakers included **Josephine Archbold**, Toronto Public Health, U of T alumna; **Dr. Ray Clement**, EnviroAnalysis; **Angela Bischoff**, Ontario Clean Air Alliance, U of T alumna; **Shirley Chen**, senior undergraduate student; **Nicola Crawhall**, Deputy Director, Great



Lakes & St. Lawrence Cities Initiative; **Linda Varekamp**, Toronto Renewable Energy Co-op, **Glen Matadeen**, School of Career Advancement; and **Kathryn Macdonald**, senior undergraduate student; **Ian Sinclair**, building and energy consultant (see page 40).

Visit <http://careerday.environment.utoronto.ca> or email david.powell@utoronto.ca, David Powell, Undergraduate Student Advisor and Placement Coordinator.

Memorial Lectures



LEFT: Presenting the 2015 Douglas Pimlott Memorial Lecture, GORD MILLER (Environmental Commissioner of Ontario) shares his perspective on current environmental issues and challenges in Ontario. CENTRE: THOMAS HART (Dept. of Philosophy, Ryerson University) speaks about the life and legacy of Bob Hunter at the 2015 Hunter Memorial Lecture. RIGHT: At the 2014 Eric Krause Memorial Lecture, Professor PAMELA ROBINSON (School of Urban Planning, Ryerson University) speaks about the municipal governmental response to climate change in Canada.

FOR UPCOMING SCHEDULE AND ABSTRACTS & SPEAKERS' BIOS OF PAST SEMINARS:

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The following Memorial Lectures were presented in Spring of 2014 and 2015 in conjunction with presentations of student awards and scholarships. For details on awards presented, see pages 16 and 21.

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.
February 12, 2014

GORD PERKS, City Councillor, Ward 14, Parkdale High Park.
Environmental Activism and Policy: From the Front Line

Mr. Perks discussed his environmental activism as City Councillor, in and beyond his ward: protecting and investing in public space, improving transit, expanding the blue and grey box program, and introducing a pesticide by-law that banned the cosmetic use of dangerous chemicals on all outdoor properties.

January 14, 2015

GORD MILLER, Environmental Commissioner of Ontario.
Managing New Challenges: The 2013/2014 Report of the Environmental Commissioner of Ontario

Mr. Miller presented highlights from his 2013-2014 Annual Report, providing his perspective on a range of current environmental issues and some recent government decisions. He reviewed his findings regarding the plight of Ontario's bees, commercial logging in Algonquin Park, air pollution impacts on the Aamjiwnaang First Nation, provincial policies and practices to control industrial pollution, disposal of high-sodium brines as dust suppressants, and the benefits of healthy farm soils.

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.
March 18, 2014

ERICH VOGT, Sessional Lecturer, School of the Environment (see page 39). *Is the Climate Changing for Climate Change?*

Dr. Vogt spoke about the communication of climate science. He explored the special scrutiny by the Prime Minister's Office of climate

and environmental scientists in Canada before their scientific findings are shared with the public. He urged that the country's media be brought up to speed, and that universities exercise their freedom and independence, and cultivate communication skills to impart knowledge and connect with the public.

April 1, 2015

THOMAS E. HART, Lecturer in Philosophy, Ryerson University.

Unalone: The Life and Legacy of Bob Hunter

Ten years after the death of Bob Hunter, many of the issues that captured his mind, body and spirit are still with us. As the co-founder and first president of Greenpeace, his successes as well as his influence in journalism and eco-activism happened because of his passion and drive, dogged determination, and his unique mix of pragmatism and idealism. This lecture, introduced by **Emily Hunter** (Bob's daughter) considered uncomfortable questions and unnerving realities about the complicated relationships between reason and knowledge, rational and political discourse, ideal and action.

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.

April 9, 2014

MARTIN HORAK, Associate Professor, Dept. of Political Science, University of Western Ontario. *Moving Beyond Gridlock: Multilevel Governance and Transit Infrastructure in the Greater Toronto Area*
Dr. Horak spoke about the Greater Toronto Area's dire need of new mass transit infrastructure and offered some recommendations. He argued that despite establishing Metrolinx and committing initial funding, the provincial government has not provided a clear and consistent political vision of the future expansion of GTA transit.

April 15, 2015

PAMELA ROBINSON, Associate Professor, School of Urban Planning, Ryerson University. *Spaces in Between: The Implications of Gaps in Monitoring Municipal Response to Climate Change in Canada.*

This presentation shared results from a national survey of municipal governments in Canada, which revealed climate activities are taking place that common inventories and reporting systems do not capture. The practical and theoretical implications of these not-yet counted mitigation and adaptation efforts were explored and recommendations for future research and practice were shared.

Environment & Health Seminar Series

2013-2014 E&H Series:

LOUISE AUBIN, Manager, Health Hazards & Environmental Health, Peel Public Health. *Assessing Vulnerability to Climate Change: Peel Region.*

JEFF BROOK, Senior Research Scientist, Air Quality Research Division, Environment Canada. *Black Carbon Personal Exposures and Cardiovascular Effects in Beijing, China.*

STEPHANIE GOWER, Research and Policy Specialist, Healthy Public Policy, Toronto Public Health. *Health Evidence in Municipal Decision-Making: Health Impact Assessment of a Proposed Expansion to Billy Bishop Toronto City Centre Airport.*

DERRICK MACFABE, Assistant Professor, Depts. of Psychology & Psychiatry; Director, Kilee Patchell-Evans Autism Research Group, University of Western Ontario. *Bugs, Bowels, Brains and Behaviour: The Role of the Gut Microbiome in Neurodevelopmental/ Neuropsychiatric Disorders.*

KAREN MORRISON, Assistant Professor, Dept. of Population Medicine, Ontario Veterinary

College, University of Guelph. *Watersheds as Settings for Health and Well-being: Ecohealth in Practice.*

MICHELLE MURPHY, Professor, Dept. of History & Women and Gender Studies Institute, U of T. *How Not to Have a Sex Panic: Reframing the Politics of Reproductive Toxins.*

STEPHEN SCHARPER, Associate Professor, Dept. of Anthropology, U of T Mississauga and School of the Environment. (See pages 5 and 34.) *A Tree on Trial: Health and the Urban Canopy, or Saving the Urban Forest One Tree—and Lawsuit—at a Time.*

SARAH WAKEFIELD, Associate Professor, Dept. of Geography, U of T. *Healthy Public Policy through an Environmental Justice Lens: Stories from the Trenches.*

2014-2015 E&H Series:

PETER BERRY, Senior Policy Analyst, Climate Change and Health Office, Health Canada. *Climate Change and Health Vulnerability Assessment Study for the Middlesex-London region.*

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GORD MILLER, Environmental Commissioner of Ontario. *Environment and Health in the 2013/14 Annual Report: Managing New Challenges by the Environmental Commissioner of Ontario.*

STEPHANIE GOWER, Health Research Specialist, Toronto Public Health. *Cumulative Risk Assessment for Health Impacts of Air Pollution in Toronto.*

CAROL MEE, Manager Healthy Public Policy Directorate, Toronto Public Health. *Advancing Active Transportation and Health.*

TARA ZUPANCIC, Director, Habitus Research. *Can Green Space Support Cooler Cleaner, More Equitable Urban Communities? A Report of the David Suzuki Foundation.*

Toronto and the Natural City

David Miller, Olivia Chow and academics discuss the natural city in public forum

BY STEPHEN SCHARPER

Toronto and the Natural City: Facing Our Ecological Future

On March 2, 2015, a standing room only crowd at the George Ignatieff Theatre at the University of Toronto came out to hear a diversified panel of politicians and academics present on the “natural city”.

Organized by **Professor Stephen Scharper** of the School of the Environment and the Dept. of Anthropology U of T Mississauga, the panel included former member of Parliament, **Olivia Chow**; **Professor Roger Kiel** of York University, and **Professor Pamela Robinson** of Ryerson University, as well as Professor Scharper. The event was moderated by former Toronto mayor and World Wildlife Fund Canada CEO and President, **David Miller**. The free, public event was sponsored by the public issues forum initiative of the Centre for Ethics as well as the School of the Environment.

Blending public policy, planning issues, and spiritual and ethical dimensions, the panelists each presented briefly on the top ecological challenges facing the city of Toronto. David Miller then surfaced questions for the panelists to respond to, and then invited questions from the audience.

With issues related to climate change, ravine protection, wildlife migration, and water infrastructure, many in the audience not only expressed deep interest in environmental issues facing Toronto, but also felt inspired by the panel and motivated to explore these issues more deeply. These ideas and motivations were unfurled further after the event at a wine and cheese and finger food reception held at the Centre for Ethics, which all the panelists attended.



A. Jagt

Standing room only crowd at U of T's George Ignatieff Theatre hear panellists discuss “Toronto and the Natural City”. Left to right panellists: Professor STEPHEN SCHARPER (Anthropology UTM and School of the Environment), former member of Parliament OLIVIA CHOW, Professor ROGER KIEL (York University), and Professor PAMELA ROBINSON (Ryerson University). The moderator was DAVID MILLER, former Toronto mayor and World Wildlife Fund Canada CEO & President.

For more information, please contact Stephen Scharper at stephen.scharper@utoronto.ca.

Kate Neville joins the School in July 2015

Assistant Professor researches global politics of energy & water resource development

BY KIMBERLY STRONG

The School of the Environment is pleased to announce that Dr. Kate Neville has been appointed to a tenure-track assistant professorship, starting on July 1, 2015. This is a joint position: 51% in the Dept of Political Science and 49% in the School.

Kate's research interests lie in the geographic, sociological, and historical context of energy and water resource developments in the global political economy. She completed her PhD in Political Science at the University of British Columbia, with a dissertation on the political economy of biofuels, focussing on eastern Africa. She also has a Master's of Environmental Science from Yale University's School of Forestry and Environmental Studies, and a BSc (honours) in Biology from Queen's. Kate was a SSHRC post-doctoral fellow in the Nicholas School of the Environment at Duke University, where she studied unconventional oil and gas developments,



K. Harris

with particular attention to debates over hydraulic fracturing in the Canadian north.

Kate brings a range of disciplinary perspectives to her research, enabling her to engage in discussions on questions of sustainability and governance from

multiple angles. She examines strategies of activism, shifting models of corporate governance, changing relationships between humans and the natural world, and the interactions between claim-makers and power-holders in historically grounded cycles of contention. Her work has attracted interest from policy-makers, practitioners, activists, indigenous communities, and industry. She brings a much-needed scholarly lens and a critical perspective to contentious and polarizing issues.

With her impressive publications and success in interdisciplinary studies, working with both natural and social scientists, Kate will be a great addition to the School!

Email address: kate.neville@utoronto.ca

Recent publication:

Neville, K.J. The Contentious Political Economy of Biofuels *Global Environmental Politics* February 2015, 15(1): 21-40. doi:10.1162/GLEP_a_00270



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.

2014-15 Instructor of JGE 321H

Multicultural Perspectives on Environmental Management (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:

(Also see page 4 for his article "Living with environmental change in W. Amazonia: traditional peoples' vulnerability and adaptation".)

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:

Abizaid, C., O.T. Coomes, Y. Takasaki, and S. Brisson. 2014. Social network analysis and peasant agriculture: cooperative labor as gendered relational networks. The *Professional Geographer* (In press)

Takasaki, Y., O.T. Coomes, C. Abizaid, and S. Brisson. 2014. An efficient nonmarket institution under imperfect markets: labor sharing for tropical forest clearing. *American Journal of Agricultural Economics* 96(3): 711-732.

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.

Karen Ing

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M.Sc. (Zoology), Toronto.
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2014-15 Instructor of ENV/SII 199H
Debating and Understanding Current
Environmental Issues, ENV 200H
Assessing Global Change: Science
and the Environment, and ENV 221H
Multidisciplinary Perspectives on
Environment.

Research Interests:

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

Development of International Opportunities for School of the Environment undergraduate students:

Spent part of 2013-14 sabbatical working
with the **Centre for International
Experience** (<http://cie.utoronto.ca/>)
at the University to seek and develop
international opportunities for the School's
undergraduate students, particularly with

strategic universities to help the School
further strengthen international partnerships.
She visited eight universities to establish
collaborations such as developing new
summer course opportunities, internship/
research opportunities, and more immersive
and directed term abroad opportunities.
(See page 14 for her article.)

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.

Douglas Macdonald

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

2014-15 Instructor of ENV 222H
Interdisciplinary Environmental Studies,
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:

*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 being implemented in leading
European jurisdictions. (Also see page 4 for
his article on this project.)

*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 studied 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 **Recent
Publications** for report details.)

*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. 2013. *Allocating Canadian
Greenhouse Emission Reductions Amongst
Sources and Provinces: Learning from
the EU and Germany*. Available at [http://
www.environment.utoronto.ca/Research/
Publications.aspx](http://www.environment.utoronto.ca/Research/Publications.aspx)

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.



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.

2014-15 Instructor of ENV 1444H Capitalist Nature.

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**, Geography, Penn State U.

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. (**See page 5 for abstract.**)
- 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.

2014-15 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). 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. 2014. Option for the poor and option for the Earth: toward a sustainable solidarity. In G. Gutierrez and D. Groody (eds.) *Option for the Poor: An Interdisciplinary Perspective*. University of Notre Dame Press. Page 97-120.
- 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. (**See page 5 for summary.**)
- Stefanovic, I.L. and S.B. Scharper (eds.) 2012. *The Natural City: Re-Envisioning the Built Environment*. University of Toronto Press. 356 pages.

Kimberly Strong

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

Office: School of the Environment,
Room 1020, 33 Willcocks St., Toronto,
tel: 416-978-6526; fax: 416-978-3884;
director.environment@utoronto.ca;
http://www.environment.utoronto.ca/
http://www.atmosp.physics.utoronto.ca/
people/strong/strong.html
B.Sc. Hons. (Physics), Memorial; D. Phil.
(Atmospheric Physics), Oxford.

Research Interests: Atmospheric remote sounding using ground-based, balloon-borne, and satellite instruments for studies of ozone chemistry, climate, and air quality. Founder of the U of T Atmospheric Observatory; Deputy Principal Investigator (PI) of Probing the Atmosphere of the High Arctic program, 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 we 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 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 running a network of Fourier transform infrared (FTIR) spectrometers for atmospheric measurements over Canada. Measurements of a suite of chemical species are 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, particularly for a suite of reactive nitrogen trace gases.

Recent Publications:

P.E. Sheese, E.J. Lewellyn, R.L. Gattinger, and K. Strong. OH Meinel band nightglow profiles from OSIRIS observations. *J. Geophys. Res. Atmos.*, 119 (19), 11417–11428, 2014.

C. Viatte, K. Strong, et al., Identifying fire plumes in the Arctic with tropospheric FTIR measurements and transport models, *Atmos. Chem. Phys.*, 15, 2227-2246, 2015.

Clare Wiseman

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

Office: School of the Environment, Room 2097, 33 Willcocks St., Toronto, Ontario, M5S 3E8; tel: 416-978-2972; fax: 416-978-3884; clare.wiseman@utoronto.ca;
http://www.environment.utoronto.ca
B.E.S. Hons., Waterloo; M.Nat.Res.Mgmt., Simon Fraser; Dr. phil.nat., Frankfurt. 2014-15 Instructor of ENV 341H Environment and Human 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:

Assessing Metal Solubility in Airborne Particulate Matter as a Proxy for Bio-Accessibility. This research examines the solubility of metals associated with airborne particulate matter fractions of human health concern as a proxy for bioaccessibility, using in vitro techniques with simulated human lung fluids. The overall goal is to identify best practices in using physiologically-based extraction experiments. Current research examines commonly used leaching solutions to determine metal solubility and their suitability to

assess bioaccessibility in the human lung.

Urban Gardening & Airborne Particulate Matter: Exploring the Fate of Traffic-Related Emissions and the Effectiveness of Risk Reduction Measures. This 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. From 2010 to 2013, different plant species were cultivated at several soil remediated locations in Toronto, with variable traffic densities to assess the soil accumulation of metal emissions over time, their uptake by plants and potential health risks of consumption.

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 in automotive exhaust and their environmental fate and bioaccessibility. Current collaborative research examines the role of common environmental complexing agents in the transformation of PGE into more toxic species and the application of simulated biological fluids to assess PGE bioaccessibility in the human lung. In addition, PGE concentrations in Toronto soil and road dust samples are the present focus of a co-supervised graduate thesis.



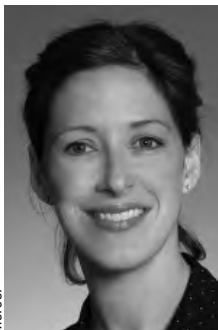
Recent Publications:

Zereini, F and C.L.S. Wiseman (Eds.) 2015. *Platinum Metals in the Environment*. Springer, Berlin. 492 pages.

Wiseman C.L.S., and F. Zereini. 2014. Characterizing metal(loid) solubility in airborne PM10, PM2.5 and PM1 in Frankfurt, Germany using simulated lung fluids. *Atmospheric Environment* 89: 282-289.
Wiseman C.L.S., F. Zereini and W. Püttmann. 2014. Metal translocation patterns in *Solanum melongena* grown in close proximity to traffic. *Environmental Science and Pollution Research* 21: 1572-1581.

PROFILES: ADJUNCT PROFESSORS

ADJUNCT PROFESSORS



Mercer

Jane Ambachtsheer

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. She is Co-Instructor (Sessional Lecturer) of

the School of the Environment's graduate course ENV1707H Environmental Finance and Sustainable Investing.



S. McGeachie

Susan McGeachie

Ms. McGeachie is the Central Canada Leader of Climate Change and Sustainability Services at EY. She advises companies on managing risks associated with environmental, social and governance issues, as well as developing appropriate governance and management models. She is a member and former chair of the School of the Environment's Environmental Finance Advisory Committee (page 25) and is Co-Instructor (Sessional Lecturer) of the graduate course ENV1707H

Environmental Finance and Sustainable Investing.



Brad Bass

Dr. Bass is a researcher and member of 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. He is Instructor (Sessional Lecturer) of the School of the Environment's undergraduate course ENV 299Y Research Opportunity Program.

undergraduate course



P. Muldoon

Paul Muldoon

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. He is also Instructor (Sessional Lecturer) of the School of the Environment's

graduate and undergraduate course ENV1701H / ENV422H Environmental Law.



S. Bhavsar

Satyendra Bhavsar

Dr. Bhavsar is a Research Scientist in the Environmental Monitoring & Reporting Branch at the Ontario Ministry of the Environment. His research interests include environmental behaviour of contaminants, monitoring, fate and transport in multimedia environment, exposure and risk assessment, mathematical modelling, and identification and understanding of contaminant patterns. He is currently monitoring the long-term temporal trends of fish mercury levels in fish

in the Great Lakes and St. Lawrence River Areas of Concern in a School of the Environment research project (see page 6).



Namrata Shrestha

Dr. Shrestha is a Landscape Ecologist, Research & Development at the Toronto and Region Conservation Authority (TRCA). She holds a Ph.D. in Geography with expertise in landscape and urban ecology, and conservation planning. Her appointment at the School offers an opportunity for research collaboration with TRCA in the area of integrating science into policy and practice, especially in urban ecosystems management. She is currently working with a post-doctoral

fellow in the Department of Ecology and Evolutionary Biology on a joint project on road and ecology in urban landscapes.



Paul Helm

Dr. Helm is a Senior Research Scientist at the Ontario Ministry of the Environment in the Great Lakes Water Monitoring Section of the Environmental Monitoring & Reporting Branch. He researches the fate and transport of organic contaminants in aquatic and urban environments, environmental chemistry of legacy and emerging persistent and bioaccumulative organic pollutants, and passive sampling approaches to monitor hydrophobic and polar chemicals, and

analyses of chemicals in environmental matrices. He is also an Associate member of the School's graduate faculty.



Bennett Jones LLP

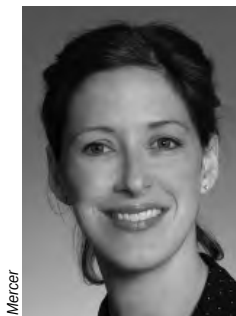
Gray Taylor

Mr. Taylor is the School's **inaugural Distinguished Visiting Fellow in Environment**. He practices business law including climate change and emission trading, environmental and sustainability law at Gray Taylor Law after decades of Bay Street practice in the same areas. He has been making a significant contribution to the School through his membership in its Environmental Finance Advisory Committee and served as the Committee's external

Co-Chair over the past year, playing a major role in planning events and raising funds for new scholarships. (see pages 16 & 25).

PROFILES: OTHER INSTRUCTORS & SESSIONAL LECTURERS

2014-15 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.



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 former chair of the School of the Environment's Environmental Finance Advisory Committee (*see page 25*).



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.



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.



Ayaz Hyder

Research Associate,
Dalla Lalla School of Public Health, U of T
ENV 4001H Environment and Health Seminars
Dr. Hyder is a computational epidemiologist with an interest in children's environmental health, infectious diseases, cancer, and health services research. His current projects include microsimulation models of esophageal cancer, residential mobility patterns in pregnant women, and complex predictive models integrating risk factors for development of childhood asthma.



C. Ollson

Christopher Ollson

Sessional Lecturer
ENV 1704H Environmental Risk Analysis and Management
Dr. Ollson is VP Strategic Development with Intrinsic 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.



C. Jia

Charles Jia

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



B. Raboy

Becky Raboy

Assistant Professor, Department of Ecology and Evolutionary Biology, U of T
ENV 1001H Environmental Decision Making
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.



Virginia Maclaren

Assoc. Prof./Chair, Dept. of Geography, U of T
JGE 1413H Workshop in Environmental Assessment
Dr. Maclaren is also Graduate Chair for the tricampus Geography and Planning programs. Her current research focus is on waste management. Most of her research in the past few years has been in Southeast Asia, but she is now working on three research projects in Canada: NIMBYism and landfills, extended producer responsibility and Waste-to-Energy (WTE) conflicts and technologies.



www.sustainability.utoronto.ca

Beth Savan

Senior Lecturer Emeritus, School of the Environment, University of Toronto
JGE 1413H Workshop in Environmental Assessment
Dr. Savan's focus is on sustainability programs and planning, financial instruments to advance resource conservation, changing behaviour to conserve resources, community based research, environmental education, community based social marketing and environmental assessment. She was the inaugural Sustainability Director at the University of Toronto. (*Also see page 3.*)

2014-15 UNDERGRADUATE INSTRUCTORS/SESSIONALS



C. Avendano

Carlos Avendano

Sessional Lecturer

JEE 337H Human Interactions with the Environment

Dr. Avendano is an Associate Professor, School of Biology, San Carlos University, Guatemala. His research interests integrate earth sciences, landscape ecology and rural development. He has developed research projects with Mayan Villages in the tropical lowlands and cloud forest highlands of Guatemala. He is developing a research laboratory in Guatemala by bringing together a group of international collaborators.



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.



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.es.utoronto.ca

Bridget Bergquist

Assistant Prof., Dept. of Earth Sciences, U of T
ENV 233H Earth Systems Chemistry

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.



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.



A. Drake

Andrew Drake

Post-Doctoral Fellow, Dept. of Biological Sciences, U of T Scarborough

ENV 316H Lab & Field Methods in Environmental Science

Dr. Drake's research involves quantifying human-mediated change in aquatic ecosystems, drawing on principles from landscape ecology, ecological risk assessment, and natural resource management. Current projects involve agent-based approaches to understand species invasions and simulation modeling to explore harvest dynamics in mixed-stock fisheries.



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.



www.es.utoronto.ca

Sarah Finkelstein

Associate Prof., Dept. of Earth Sciences, U of T
ENV 316H Lab & Field Methods in Environmental Science

Dr. Finkelstein and her group study paleoclimates and the drivers of long-term ecological change by analysing lake and wetland sediment records. Projects span Arctic to tropical biomes, and time periods from Pleistocene interglacials to recent times. Paleoenvironmental records are critical to understanding and responding to anthropogenic environmental change, and to predicting future impacts.



www.chem.utoronto.ca

Jennifer Murphy

Associate Professor, Dept. of Chemistry, U of T
ENV 316H Lab & Field Methods in Environmental Science

Dr. Murphy's research group applies state-of-the-science analytical techniques to address issues including urban air quality, climate change, acid precipitation, and ecosystem function. Their focus is on field measurements, particularly of reactive nitrogen compounds, that can be used to evaluate our understanding of the rates and mechanisms of chemical transformations in the environment.



J. Nugent

James Nugent

Ph.D. candidate, Dept. of Geography, U of T
JGE 331H Resource & Environmental Theory

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.



A. Stanley

Anna Stanley

Sessional Lecturer

ENV 223H Fundamental Environmental Skills

Dr. Stanley is Visiting Professor in the Department of Geography and Program in Planning at U of T. Her research focuses on the cultural politics of environment and on connections between colonialism and the political economy of contemporary resource extraction in Canada. She has worked with a variety of Indigenous organizations and communities on a number of policy issues.



D. Pond

David Pond

Sessional Lecturer

ENV 320H National Environmental Policy

ENV 221H 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).



K. Stewart

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.



R. Rice

Roberta Rice

Sessional Lecturer

ENV 451H Current Environmental Topics

Dr. Rice's research focus is Indigenous politics. She currently holds a standard research grant with the Social Sciences and Humanities Research Council of Canada for a comparative project on Indigenous rights and representation in Canada and Latin America. Her cases include the Yukon and Nunavut in Canada and Ecuador and Bolivia in Latin America. She has published extensively on the topic.



A. Tevlin

Alex Tevlin

PhD candidate, Dept. of Chemistry, U of T

ENV 233H Earth Systems Chemistry

Ms. Tevlin's research focuses on processes governing the fate and impacts of ammonia in the atmosphere. She uses field measurements and analysis of long-term datasets to investigate trends in the surface-atmosphere and gas-particle partitioning of atmospheric ammonia, in order to better understand the influence of ammonia on inorganic particulate matter formation, aerosol neutralisation, and nitrogen deposition.



C. Richter

Christoph Richter

Lecturer, Dept. of Biology, U of T Mississauga

ENV 395Y Special Topics Field Course. Ecology and Conservation in the Andes, Western Amazonia & Galápagos

Dr. Richter has taught courses on ecology, animal behaviour, vertebrate biology, marine mammalogy, biological diversity, and statistics. He earned a MSc from Memorial University of Newfoundland and a PhD from Otago University, New Zealand, studying human impacts on cetaceans. He is co-author of a new ecology textbook.



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.



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. (Also see page 40.)



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.

2014-15 UNDERGRADUATE INSTRUCTORS/SESSIONALS



S. Wadgyamar

Susana Wadgyamar

PhD Candidate, Dept. of Ecology and Evolutionary Biology, U of T
ENV 234H Environmental Biology

Ms. Wadgyamar's research examines the circumstances under which a plant's responses to climate change may be beneficial or adaptive, and how this might ultimately influence the evolution of life history traits. For example, evaluating responses within differing communities, and under specific combinations of abiotic and biotic conditions.



R. Cunha

Kaley Walker

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

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.



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.



A. Schroeder

Aaron Schroeder

Distance Education Instructor
Climate Change Policy and Practice Certificate Program

Mr. Schroeder is a Principal with ICF International in ICF's Canadian Air & Climate practice. He manages a team of professionals who work with local, provincial and federal governments, industry and private companies through the development and implementation of air and climate regulations and voluntary initiatives. He is an established expert in greenhouse gas quantification and verification.

2014-15 DISTANCE EDUCATION INSTRUCTORS



O. Bussler

Oliver Bussler

Distance Education Instructor
Climate Change Policy and Practice Certificate Program
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.



D. Sider

David Sider

Distance Education Instructor
Environmental Management Certificate Program and Water Resource Management Certificate Program

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. *(Also see page 39.)*



G. Gienko

Gennady Gienko

Distance Education Instructor
GIS for Environmental Management Certificate Program

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.



I. Sinclair

Ian Sinclair

Distance Education Instructor
Renewable Energy Certificate Program

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, and engineering. He also instructs the School's In-Class Certificate Programs in Water Auditing and Implementing Energy Management Systems *(see page 24).*



M. Govorov

Michael Govorov

Distance Education Instructor
GIS for Environmental Management Certificate Program

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.



L. Sportza

Lucy Sportza

Distance Education Instructor
Environmental Management, Renewable Energy, and Water Resource Management Certificate Programs

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 of Arctic and Equatorial environments:

TOP: View near the Polar Environment Atmospheric Research Laboratory (PEARL) in Eureka, Nunavut, where Kimberly Strong (Director, School of the Environment) and her graduate students and co-researchers do Arctic atmospheric research. (credit: Paul Loewen)

BOTTOM: Herd of vicunas on Mount Chimbarazo in Ecuador during the summer field course ENV 395Y Ecology and Conservation in the Andes, Western Amazonia and the Galapagos (credit: Katherine Baird)