School of the Environment
UNIVERSITY OF TORONTO

2016-17 ANNUAL REPORT

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2016-17 Annual Report Contents

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Director's Message

Professor Kimberly Strong, Director, School of the Environment

The School of the Environment continued to flourish during the 2016-17 academic year, as you can see from the many accomplishments highlighted in this year's annual report. One major undertaking was the start of a cyclical review of the School's undergraduate programs under the University's Quality Assurance Process. This involves the preparation of a detailed self-study report, including consultations with the School's students, faculty, and staff that began in spring 2017. One outcome of these consultations was the articulation of the School's aspirations, resulting in these guiding statements:

- ***The vision*** *for the School of the Environment is to foster positive change for a sustainable future through transdisciplinary research, teaching, and collaboration.*
- ***The mission*** *of the School of the Environment is to serve as an interdisciplinary hub for education and scholarship on the environment and sustainability, creating new knowledge, training future leaders, engaging and forging partnerships with the wider community, and contributing to positive environmental and social change from the local to the global scale.*

As you peruse this report, I hope that you will see much evidence of these aspirations being put into practice.

We were delighted to welcome two new colleagues this year, further expanding our teaching and research capabilities. **Tanhum Yoreh** joined us as an Assistant Professor in a three-year appointment in the School, bringing expertise in religious-based environmental concepts and their modern application to behavior, including human consumption patterns. **Hui Peng** is a cross-appointment with the Department of Chemistry and is a toxicological chemist who uses a variety of novel chemical methods to study bioactive environmental chemicals and to profile their toxic pathways. Looking ahead, we are excited to be recruiting for three additional cross-appointments, with the Department of Political Science, the Department of Computer Science, and the Daniels Faculty of Architecture, Landscape, and Design.

In fall 2017, we hired two new staff, splitting one former position into two, to better meet the School's growing needs. **Stella Kyriakakis** is the new Assistant to the Director and **Kiran Champatsingh** has taken on the new position of Communications Officer. Both bring considerable experience to their roles and are terrific hires for the School.

Although strictly happening in the 2017-18 academic year, I would like to note that **Sarah Finkelstein** stepped down from her role as Academic Associate Director at the end of November, and was replaced by **Karen Ing**, who has kindly agreed to serve in an interim capacity until June 2018. It has been a very great pleasure working with Sarah over the last two years and I thank her for her many valuable contributions to the academic mission of the School. One other transition is the retirement of **Doug Macdonald**, who is profiled on page 6. Doug has been a mainstay of the School and its predecessors, including the Centre for Environment and the Innis College Environmental Studies Program, since 1988. We all wish Doug the very best in this next phase of his life.

The School is fortunate to have a significant number of scholarships for our students. Over the last several years, the **Skip Willis**, **Rodney White**, **Beatrice and Arthur Minden**, and **Alan Weatherley** scholarships have been endowed, and we are grateful to their families and friends for establishing these awards. We were thrilled to receive two new endowments this year that have enabled the establishment of additional scholarships. One is the **Marjorie Gillespie Bolton and Mabel Gillespie Norris Memorial Scholarship**, resulting from a donation by **Kevin (Vin) Bolton** in memory of his mother and aunt. This is to be awarded annually to a graduate student whose academic focus is in the area of sustainability, environmental justice, biodiversity, and/or conservation. The other new award is actually three: the **Barbara Green Scholarships in Environmental Entrepreneurship**, resulting from a very generous endowment by **David Scrymgeour**, **Sandra Beaumont**, and **Steven Scrymgeour** in memory of their mother. These were created to encourage the recruitment of outstanding Canadian students who have an entrepreneurial spirit, a commitment to contributing to the vitality of their local communities, and an interest in future environmental stewardship. They will be awarded to undergraduate students at the beginning of their second year, and are intended to cover approximately 50% of their tuition over three years. I thank Vin, David, Sandra, and Steven for their vision and generosity in establishing these scholarships at the School.

In October 2016, we were pleased to host the second **Beatrice and Arthur Minden Symposium on the Environment**, with additional support from the Toronto Atmospheric Fund. The topic was "FutureTalks Design Workshop: Best Practices in Citizen Engagement for a Sustainable Future". The goal was to explore the potential for creating a large-scale community engagement program connected to TransformTO, Toronto's new climate change plan, and the results fed into the development of new partnerships and a proposal for a SSHRC Partnership Development Grant.

The School's undergraduate programs continue to thrive, with about 800 students enrolled in our majors, minors, and collaborative programs, and more than 3,000 students taking our courses. On the graduate front, our **Collaborative Specializations in Environmental Studies and Environment and Health** are also doing well, with 151 students from more than 25 units enrolled in 2016-17. Our students are active on numerous fronts, as you can see from many articles in this report.

Our Professional Development Program continues to offer high-quality in-class and distance courses, while the **School's Environmental Finance Advisory Committee** recruited five new members and had another active year, organizing several highly successful events, including the fourth annual **Willis & White Thought Leadership Event** with keynote speaker **The Honourable Glen Murray** (Ontario Minister of Environment & Climate Change).

All of the activities featured in this report are the result of the hard work and dedication of many people, including our faculty, staff, sessional lecturers, students, invited speakers, alumni, donors, and those with more informal connections. Thank-you to everyone who has supported the School over the past year.

The Barbara Green Scholarships in Environmental Entrepreneurship

David Scrymgeour (left) and Barbara Green

The School of the Environment is delighted to announce three new undergraduate scholarships: **The Barbara Green Scholarship in Environmental Entrepreneurship - I, II and III**. These scholarships have been established through a generous donation by **David Scrymgeour**, **Sandra Beaumont**, and **Steven Scrymgeour** in honour of their mother, **Barbara Green**, for whom the award was named.

Ms. Green was a "small-footprint enthusiast" who made a conscious effort to leave as little human impact on the natural environment as possible by subscribing to a conservationist ecological ethos, "decades before it became fashionable." That's how benefactor David Scrymgeour describes his mother. Ms. Green was "well-read, adventurous, smart, and savvy - a true pioneer at heart. She enjoyed First Nations folklore, was a proud Canadian, would have loved the idea of a School of the Environment, and would have been delighted with these awards," added daughter Sandra Beaumont.

For Ms. Green and her family, sustainability was a way of life. In an age of consumerism, Green was a committed 'non-consumer'; possessions were always well maintained rather than replaced. She was ahead of the 'shop local' movement. She grew organic vegetables, baked her own bread, cooked from scratch and practiced composting. An avid walker and transit user, her conservative approach to energy use extended to all areas of her life. She used water and energy scrupulously, hung laundry out to dry, and enjoyed sewing, knitting and mending her own clothes.

The organic, economical approach to living exemplified by Ms. Green is a model for us all. It is fitting that the three scholarships named in her honour were created to encourage the recruitment of outstanding students who have exhibited entrepreneurial potential as well as deep interest in environmental stewardship.

As an organizational advisor and entrepreneur, Mr. Scrymgeour sets an example of how an economic plan rooted in sound principles can benefit the environment. He invests his time and energy in philanthropic projects, partnering with business, not-for-profit, political, community and sustainable development organizations. He is the founder and owner of an information management company and has contributed greatly to innovation in the records-management industry. He is also the founder of two skills-training businesses and the majority shareholder of Green Standards Ltd., a company that provides innovative, environmentally progressive solutions to corporate waste through repurposing unwanted office equipment. He has served as an advisor, donor, and board member for many organizations.

Mr. Scrymgeour's relationship with U of T goes back to his days as a student here. He is a graduate of the Commerce and Finance (B.Com. '79) program and now an Executive-in-Residence at the Rotman School of Management. In winter 2016, senior students at the School of the Environment had the opportunity to be mentored by Mr. Scrymgeour through the Capstone Learning Community's 'Using Science for Change' program, offered as part of the Faculty of Arts & Science STEP Forward initiative. This 12-week course brought together students from five units across the Physical and Mathematical Sciences, and gave them an opportunity to explore the application of their scientific training to solve problems outside the traditional science setting and in a real-world start-up environment under Mr. Scrymgeour's framework of organizational change.

The Barbara Green Scholarships in Environmental Entrepreneurship were created to support students with entrepreneurial potential and a focus on the study of the environment. The scholarships will be awarded annually to outstanding Canadian students who have an interest in studying the disciplines associated with the School of the Environment, an entrepreneurial spirit, a commitment to contributing to the vitality of their local communities, as demonstrated through their participation in sports, culture or other extracurricular activities, and an interest in future environmental stewardship.

Full-time undergraduate students may apply for the scholarships at the beginning of their second year, and the awards are renewable on the basis of continued full-time registration at the School of the Environment and a minimum annual GPA of 3.0. Each scholarship is ultimately intended to cover approximately 50 per cent of three years' tuition, with a weighting of 25 per cent in Year Two, 35 per cent in Year Three, and 40 per cent in Year Four.

The first Barbara Green Scholarship will be awarded in 2017-2018, and the second and third will be introduced in 2018-2019.

The Marjorie Gillespie Bolton and Mabel Gillespie Norris Memorial Scholarship

The Marjorie Gillespie Bolton and Mabel Gillespie Norris Memorial Scholarship is a new graduate scholarship established through the generosity of the Estate of Marjorie Bolton.

Born in 1906, **Jennie Mabel Bernice Gillespie** was a small town girl with great ambition. She joined the work force early and spent more than 45 years doing administrative work for the American Optical Company Canada Limited, in her home town of Belleville, Ontario. Self-sufficient and free spirited, Mabel had a lifetime rich with projects and exploration. Being financially independent and a prudent businesswoman afforded her a small nest-egg. Mabel was a lifetime member of The Order of the Eastern Star. She enjoyed playing cards and had a passion for animals. She spent countless hours tirelessly working in the garden.

Marjorie Bolton was born with her Aunt Mabel's independence and will. Also born in Belleville, Marjorie was an accomplished seamstress. Leaving school to help support her family, she worked for local manufacturers in her early years, her experience extending from shirts to shoes. She enjoyed camping, square dancing, bowling, curling, and card playing. Aware of what was going on in the world, Marjorie turned to letter writing as she became increasingly determined to make a difference in causes with which she identified, including animal welfare, conservation of habitats, and ecological concerns. The Prime Minister of Canada, several federal Ministers, a Premier, a Senator, multinational corporations, and animal welfare organizations were among the recipients of her letters.

According to Marjorie's son, **Kevin (Vin) Bolton**, Marjorie and Mabel enjoyed spending time together at the cottage and shared a love of the outdoors, gardening, animals, and the natural environment. Mr. Bolton described education as something that was paramount for both. Careful stewardship of both estates was critical in considering how best to acknowledge the lives of these two strong women. This award is thus designed to be a permanent acknowledgement of Marjorie and Mabel's care and compassion, their quest for change, and their passionate commitment to the environment. It is intended to support, in perpetuity, the education of those next entrusted with the care of our Earth, its ecosystems, and all of its inhabitants, and to empower them to make a difference.

The Marjorie Gillespie Bolton and Mabel Gillespie Norris Memorial Scholarship will be awarded annually to a graduate student at the University of Toronto with demonstrated financial need. The academic focus of the student will be in the area of sustainability, environmental justice, biodiversity, and/or conservation. Preference will be given to a student enrolled in the School of the Environment's graduate programs. The first scholarship will be awarded in spring 2018.

Jennie Mabel Bernice Gillespie

Marjorie Erma Gillespie Bolton

The School of the Environment Promotes Discussion on Citizen Engagement for a Sustainable Future at the Second Beatrice and Arthur Minden Symposium on the Environment

Jo-Ann Minden (left) and the School of Environment Director Kimberly Strong

The second **Beatrice and Arthur Minden Symposium on the Environment**, held on October 12 and 13, 2016, brought together 29 representatives from Toronto's community groups for two days of discussion at the **FutureTalks Design Workshop: Best Practices in Citizen Engagement for a Sustainable Future**. Community experts were invited to contribute to the planning of a large-scale program designed to actively engage Toronto residents in creating a sustainable future.

Invited speakers **Dave Biggs**, CEO,MetroQuest; **James Goldstein**, Senior Fellow the Tellus Institute in Boston; **Dr. Arnim Wiek**, Senior Sustainabilty Scientist and Associate Professor, Arizona State University; **Dr. Patrizia Nanz**, Scientific Director, the Institute for Advanced Sustainability Studies in Potsdam; and **Sylvia Cheuy**, Director, Deepening Community, Tamarack Institute, provided their perspectives.

The goal of the event was to come up with the best ways to engage 100,000 to 200,000 Torontonians to take part in a much more elaborate process - to construct a workable vision of a low-carbon future for the City to work toward; one that reflects the values and diversity of the people who live in it.

Led by Professor **John Robinson**, the Symposium explored the potential for creating a large-scale community engagement program - FutureTalks - including possible partnerships with the City of Toronto and the Toronto Atmospheric Fund, connected to the development of TransformTO, Toronto's new climate change plan. The results of the Symposium fed into the development of a proposal for the Social Sciences and Humanities Research Council of Canada's Partnership Development Grant program.

"The idea is that if we're going to make good policy about climate change or sustainability, we should first listen to what people tell us about what they want for the city and especially what kinds of trade-offs they'd be willing to accept and not accept," says Professor John Robinson of the Faculty of Arts & Science. An expert in sustainability, Robinson teaches at U of T's Munk School of Global Affairs and the School of the Environment.

Facilitator **Steve Williams**, a visiting PhD candidate from the University of British Columbia, says FutureTalks will likely have to engage different groups in different ways – from in-person sessions to interactive online tools. "There are really interesting research questions that might come up around how to deal with these different engagement tools and techniques," says Williams, who is part of the FutureTalks team.

Mary Pickering is one of the symposium organizers and vice-president of programs and partnerships at the Toronto Atmospheric Fund, a city-backed agency that invests in initiatives that tackle climate change. "I feel that we have a huge untapped resource in our community and the engagement process can not only allow us to better understand different perspectives, but it can help us mobilize resources that we haven't had access to before," says Pickering.

Instead of the gloomy rhetoric around climate change, Robinson says, with the help of Toronto residents and politicians alike, we have the potential to change the City's course.

The Beatrice and Arthur Minden Symposium on the Environment, made possible by the generous support of the Beatrice and Arthur Minden Foundation, is an annual event intended to 'make a difference' by enabling scholarly and public discussion and debate on environmental issues of the day. This year's Symposium was also supported by the Toronto Atmospheric Fund, which invests in urban solutions to reduce greenhouse gas emissions and air pollution, with the goal of reducing Toronto's greenhouse gas (GHG) emissions by 80% by 2050.

Facilitator Steve Williams leads a discussion

"Society is asking universities to engage with the big problems," says Professor John Robinson. "Sustainability is one of the ways it can be done." (Photo by: Geoff Vendeville)

Meeting the Challenge: Climate Change and Sustainability at U of T

The University of Toronto's first **presidential adviser on the environment, climate change and sustainability** says he and members of the new committee he heads are determined to create more opportunities for all parts of the university – faculty, students and staff – to collaborate on sustainable practices.

"Quite concrete things are happening. Quite ambitious things are happening," said **John Robinson**, a professor at U of T's Munk School of Global Affairs and the School of the Environment in the Faculty of Arts & Science. "There is a ton of work taking place in research, in teaching and in operations – but generally people aren't aware of each other."

Making those connections is one of the first priorities for Robinson and the newly created committee, which includes faculty and staff members, as well as students and an alumnus. A change in institutional culture will be required to integrate the operational and academic activities, Robinson said, but doing so is essential for U of T's campuses to become test beds for research and innovation in this area.

Plans for how that change might happen are outlined in the first annual report from the **Committee on the Environment, Climate Change and Sustainability**. The committee, along with Robinson's advisory position, follow from **President Meric Gertler**'s "Beyond Divestment: Taking Decisive Action on Climate Change" report.

The committee began meeting in February 2017 and uses its first report to lay out its three areas of focus and the definition of sustainability that will guide its work. "As the country's top research university, it's important that U of T show leadership on these vital issues, in our core academic mission and in our operations," President Gertler said. "The committee members are taking great strides to enhance our contributions, building on the great work that is already happening across our three campuses."

A core theme in the new report is the need for all parts of the university to work together. "In most universities, sustainability goes on operationally through energy efficiency programs and academically in research and teaching. The two worlds never connect," Robinson explained. "If you can create an integrated approach, it is amazing what can happen."Robinson said he witnessed this first-hand when he led a similar initiative at UBC, and noted universities in the U.K. are adopting a similar approach.

Even so, he said transforming U of T's campuses is just the first step. Involving community partners also is essential so that the lessons learned can be applied elsewhere. "Society is asking universities to engage with the big problems, and we want to do that. Sustainability is one of the ways it can be done," he said.

Since the Committee on Environment, Climate Change and Sustainability first met, its members have begun work in three areas: the campus as a living lab, the university as an agent of change, and curriculum innovation. Its members have compiled a preliminary inventory of 614 existing courses that contain sustainability content and, among those, a subset that also includes an opportunity for community-based learning.

They also have identified possible new living lab projects and potential partners from the public and private sector that could be involved in the projects.

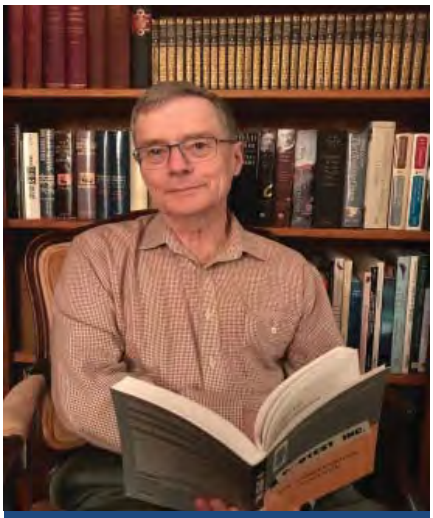
The committee is taking a broad approach in its work, defining sustainability as encompassing both human and environmental well-being. It plans to emphasize "regenerative sustainability," which looks for ways to reduce damage or harm, and, when possible, to improve both the environment and human well-being.

Such an approach, Robinson said, might include buildings being designed to improve productivity and help the environment, as opposed to just not doing damage. Among the committee's many ambitious goals is its aim to offer students in every discipline an opportunity to add sustainability to their programs, and to have thousands of students involved in sustainability projects on and off campus.

"This is a huge opportunity for U of T to show leadership and to engage in a very visible and active way in all three domains – teaching, research and innovation – and in partnership with the private sector, the public sector and civil society," Robinson said.

Article courtesy of U of T News

Douglas Macdonald: Immense Contributions to the School of the Environment and Interdisciplinary Environmental Studies



Professor Douglas Macdonald

Professor Douglas Macdonald, instrumental in shaping the interdisciplinary curriculum at the School of the Environment, retired in July 2017 after a 30-year contribution to the University of Toronto and the scholarly fields of environmental policy analysis and environmental studies. At the point of retirement, he prepared a short document for his colleagues titled: **Why we need interdisciplinary environmental studies: fond remarks to friends and colleagues at the School of the Environment, University of Toronto**. The document is available on Doug's webpage on the School of the Environment site. In the document, he discussed the central challenge of the School today and its preceding incarnations that he has been addressing for many years – creation of an intellectually coherent body of thought and practice, including teaching and research. Referring to that which unites all of us in the School of Environment, across widely varying areas of disciplinary expertise, he said: "We need to remember that no matter how widely varying our fields of expertise, we have one thing in common – our love of nature and our profound belief more must be done to protect it."

Macdonald graduated from U of T with a master's degree in Canadian history in the early 1970s and then, after time spent working in municipal government and as executive director of the Canadian Institute for Environmental Law and Policy, began his teaching career here in 1988, when as a sessional lecturer he taught a course on environmental politics in what was then the Innis College Environmental Studies Program. After becoming the director of that program in 2001, he worked with **Ingrid Stefanovic**, director of the Division of the Environment and **Rodney White**, director of the Institute of Environmental Studies, to chaperon the transition of those three programs into the Centre for Environment, which opened its doors on July 1, 2005 and then eventually became the current School of the Environment.

Known for his collegiality with faculty and staff, Macdonald, a dedicated teacher, expressed passion for his course material combined with insightful knowledge, both of which were much appreciated by his students. More recently, he encouraged students to take their classroom learning into the real world of environmental politics through informed activism by providing guidance to the **University of Toronto Environmental Action (UTEA)**. The club's activity was focused on the slogan "climate justice for youth" intended to highlight the gross inequity whereby today's generation of decision-makers, by refusal to take effective action, is passing on enormous future adaptation and mitigation costs to today's children and young people.

Outside of the classroom Macdonald personified what is best in the field of interdisciplinary environmental studies, which seeks knowledge as a basis for action, through his rigorous scholarship and his insistence on making a difference in the world through policy contributions. In terms of the latter, Macdonald served in 2000 - 2002 on the **Research Advisory Panel of the Walkerton Inquiry** and served as a board member of ENGOs such as **Environmental Defence** and the **Toronto Environmental Alliance**. His 2007 book **Business and Environmental Politics in Canada** received the **Canadian Political Science Association's Donald Smiley award** as "the best book published in English or French in the field relating to the study of government and politics in Canada in 2007."

His long-time colleague, Professor **Beth Savan** praised his contributions in this way: "his moral rigour in particular, both as applied to his research and the writing he has based on that, and also in his teaching and advocacy efforts, is a continuing inspiration for me as I'm sure it is for his students - his advice is always thoughtful, fair and considers first principles, not just the tactics and media impact - Doug reminds us always of what matters most!"

Post-retirement, Macdonald is working hard to complete a book based on his research done over the past decade, with the working title: **Carbon province, hydro province: The challenge of Canadian energy and climate federalism**. He spends time at his rustic cottage in King Township – a place he has been visiting since he was six years old. "For the past 15 years I have been going there mostly by myself," says Macdonald, explaining that his beloved wife Lorraine Wai Chun Cheng is a Hong Kong city-girl, who prefers to spend her time in a house with electricity and running water.

"I spend my time in the cabin, reading and looking out over the lake, and outdoors cutting wood, mowing lawns, cutting back brush, digging out the beaver dam, but mostly just wandering over the property, binoculars in hand. There is always something to see." He cherishes the feeling of being surrounded by the natural surroundings, "Out on the lake in the evening, fish are rising to feed, creating circles all over the calm water, while swallows are swooping and swirling, feeding on insects, providing their contribution to the vibrant sense of life, death and beauty."

David Powell, who has known Macdonald for 35 years, speaks to his contribution. "Throughout his career Doug has demonstrated the highest standard of integrity," says Powell. "His contributions are and will be greatly missed by all of us, but he has left a legacy and a standard for all of us to live up to."

The School's Director, **Kimberly Strong**, says "It has been an honour to work closely with Doug over the last few years, particularly while he served as the School's Academic Associate Director. I enjoyed our weekly meetings, learned much from his perspectives on many topics, and appreciated the dedicated and thoughtful approach that he takes to every task. I know we all wish Doug the very best in this next phase of his life. Happy retirement Doug!"

Dr. Tanhum Yoreh

Tanhum Yoreh
Assistant Professor, School of the Environment

Dr. Tanhum Yoreh joined the School of the Environment on January 1, 2017 as an Assistant Professor in a three-year 75% FTE appointment. "Tanhum is a wonderful addition to the School, expanding our expertise in the humanities," says School Director **Kimberly Strong**.

Dr. Yoreh studies the intellectual history of religious-based environmental concepts and their modern application to human behaviour. He obtained his PhD in Humanities from York University in 2014. His dissertation focused on Religion and Environment, investigating the intellectual history of the Jewish prohibition against wastefulness. He has since expanded his research on wastefulness to include other Abrahamic faiths, namely Christianity and Islam. He was the recipient of a Spalding Trust Award in 2015 for post-doctoral interfaith research. Dr. Yoreh also holds a Bachelor's degree in Environmental Studies from McGill University's School of Environment, and a Master's degree in Geography specializing in Environmental Management, Planning and Policy from the Hebrew University of Jerusalem. While studying for his MA, he hosted an award-winning radio program on Israeli and Middle Eastern environmental issues.

Dr. Yoreh has taught at Leo Baeck College in London, the Faculty of Divinity at the University of Cambridge, and the Department of Near and Middle Eastern Civilizations at U of T. He is interested in faith-based wisdom as it pertains to the environment and in understanding how this wisdom is translated from theory into practice. His current research focuses on the impact of religious values on environmental behavior in Toronto communities. He is also interested in religious legal approaches to environmental protection.

Dr. Hui Peng

Hui Peng
Assistant Professor, Department of Chemistry and School of the Environment

Dr. Hui Peng joined the School of the Environment as an Assistant Professor on July 1, 2017. This is a joint position with the Department of Chemistry: 51% Chemistry, 49% Environment. "Hui is an outstanding addition to our faculty, bringing new expertise in both environmental chemistry and environmental toxicology to the School of the Environment," says Director **Kimberly Strong**.

Dr. Peng received his BSc and PhD in Environmental Science from Peking University in Beijing, China. After graduating with his PhD in 2013, he went on to complete postdoctoral fellowships at the Donnelly Centre for Cellular and Biomolecular Research at the University of Toronto and in the Toxicology Centre at the University of Saskatchewan. He has an impressive publication record, with 38 papers, 13 as first author, in top journals in his field.

Dr. Peng's research is in the area of environmental chemistry and toxicology, with a focus on identifying the occurrence of environmental pollutants and determining their potential health and ecological risks. He has developed chemical analysis methods to detect pollutants in environmental mixtures, and was the first to discover thousands of previously unknown halogenated compounds in the environment.

His discovery of a new class of chemicals of emerging concern, brominated azo dyes, which are organic compounds used in dyeing textiles, has received wide attention. In environmental toxicology, he has developed proteomics assays that provide an invaluable opportunity to determine how environmental chemicals interact with proteins to cause toxicity. At the University of Toronto, Dr. Peng plans to focus on the development of novel chemistry and biology techniques to pursue three research directions: untargeted identification of novel environmental chemicals, investigation of the sources and behaviors of environmental chemicals, and unbiased identification of their physical protein targets.

Professor Andrea Most Explores a New Field of Research: Environmental Humanities

Professor Andrea Most

Professor Andrea Most is engaged in a relatively new field of research – **environmental humanities**. On the simplest level, the environmental humanities study environmental issues and especially the human relationship to those issues through the lens of literature, history, art and philosophy. The field is fundamentally interdisciplinary, and often includes collaborations with the sciences, social sciences and various areas of the humanities. Dr. Most is a professor of American literature and environmental studies in the Department of English at the University of Toronto, where she teaches and conducts research in modern American literature and culture, Jewish cultural studies, food studies, and theatre and performance.

Prof. Most has students use the lens of literature, history, art and philosophy to explore the human relationship to the environment. "How we behave in relation to the world around us is shaped first and foremost by cultural values, by the stories we tell about who we are – and who we should be – in the world," she says. "While science is essential for explaining what we need to do to address issues such as climate change, environmental toxins, pollution, and water issues the general public doesn't pay much attention, and certainly isn't taking action proportionate to the severity of the situation. This is where humanities scholars, writers and artists have a crucial role to play."

Environmental humanities scholars often straddle the divide between academia and the general public, both responding to and influencing popular representations of current ecological conditions and problems. In the earlier days of the environmental humanities, scholars focused on championing and explaining environmentalist thought — and this is still a part of their agenda — but in recent years, the environmental humanities have begun to challenge environmentalists (and all of us) to think more carefully about our concept of "nature" and the relationship between nature and culture. "Only through creating and living new stories, what I would call new cultural mythologies, about freedom, success, health, nature, humanity, and ethics can we begin to change our behaviour in the deep and fundamental ways necessary to allow us to rise to the challenge of the great crisis facing our species. Humanities scholars are uniquely trained for this task. This work can't happen without us," enthuses Prof. Most.

Her first-year seminar course, The Environmental Imagination, introduces students to some of the core concepts of the environmental humanities. "I try to move students from thinking of themselves as "being in nature" when they are out in the country to "being in nature" even when in an urban built environment, and finally, by the end of the year, to simply "being nature", so that they begin to conceive of themselves as part of an ecosystem and not separate from it," explains Prof. Most. This year her course culminated with an experiential component in which the students told their own nature story by creating a ritual celebration of the seasons using songs, stories and theatre.

Prof. Most is passionate about teaching students to read and think critically in whatever field they choose. "What I try to communicate to my first-year students is that there isn't a gaping divide between the core ideas of the environmental humanities and their own long-term goals in business, technology or medicine. We discuss questions of what it means to be human, what our responsibility is to one another and the earth, how we can bring these concerns and thoughts into many fields."

A co-founder and Creative Director of Bela Farm, a 99-acre site for experimental agriculture, art, performance, education, and advocacy around urgent environmental issues, Prof. Most's current research initiative, The Persephone Project, brings together scholars, writers, artists, farmers and scientists both in Toronto and at Bela Farm for cross-disciplinary experiments in ecological design, health sciences, and embodied life writing geared towards articulating a new feminism for an overheated planet. She will also be teaching a series of experiential graduate seminars in ecocriticism at Bela Farm, beginning in spring 2018, with support from an ATLAS grant from the Faculty of Arts and Sciences.

Professor Most was appointed as a graduate faculty member of the School of the Environment in 2016.

Students in Andrea Most's first-year seminar, The Environmental-Imagination, present their final projects, exploring a multilayered celebration of spring (Photo by: Diana Tyszko)

Article adapted from Arts & Science News

Research Day 2017

The School of the Environment's annual **Research Day,** held on April 19, 2017 during Earth Week, showcased research conducted by faculty and graduate students of the School of the Environment. Hosted by Professor **Kimberly Strong**, Director of the School of the Environment, the 2017 program included four research talks, followed by a presentation of graduate students' awards and a reception.

Research Day Presentations

Columba Gonzalez, PhD Candidate, Department of Anthropology and School of the Environment
Traditional Ecological Knowledge (TEK) on Monarch Butterfly Conservation in the United States and Mexico
This presentation synthesizes my findings on Traditional Ecological Knowledge (TEK) related to monarch butterflies in the United States and Mexico gleaned from written and verbal sources. My analysis of these sources (160 in total) allowed me to categorize the types of ecological knowledge generated and possessed by the multiple indigenous groups that live along both the East and West Coast migratory routes of the butterfly. My findings indicate that these groups' knowledge about the butterfly and its habitats exist as part of, and in relation to, indigenous groups' connections to and experiences with the land within their territories. It suggests that TEK of monarchs and their habitats is at risk of disappearing if the groups' access to their traditional and consuetudinary uses of the land continues to be restricted and impeded. I elaborate on the difficulties tri-national conservation agencies may find in the implementation of recommendations that target the territory as a socio-natural category instead of working to preserve individual species in isolation.

Anastasia Hervas, PhD Candidate, Geography and Planning and School of the Environment
Implications of Smallholder Oil Palm Cultivation for Local Food Security: Study of Q'eqchi' Maya Households in the Lachuá Ecoregion, Guatemala
Expansion of cash crop farming in developing countries is often advocated as a means of reducing rural poverty and increasing food security through improved purchasing power. In Guatemala, smallholder oil palm cultivation had been aggressively promoted by the state in some of the poorest regions of the country, with improved food security as one of the ostensible benefits. This study of two communities in the Lachuá Ecoregion challenges this narrative, showing that as a result of the introduction of oil palm into a community, household-level food security increases for only a small portion of the residents. On the other hand, staple crop cultivation appears to be much more important, especially for marginalized households and households that are excluded from oil palm employment.

Paul J. Kushner, PhD, Professor, Department of Physics; Graduate Faculty Member, School of the Environment
Canadian Snow and Sea Ice: From Observations, to Models, to Predictions
The daily weather forecasts we count on for planning our work and leisure are part of a suite of environmental prediction tools that are available to predict climate over the coming weeks, the next season, the next decade, and the next century. What's the most effective way to develop these predictions, to test them, and ultimately to measure their utility? To approach these questions, I'll focus on the work of the Canadian Sea Ice and Snow Evolution Network (CanSISE, www.CanSISE.ca). CanSISE brings together researchers from across Canada to improve Canadian capacity to predict sea ice and snow over a wide range of timescales from the seasonal to the centennial. Snow and sea ice research exemplifies the advantages of gathering researchers with different perspectives and scientific approaches, and observations from different sources, to develop better and more useful predictions of snow and sea ice. I will highlight through a couple of case studies recent progress we've made in CanSISE, and reflect on what the future might hold for snow and sea ice in Canada as a result of anthropogenic climate change.

Terri Peters, Post-Doctoral Researcher, Daniels Faculty of Architecture, Landscape and Design and School of the Environment
Superarchitecture: Building Better Health
One of the most significant challenges in architectural research and practice is how to better define and evaluate sustainability in buildings and cities. In the past, this has meant 'green architecture' focused on resource use and comparisons to benchmark buildings, but increasingly a more holistic approach and new metrics for evaluating sustainable buildings, including 'social sustainability', are gaining influence. Research has shown that buildings have the power to enhance people's health and emotional wellbeing, encourage physical activity, and help people be happier and more productive. This talk will reframe key issues in sustainable design research to focus on the human experience, drawing on the speaker's recent journal issue on architecture's role as the link between environmentally sustainable design and health promoting environments. This talk introduces the concept of superarchitecture, which are buildings that go beyond reducing energy use or mitigating the impacts of climate change to offer positive co-benefits of improved health and wellness for occupants, better environmental performance, and enriched architectural design such as innovative spatial experiences, enhanced community benefits, and additional amenities. The talk proposes a framework for social sustainability in architecture and ends with proposals for future research directions in net positive design for defining, measuring and evaluating a new generation of green architecture.

Identifying Cross-Cutting Indicators of the Collective Impacts of Cycling

BY MICHELLE KEARNS, MSc PLANNING

We know that an increased share of trips made by bicycle benefits the health of individual cyclists, and reduced car travel results in less air pollution and congestion. But how do we evaluate the full collective benefits of more people cycling? What about improved access to employment and education? Reduced GHG emissions and health care costs? More vibrant main streets and increased tax revenues? Many of these impacts affect non-cyclists and cyclists alike, and can only be measured through integrating data collected by different levels of government and varying departments within those governments. Public health, as well as transport, municipal affairs departments and others all have policies that align and benefit from increased cycling and each hold some of the data and expertise necessary to develop a more comprehensive method of evaluating and communicating the collective benefits of cycling.

The latest project of the **Toronto Cycling Think & Do Tank** has allowed us to investigate these questions. With a grant from the Metcalf Foundation and a partnership with Swerhun Facilitation, our research team is working to identify the potential for broader cycling indicators. After reviewing current world-wide literature detailing various effects of an increased share of trips made by bicycle, such as reduced emissions, economic gains through cycle tourism and bicycle-related industry, and reduced infrastructure costs, we identified that benefits of cycling are described in discrete silos and are frequently approached on the basis of benefits to individuals or in singular analysis of a specific social benefit such as reduced health care costs. We need a collective effort among governments, NGOs and researchers to identify cross-cutting indicators that capture a wider range of these benefits, allowing for a fuller appreciation of the policy and financial returns on cycling investment. Moreover, any cycling research needs to acknowledge the challenges of public and government perception as well as create context-sensitive recommendations recognizing the great variation in built form throughout the GTHA and Ontario. Downtown Toronto's cycling challenges and benefits are different from Peterborough's.

We held an initial consultation meeting with key municipal, provincial, and NGO stakeholders in cycling, transportation, public health, and policing, to determine what sort of indicators and tools would be useful to policy makers and program coordinators in the GTHA and throughout the province. The feedback was strong - participants expressed enthusiasm at the project going forward and agreed to a series of further meetings.

We are moving forward with follow-up conversations and further research with the ultimate aim of developing a useful tool to help municipalities, provincial bodies, and NGOs assess the collective benefits of increased cycle mode share. This will enable a fuller articulation of the benefits of increased bicycling to politicians, policy makers and the general public.

Energy Efficiency as a Gateway to Further Greenhouse Gas Reductions in Faith Communities

BY TANHUM YOREH

Religious and faith communities have been an underutilised resource in combating climate change with over 75% of Canadians self-identifying as belonging to a faith community (National Household Survey 2011). Presenting climate action through faith is an essential pathway towards widespread behaviour change. My most recent research project investigates the impact of environmental action in sacred spaces (e.g. building energy retrofits, food waste diversion programs, recycling campaigns) on the behaviour of community members and advances a framework for driving environmental behaviour change through action in sacred spaces. This research is in its early stages, and I am currently applying for funding to support this work.

In addition to directly reducing GHG emissions, building retrofits undertaken in a communal space have the potential for spillover impacts as community members are inspired to take action at home. My research, in collaboration with a number of other colleagues and the ENGO **Faith and the Common Good**, will investigate and quantify the impact of sacred space "greening" - with a focus on energy retrofits – to inspire GHG-reducing behaviour changes among community members. The communities being studied in this project have already taken the initial step of "greening" their place of worship. Whether this has been done through charismatic leadership, community-driven initiatives or theologically accessible rationalisations, this has set in place a social norm within these communities. A goal of this research is to see what values create this social norm and how far it permeates into daily life choices.

The two central questions driving this research are, does the fact that a community-adopted energy efficiency and other "greening" measures in its place of worship have positive knock-on effects on the consumption and energy usage of community members? and what are the values that motivate environmentally responsible behaviour in faith communities?

Decolonizing Water Governance in Canada

Northern Lake (Photo by: Kate Neville)

BY KATE NEVILLE

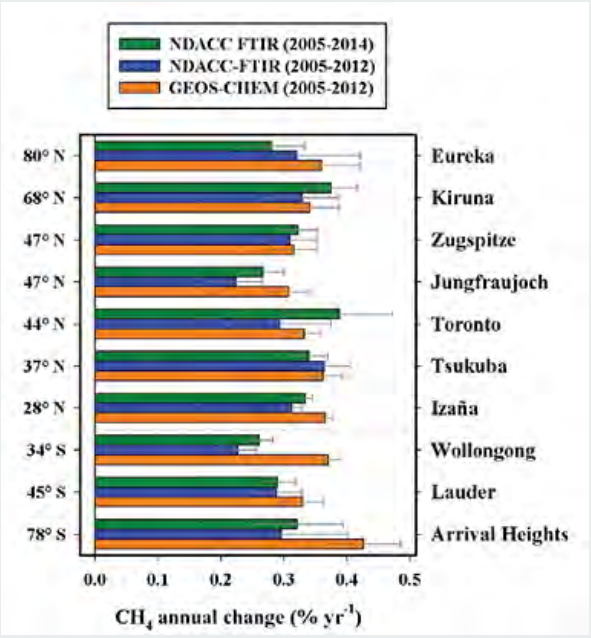
From the Site C dam in BC to Muskrat Falls in Newfoundland, and from hydraulic fracturing in Saskatchewan to the oil sands of Alberta, large-scale energy production is intensifying pressure on already threatened watersheds across Canada. Combined with water withdrawals and contamination from agriculture, urban centres, and other industrial activity, these pressures are threatening human and non-human well-being alike. The WWF reports that two-thirds of wetlands have been lost in Ontario, along with a third of all BC freshwater fish species. And the CBC announced that as of November 2016, 130 Indigenous communities were under boil water advisories. With the longest coastline in the world and one-fifth of the planet's freshwater resources, it seems abundance fosters wastefulness - and those who bear the burden of such intemperance are inevitably the most marginalized and vulnerable communities.

What could a different future look like for water governance in Canada? How might Indigenous systems of law and governance inform national and local water policies? What traditions, legal systems, and values might be engaged to protect water resources and lead to more sustainable, equitable outcomes?

A collective of academics, Indigenous leaders, non-profits, lawyers, and community members have launched a project to explore those questions. The **"Sustainable Water Governance and Indigenous Law Project"** is supported by the Social Sciences and Humanities Research Council of Canada (SSHRC). Professor **Kate Neville** has joined this interdisciplinary project team---known in short as the **"Decolonizing Water Project"**(http://www.decolonizingwater.ca/). Guided by principles of land-based learning, community-based research, and "two-eyed seeing" (bringing together insights from both Indigenous and Western ways of knowing), the team seeks to develop place-based, Indigenous-led water monitoring initiatives and governance approaches.

Global Atmospheric Methane Trends Determined by the Network for Detection of Atmospheric Composition Change

BY WHITNEY BADER AND KIMBERLY STRONG



Atmospheric methane is the second most abundant anthropogenic greenhouse gas after carbon dioxide, and is responsible for approximately one-fifth of the increase in radiative forcing by human-linked greenhouse gases since 1750. Human activities associated with the agricultural and energy sectors are the main sources of anthropogenic methane, while natural sources include wetlands, termites, methane hydrates and ocean, and biomass burning. Given its atmospheric lifetime (8-10 years) and its impact on radiative forcing and on atmospheric chemistry, methane is one of the primary targets for regulation of greenhouse gas emissions and climate change mitigation. From the 1980s until the beginning of the 1990s, atmospheric methane increased by about 13 ppb/year, followed by stabilization from 1999-2006 and a renewed increase since 2005-2006. These methane trends have been the subject of many studies.

In a recent paper led by UofT postdoctoral fellow Whitney Bader, we report for the first time the changes in atmospheric methane total columns since 2005 derived from Fourier transform infrared solar observations carried out at ten ground-based sites affiliated with the Network for Detection of Atmospheric Composition Change (NDACC), including two run by our group (Toronto and Eureka). From this, we find an increase of atmospheric methane total columns of 0.31±0.03 % per year for the 2005-2014 period. We used the GEOS-Chem chemical transport model to simulate the atmospheric methane, finding good agreement with the measurements, as seen in the figure, which shows the % per year methane total column mean annual change with respect to 2005. Analysis of the GEOS-Chem tagged simulation also allowed us to quantify the contribution of each emission source to the global methane change since 2005. We find that natural sources such as wetlands and biomass burning contribute to the interannual variability of methane, while anthropogenic emissions, such as coal mining, and gas and oil transport and exploration have played a role in the increase of atmospheric methane. This topic remains an area of intensive research as the international community works to better understand the relative importance of these various methane sources.

More details can be found in Bader et al., The recent increase of atmospheric methane from 10 years of ground-based NDACC FTIR observations since 2005, Atmos. Chem. Phys., 17, 2255-2277, 2017 (www.atmos-chem-phys.net/17/2255/2017/).

How Much Methane? A U of T Study Aims to Create the Most Accurate Estimate Yet of Toronto's Greenhouse Gas Emissions

BY SCOTT ANDERSON

Colin Arrowsmith spent part of his summer cycling – not for fun or exercise, but for science. As part of a research placement with U of T physics Professor **Debra Wunch**, the second-year student criss-crossed campus on a bike, towing a buggy with a bright yellow box inside – a spectrometer used to measure the concentration of greenhouse gases at precise locations.

The project, which got underway earlier this year, marks a new and ambitious attempt to calculate the city's emissions of methane, carbon dioxide and other gases based on atmospheric measurements rather than on estimates from industry. Prof. Wunch says the information will help pinpoint the biggest sources of Toronto's emissions. The data could prove vital as the city strives to cut its contributions to greenhouse gases to one-fifth of 1990 levels by 2050. It will also enable the city to zoom in on where its reduction efforts are needed most – and to notify organizations about fixing previously unnoticed leaks. As Prof. Wunch observes, this is not only good for the planet, it's good for the organization.

In addition to using the mobile equipment, Prof. Wunch and her team will install spectrometers at the tops of two buildings – one upwind and one downwind from the city. These will provide readings of greenhouse gases in a column from ground level right up to the top of the atmosphere, enabling the researchers to measure the city's overall emissions.

Prof. Wunch has conducted a similar study in Los Angeles, which found methane emissions to be higher than had been previously estimated. The carbon dioxide levels measured were about the same as estimates, she says.

The Toronto study is just beginning, but Prof. Wunch hopes that it leads to a long-term effort to monitor greenhouse gases in Toronto. "You want to actually be able to watch as the emissions reductions occur over time, and see that the city's efforts are working," she says.

Debra Wunch's research is supported by the Natural Sciences and Engineering Research Council of Canada, the Canada Foundation for Innovation and the Ontario Research Fund. She is a Professor in the Department of Physics and the School of the Environment.

Second-year student Colin Arrowsmith bikes along Huron Street, pulling a device to measure greenhouse gas emissions on U of T's St. George campus (Photo by: Ian Patterson)

Academic Associate Director's Message

As Academic Associate Director for the School of the Environment, my responsibilities include overseeing graduate and undergraduate academic programming, supporting our instructors, and working to promote the high quality of teaching and academic excellence our students enjoy. With more than 750 students enrolled in our undergraduate programs, over 3000 students enrolled in our courses, and almost 200 graduate students in our collaborative programs spanning more than 20 disciplines, the School is thriving.

In 2016-17, we were pleased to offer two new undergraduate courses. One was the capstone Environmental Science Seminar (ENV452) taught by Prof. **Debra Wunch** (see page 15). With this rolled out, all of the core courses envisioned for the 'new' Environmental Science Major are now being taught. The other new offering this year was the special topics course "The U of T Campus as a Living Lab of Sustainability" taught by Prof. **John Robinson** (see below).

This year also saw the latter course as well as five others formally approved as permanent offerings, starting in 2017-18, with all five originating as special topics courses created from the transition of the Faculty's Big Ideas courses to the School in 2015-16. Two are related to the sustainability of digital life: ENV261 Is the Internet Green? (taught by Prof. **Miriam Diamond**, Dept. of Earth Sciences) and ENV361 Social Media and Environmentalism (Prof. **Steve Easterbrook**, Dept. of Computer Science). These provide different perspectives on the Internet and social media, which are now are an integral part of all our lives. Despite the fact that students are using these platforms nearly constantly, there is relatively little opportunity for critical analysis of their impact - socially, politically, and environmentally. The fresh content and relevance to student lives clearly resonates with class participants.

Another three courses are related to energy: ENV262 The Science of Energy in the Environment (a new breadth course to be taught by Prof. **Stephen Morris**, Dept. of Physics), ENV362 Energy and Environment - Transitions in History (Prof. **Ben Akrigg**, Dept. of Classics), and ENV462 Energy and Environment - Economics, Politics and Sustainability (Prof. **Adonis Yatchew**, Dept. of Economics). This sequence of courses examines energy in the environment through numerous lenses, providing a multi-disciplinary perspective on a topic of great national and international significance. The innovative approaches used in all of these courses put into practice the School's core philosophy on the need for interdisciplinarity in grappling with and resolving current and emerging environmental issues.

Professor Sarah Finklestein, Academic Associate Director

The School of the Environment offers Undergraduate degrees through a BA program in Environmental Studies and a BSc program in Environmental Science, as well as collaborative programs with departments and programs at the University of Toronto such as chemistry, geography, geology, human biology, physics, philosophy, psychology, and others. At the Graduate level, interdisciplinary Collaborative Specializations in Environmental Studies, as well as in Environment and Health, are offered in partnership with more than twenty other units at the University. For information on the School's academic programs, please visit: https://www.environment.utoronto.ca/undergraduate/ and https://www.environment.utoronto.ca/graduate/.

The U of T Campus as a Living Lab of Sustainability

Instructor: John Robinson, Professor, Munk School of Global Affairs & School of the Environment

In 2016-17, the special topics course, ENV481/ENV2002 The U of T Campus as a Living Lab of Sustainability, which was offered as a joint undergraduate/graduate course, was made permanent as ENV461/ENV1103.

Sustainability is a growing priority for universities all over the world. Many are developing strong operational sustainability goals and targets, and are giving increasing emphasis to teaching and research on sustainability issues. Yet few have committed at the executive level to integrating academic and operational sustainability in the context of treating their campus as a living laboratory of sustainable practice, research and teaching. Arguably, it is such living lab approaches that offer the largest potential for universities to play a significant role in the sustainability transition. This course explores and applies the living lab concept, in the context of operational sustainability at the University of Toronto.

Beginning by looking at the literature on university sustainability and the living lab concept, the bulk of the course involves undertaking an applied research project on some aspect of campus sustainability, working in close partnership with operational staff at the University of Toronto. Students develop the skills needed to work across disciplines and fields of study, and with non-academic partners. Students work on operational sustainability projects identified by the staff working in or with the Sustainability Office at the University of Toronto. Students are organized into groups, each of which is assigned a project, overseen by one or more U of T staff members. The bulk of the course consists of regular meetings with the staff "clients", with instructors, and in small groups to undertake a group project. Each group produces a mid-term and final report, and gives mid-term and final presentations.

Undergraduate Programs

For more information, please visit www.environment.utoronto.ca, or contact David Powell, Undergraduate Student Advisor:
416-946-8100; David.Powell@utoronto.ca

Core Programs

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

1. Environmental Science (BSc Major and Minor)
2. Environmental Studies (BA Major and 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 (BSc, with the Department of Chemistry)
2. Environmental Geosciences (BSc, with the Department of Earth Sciences)
3. Environment and Health (BSc, with the Human Biology Program)
4. Environment and Toxicology (BSc, with the Department of Pharmacology and Toxicology)

Major Programs

1. Environmental Ethics (BA, with the Department of Philosophy)
2. Environment and Health (BSc, with the Human Biology Program)

Minor Programs

1. Environment and Behaviour (BSc, with the Department of Psychology)
2. Environmental Ethics (BA, with the Department of Philosophy)
3. Environment and Energy (BSc, 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 (BA)
2. Environmental Biology (BSc)
3. Environmental Chemistry (BSc)
4. Environmental Economics (BA)
5. Environmental Geography (BA)
6. Geographic Information Systems (BA)
7. Physical and Environmental Geography (BSc)

Undergraduate Courses

2016-17 School of the Environment undergraduate offerings and instructors.

ENV 100H	Introduction to Environmental Studies *(Summer 2016: Stephen Scharper, Anthropology UTM/Environment, Fall 2016: Simon Appolloni, sessional)*
SII 199H	Debating and Understanding Current Environmental Issues *(Karen Ing, Environment)*
ENV 200H	Assessing Global Change: Science and the Environment *(Summer 2016: Romila Verma, sessional; Spring 2017: Karen Ing, Environment)*
ENV 221H	Multidisciplinary Perspectives on Environment *(Summer 2016: David Pond, sessional; Fall 2016: Karen Ing, Environment)*
ENV 222H	Interdisciplinary Environmental Studies *(Douglas Macdonald, Environment)*
ENV 223H	*Fundamental Environmental Skills (Christian Abizaid, Geography/ Environment)*
ENV 233H	Earth Systems Chemistry *(Jessica D'eon, Chemistry; Grant Henderson, Earth Sciences)*
ENV 234H	Environmental Biology *(Hélène Cyr, Ecology & Evolutionary Biology; Jörg Bollmann, Earth Sciences)*
ENV 237/8H	Physics of the Changing Environment *(Kaley Walker, Physics)*
ENV 281H	Big Ideas in the Digital World I: Is the Internet Green? *(Miriam Diamond, Earth Sciences; Steve Easterbrook, Computer Science)*
ENV 282H	Big Ideas in Energy I: Technology & Society *(Ben Akrigg, Classics; Stephen Morris, Physics; Adonis Yatchew, Economics)*
ENV 299Y	Research Opportunity Program *(Brad Bass, adjunct faculty)*
ENV 307H	Urban Sustainability *(David Sider, sessional)*
ENV 316H	Laboratory & Field Methods in Environmental Science *(Debra Wunch, Physics/Environment; Njal Rollinson, Ecology & Evolutionary Biology/ Environment)*
ENV 320H	National Environmental Policy *(Douglas Macdonald, Environment)*
JGE 321H	Multicultural Perspectives on Environmental Management *(Christian Abizaid, Geography/Environment)*
ENV 322H	International Environmental Policy *(Kate Neville, Political Science/ Environment)*
ENV 323H	Ontario Environmental Policy *(Russ Houldin, sessional)*
JGE 331H	Resource and Environmental Theory *(James Nugent, sessional)*
ENV 333H	Ecological Worldviews *(Stephen Scharper, Anthropology UTM/Environment)*
ENV 334H	*Environmental Biology: Applied Ecology (Hélène Cyr, Ecology & Evolutionary Biology)*
ENV 335H	Environmental Design *(Sheila Waite-Chuah, sessional)*
ENV 337H	Human Interactions with the Environment (*Karen Ing, Environment)*
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 381H	Big Ideas in the Digital World II: Social Media & Environmentalism *(Miriam Diamond, Earth Sciences; Steve Easterbrook, Computer Science)*
ENV 382H	Big Ideas in Energy II: Economics, Politics & Security *(Ben Akrigg, Classics; Stephen Morris, Physics; Adonis Yatchew, Economics)*
ENV 395Y	Special Topics Field Course. Ecology and Conservation in the Amazon, Galápagos, and Andes (*Barbara Murck Geography UTM; & Monika Havelka, Geography, UTM)*
ENV 396Y	Australian Environment, Wildlife and Conservation (*offered by the University of New South Wales)*
ENV 421HY	Environmental Research *(Douglas Macdonald, Environment)*
ENV 422H	Environmental Law *(Paul Muldoon, sessional)*
ENV 432H	Urban Ecology *(Don Jackson, Ecology & Evolutionary Biology; Karen Ing, Environment)*
ENV 440H	Professional Experience Course *(David Sider, sessional)*
ENV 451H	Current Environmental Debates *(Erich Vogt, sessional)*
ENV 452H	Environmental Science Seminar *(Debra Wunch, Physics/Environment)*
JEH 455H	Current Issues in Environment and Health *(Ron Wilson, Human Biology Program, New College)*
ENV 481H	Special Topics in the Environment: U of T Campus as a Living Lab of Sustainability *(John Robinson, Munk/Environment)*
ENV 492/3H	Independent Studies Project *(various faculty)*

New Undergraduate Courses for 2016-17

Environmental Science Major

We have been rolling out courses in the Environmental Science Major since it started in 2013-14, in collaboration with the Departments of Chemistry, Physics, Earth Sciences, and Ecology & Evolutionary Biology. The last of these new courses was introduced this year.

In 2013-14, two new second-year courses were offered: ENV 233 Earth Systems Chemistry and ENV 237/238 Physics of the Changing Environment, followed by two new third-year courses **in 2014-15**: ENV 316 Laboratory and Field Methods in Environmental Science and JEE 337 (now ENV 337) Human Interactions with the Environment. **In 2015-16**, the first of two fourth-year courses was introduced: ENV 432 Urban Ecology.

Newly offered in 2016-17: ENV 452 Environmental Science Seminar, the capstone course for the Environmental Science Major, was offered for the first time, taught by Professor **Debra Wunch**.

ENV 452 Environmental Science Seminar

ENV 452 focuses on current challenges in environmental science, ranging from the carbon cycle, to policy, to greenhouse gas emissions, to biological and health impacts. There are a variety of guest speakers during the term. One focus of the course is to read scientific papers, and evaluate the presentation of their results in news articles. Students are actively involved in leading and participating in class discussions.

Big Ideas Courses Evolve into Five New Permanent Courses

The School of the Environment became the new home of the Faculty of Arts & Science's "Big Ideas" courses in 2015-16, designed to give students an opportunity to explore topical and challenging issues from a variety of disciplinary perspectives. Four new courses were offered as special topics: ENV 281 and ENV 381 on the environment and the digital world and ENV 282 and ENV 382 addressing energy and the environment. We are happy to announce that the ENV 381 course on Social Media and Environmentalism was featured as one of two "cool courses" at U of T in the 2017 Maclean's Canadian Universities Guidebook. In 2016-17, these four courses were approved as permanent offerings, and an additional course was added, ENV 262. These will be taught by faculty from five departments, helping to fulfill the schools mandate to foster shared teaching related to the environment.

ENV 261 Is the Internet Green?

Instructor: Miriam Diamond (Professor, Department of Earth Sciences)

The Internet has deeply penetrated most aspects of society and yet we are remarkably unreflective about its impacts and sustainability. This course challenges students to critically evaluate evidence regarding the environmental and social impacts of the Internet and how the Internet contributes (or not) to goals of environmental sustainability.

ENV 361 Social Media and Environmentalism

Instructor: Steve Easterbrook (Professor, Department of Computer Science)

This course examines the impacts of the internet on environmental thinking and policy-making. Topics include the use of social media as a tool for community-building and collaborative design, the sharing economy, online protest movements, mass surveillance and its implications, and the impact of misinformation on climate denialism.

ENV 262 The Science of Energy in the Environment

Instructor: Stephen Morris (Professor, Department of Physics)

Energy is a fundamental organizing principle of Nature. It has a central role in the origin and evolution of the universe, and is the basis of the ecosystem of the Earth and of technology and the world economy. This course explores the science of energy in all its forms.

ENV 362 Energy & Environment: Transitions in History

Instructor: Ben Akrigg (Professor, Department of Classics)

An exploration of the interactions between humans and their environments in the Holocene, focussing on the contexts and consequences of changes in energy technologies. Includes consideration of changes in food production and processing, transport and power generation technologies from the adoption of agriculture to the twentieth century.

ENV 462 Energy & Environment: Economics, Politics and Sustainability

Instructor: Adonis Yatchew (Professor, Department of Economics)

This is an interdisciplinary course that examines key ideas in economics, politics and security that are essential to understanding energy and environmental issues. The course covers energy markets, energy security, and the increasing role that sustainability plays in setting policies.

Students from ENV316 at Humber Bay

Undergraduate Research and Experiential Courses

ENV 421H Environmental Research - 2016-2017 Instructor: Douglas Macdonald, School of the Environment

In this course, senior undergraduate students work together over the fall and winter terms in small groups to conduct research related to a broad environmental research theme for the class. In 2016-17, the research theme was to provide a hypothetical new Canadian environmental non-governmental organization (ENGO) with information, analysis, and recommendations to support its mandate to do analysis and advocacy of ways in which other species and Canadians who will be born after 2050 can be given a proxy voice in current public and private decision making which has the potential to cause each of those groups environmental harm. The ENGO believes strongly that one of the major reasons for the current weakness of Canadian environmental protection is that those with the most to lose, other species and future humans, are unable to speak publicly and to protect their interests by participating in the decision making which affects them. A total of 18 students undertook research projects on whether or not future generations should have a voice in present generation legal and political decision-making processes, how anthropocentric and ecocentric values contribute to the debate about the representation of nature in decision making; the effectiveness and efficiency of think tanks as a mechanism for addressing ENGO's mission; the body of philosophy, social norms, history, law and policy implementation to reduce cruelty to sentient beings, with a focus on the entities that are held responsible for protecting animal rights and making their voices heard compared to those that do not; and the duty owed to future generations by the present generation, as expressed by the theory of "intergenerational equity", that future generations have the right to inherit a natural and cultural heritage (in particular, a health environment) from past generations. Through the course, students gained valuable experience in conducting social science research projects from start to finish.

ENV 440H Professional Experience Course - 2016-2017 Instructor: David Sider, Sessional Lecturer

This course provides an opportunity for students to gain practical work experience in the environmental field through placements with organizations and agencies engaged in a wide range of issues from local to global scales. Student placements include activities such as research, policy development, project administration, proposal writing, networking, community organizing, and public awareness. In 2016-17, 58 students did summer/fall placements at non-profit/charitable groups (e.g., Evergreen, High Park Nature Centre, Foodshare, Jane Goodall Institute), government agencies (e.g., City of Toronto Environment & Energy Division, Environment Canada), private sector companies (e.g., terus, Triovest), and U of T organizations (Sustainability Office, Bike Chain). The academic component of the course is oriented toward reflection on, and analysis of, students' placement experience and the effectiveness of their placement organizations. Together, the practical and academic parts of the course are geared toward preparing students for successful careers in the environmental field.

ENV 492/493H Independent Studies Projects

The following undergraduate students completed independent studies/research courses in the 2016-17 academic year:

Mahytab Soliman. Fourth year student in 2016-17, Majors in Environmental Studies and Architectural Studies (Design). ENV493H1 research topic: **"Ecological Worldviews and the Built Environment".** Supervisor: Stephen Scharper, Anthropology at UTM and the School of the Environment.

Larissa Parker. Fourth year student in 2016-17, Majors in Environmental Studies and in Ethics, Socieity and the Law, and Political Science Minor. ENV492H1 & ENV493H1 research topic: **"Analyzing the Sustainability of Market Liberal Strategies in Environmental Governance".** Supervisor: Matthew Hoffman, Political Science

Rachel So. Fourth year student in 2016-17, Environment & Health Specialist, Biology Minor. ENV492H1 research topic: **"Soil Phosphorus Chemistry: Experiments with a virtual lab".** Supervisor: Miriam Diamond, Earth Sciences

International Courses

The School of the Environment continues to support and promote international opportunities for our students. This interest coincides with the University's commitment to international partnerships, one of three current strategic priorities for the University alongside: city building and transformative education.

A sampling of these opportunities include:

- **ENV 395Y SPECIAL TOPICS FIELD COURSE:** Ecology and Conservation in the Amazon, Galápagos, and Andes
- **ENV 396H - SPECIAL TOPICS:** Australian Environment, Wildlife and Conservation
- **GOETHE UNIVERSITY FRANKFURT:** Biodiversity in the Context of Global Change (ENV 3**H credit)
- **CHINESE UNIVERSITY OF HONG KONG:** Energy and Green Society (ENV 2**H credit)
- **ROTHBERG INTERNATIONAL SCHOOL AT HEBREW UNIVERSITY OF JERUSALEM**: Transboundary Water Cooperation (ENV2**H credit)
- **NATIONAL UNIVERSITY OF SINGAPORE:** Wildlife Protection in Southeast Asia (ENV 2**H credit)

Working with the Study Abroad Office at Woodsworth College and the Centre for International Experience Office, the School has assembled a variety of opportunities that complement the studies of our environmental studies and environmental sciences students. (https://www.environment.utoronto.ca/undergraduate/international-opportunities/).

Summer Abroad

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

ENV 395Y: May 20 - June 22, 2017
Instructors: Monika Havelka and **Barbara Murck**, Senior Lecturers, Geography, UTM.

This was the 12th year that this exciting program was offered to students interested in life sciences, environmental studies, conservation biology, geology and geography. Students experienced one of the most ecologically diverse countries in the world and delved into the pressures and challenges on these unique environments.

The Special Topics Field Course: Ecology and Conservation in the Amazon, Galápagos, and Andes explored fundamental concepts in ecology, evolution, biodiversity, geology and conservation biology through lectures and fieldwork in highland, tropical and island ecosystems in Ecuador. The complex relations between these environments and the people who depend on them were examined through analysis of the social, cultural and economic transformations that have taken place in recent years.

The program is hosted by the Universidad San Francisco de Quito (USFQ) and uses two of its research centres, the Galápagos Academic Institute for the Arts and Sciences, (GAIAS) and the Tiputini Biodiversity Station (TBS; located in the Amazon Rainforest), as well as its Quito campus.

Students began in Quito with orientations and introductory lectures, including visits to old Quito and Mitad del Mundo (the Equator) and then spent several days in the Andes highlands studying its unique flora and fauna, while examining the economy and culture of the indigenous mountain peoples. The next course segment consisted of eight days at the Tiputini Biodiversity Station, situated along one of the headwaters of the Amazon River in one of the few remaining pristine rainforests in Ecuador. Students focused on tropical forest ecology, and the impacts of oil exploration on wildlife and indigenous peoples. The group then headed to the Galápagos - a chain of active volcanic islands that has played a crucial role in the history of science - to examinine how plants, animals and people interact in this fragile and threatened environment. Also included were five days of lectures and field trips based at the GAIAS institute on San Cristobal, which was followed by a five-day tour of other islands. The program concluded in Quito, Ecuador.

For more information, contact barbara.murck@utoronto.ca or monika.havelka@utoronto.ca.

School of Environment student Nie Tian in Ecuador

FOR MORE INFORMATION, PLEASE VISIT WWW.SUMMERABROAD.UTORONTO.CA.

Undergraduate Awards

Congratulations to the following undergraduate students who received School of the Environment scholarships. They were awarded in 2016-2017.

Frances L. Allen Scholarship

Awarded to second or third-year student in a specialist or major BA program in the School of the Environment. The recipient was **Danielle Pal**, Environmental Studies and Psychology Majors; Environment & Behaviour Minor.

Chachra Family Scholarship in Environment and Science

Awarded to one or two students in a School of the Environment BSc specialist or major program, on the basis of financial need and academic merit. The recipient was **Cameron So**, Environmental Science Major; Environmental Studies Minor; Ecology & Evolutionary Biology Specialist.

Dr. Stanley Allan Cord Scholarship in Environmental Studies

Awarded to a School of the Environment student in their third or fourth year, on the basis of Academic Merit. The recipient was **Veronica Badali**, Environmental Science and Environment & Health Majors; French as a Second Language Minor.

Jane Goodall Scholarship

Awarded to one or more outstanding students enrolled in a School of the Environment program. Preference is given to students studying environment and development. The recipient was **Ruth Midgely**, Environmental Studies and Biodiversity & Conservation Biology Majors.

Peter John Hare Memorial Scholarship in Environment

Awarded to students in a School of the Environment specialist or major program. Preference is given to students taking courses in environmental science, as well as students who demonstrate a commitment to environmental issues. The recipient was **Su Hyun Park**, Environmental Science and Environment & Health Majors; French as a Second Language Minor.

Robert Hunter Scholarship

Awarded to outstanding School of the Environment students in memory of Robert Hunter, journalist and co-founder of Greenpeace. Preference is given to students who are focusing their environmental studies on climate (extra-curricular involvement with climate issues will also be considered). The recipient was **Adriana Shu Yin**, Environmental Science and Environment & Health Majors; Environmental Geography Minor.

Jane Joy Memorial Scholarship: Excellence in Environmental Sustainability

Created with a donation by the University of Toronto Women's Association, this is awarded to a student specializing or majoring in Environmental Science at the School of the Environment, who has demonstrated involvement in sustainability issues. The recipient was **Rebecca Chan**, Environment & Toxicology Specialist; Physical & Environmental Geography Major.

Kathryn S. Rolph Scholarship

Awarded to an outstanding second or third year student in a program offered by the School of the Environment who has achieved a high mark in a course on environmental issues offered by or on behalf of the School. The recipient was **Leila Park**, Environmental Studies and Equity Studies Majors; Environmental Biology Minor.

Sidney and Lucille Silver Scholarship

Awarded to a third-year student in a School of the Environment or Geography specialist or double major program. The recipient was **Sophia Zamaria**, Physical & Environmental Geography and Earth & Environmental Systems Majors; Geographic Information Systems Minor.

(L-R) Professor Kimberly Strong, Thomas Hart, Elizabeth May, Emily Hunter and Professor Stephen Scharper at the Robert Hunter Memorial Lecture (Photo by: Nathan Taylor)

Douglas Pimlott Awards and Scholarships

These awards are in honour of **Douglas Pimlott**, the first Director of the former Environmental Studies Program at Innis College. They are awarded to School of the Environment students with excellent levels of academic achievement combined with a demonstrated commitment to social involvement in environmental issues.

(L-R) Michelle Lee and Kathryn Condon with award presenter WWF President Emeritus Monte Hummel and Mark Pimlott (Douglas Pimlott's son)

Pimlott OSOTF Award Recipient

Xia (Alice) Zhu, Environmental Chemisty Specialist
Dana Pugh, Environmental Studies and Forest Conservation Majors

Pimlott Entrance Scholarship

Kathryn Condon, Environmental Studies and Ethics, Society and Law Majors; Environmental Ethics Minor

Graduating Scholarship

Francesca Hannan, Environmental Studies and Economics Majors; Environmental Geography Minor
Michelle Lee, Environmental Science and Geoscience Majors; Geographic Information Systems Minor

This year we were delighted to award the third Rodney White Environmental Studies Scholarship and the fourth Skip Willis Undergraduate Scholarship. These scholarships were established by the families and friends of Rodney and Skip. The School of the Environment is very grateful to both families for choosing to endow the scholarships here for our students, and to all of the donors for their generous contributions. The scholarships were presented on December 23, 2016, at the annual Willis & White Thought Leadership Event organized by the School of the Environment's Environmental Finance Advisory Committee (EFAC). The event, **Update from the 2016 Marrakech UN Climate Negotiations: Conference Highlights & Considerations for Canada and the Provinces Under the Paris Agreement**, included an expert panel on issues related to climate change, some of whom were part of the discussions at the UN conference in Morocco.

Rodney White Environmental Studies Scholarship

This award was established in memory of Professor Rodney White, Director of the former Institute for Environmental Studies and co-founder of the Centre for Environment, which became the School of the Environment. The Rodney White Environmental Studies Scholarship is awarded to a third-year undergraduate student on the basis of academic merit, with preference to a student studying topics related to environment and international development. This year's recipient, **Keira Lewis.** Keira is pursuing a double major in Environmental Studies and Indigenous Studies, and has volunteered in Kenya and Ecuador, working with children to promote education and engagement on environmental issues. **Sue White** introduced Keira and presented her with the scholarship.

Skip Willis Undergraduate Scholarship

This award was established in memory of Errick (Skip) Willis, Principal of the Willis Climate Group and a founding member of the Professional Development Program's Environmental Finance program. The award is given to an undergraduate student at the School who has demonstrated interest in adaption and mitigation of climate change in Canada, market-based instruments, and carbon offset projects. This year's winner is **Lika Miao**, who is doing a major in Environmental Science and a minor in Environment and Energy, and is deeply engaged in issues related to adaptation and mitigation of climate change in Canada. Lika was introduced by **Kelly Willis**, who presented the scholarship to her.

Rodney White Environmental Studies Scholarship winner Keira Lewis with Sue White (Photo by: Nathan Taylor)

Skip Willis Undergraduate Scholarship winner Lika Miao with Kelly Willis (Photo by: Nathan Taylor)

Graduate Collaborative Specializations

The School of the Environment offers two Collaborative Specializations at the Master's and Doctoral level: (1) Environmental Studies, and (2) Environment and Health. Students who are admitted to a 'home' unit apply to the Collaborative Specialization 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 and to interact with students and faculty from other units who are also interested in environment. There are currently 22 and nine degree programs, respectively, participating in the Environmental Studies and the Environment & Health Collaborative Specializations. In 2016-17, the School of the Environment was pleased to welcome 57 new students into these programs and to have 30 alumni graduate. A total of 151 students were enrolled in these programs this year, 125 in Environmental Studies and 26 in Environment & Health, representing almost a fourfold increase in the five years since the School was established. The School also has ~125 graduate faculty members spanning all three campuses and multiple Faculties; these faculty are available to supervise student research and participate in the School's programs and events. We continue to develop the proposal for a new Master of Environment and Sustainability (MES) in consultation with the Dean`s Office, and are now aiming for a roll-out in September 2019.

Environmental Studies Collaborative Specialization

One of the compelling strengths of this program is the interdisciplinary environment in which teaching and research are conducted. Students are able to specialize in an area of environmental research while also gaining exposure to a wide range of intellectual and methodological disciplines focused on environmental issues. The program currently has students from across the disciplinary spectrum. Collaborating units and programs include Adult Education & Community Development (OISE), Anthropology, Chemical Engineering & Applied Chemistry, Chemistry, Earth Sciences, Ecology & Evolutionary Biology, Forest Conservation, Forestry, Geography, Global Affairs, Information, Information Studies, Management, Physics, Program in Planning (Geography), Political Science, Public Policy & Governance, Religion, Social Justice Education (OISE), Sociology, Sustainability Management, and Women & Gender Studies. Students may also be admitted from other units on an individual basis. For example, we have students enrolled from such diverse home units as Cell & Systems Biology, Criminology, Drama, Theatre & Performance Studies, East Asian Studies, Educational Leadership & Policy (OISE), English, Law, and Music.

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

Given the growing popularity of ENV 1001 (51 students enrolled in fall 2015-16), we offered it in both terms in 2016-17 to keep the class size small enough to encourage engagement and discussion between students from many different disciplines. The course was taught by Prof. Kate Neville in the fall and by Profs. Doug Macdonald and Tanhum Yoreh in the spring. For 2017-18, we decided to change the format of the course, linking it to the biweekly public Environment Seminar Series, inviting our speakers to provide readings for the students and to link their topic to some aspect of environmental decision making, with the goal of providing an enriched learning experience for our students.

We are pleased to have two new graduate courses approved as permanent offerings, both taught by Prof. John Robinson. The Development of Sustainability Thought (JSE 1708) is a joint course with the Munk School of Global Affairs that examines how attitudes towards human nature and non-human nature have changed over time and whether contemporary concerns about sustainability require fundamental changes in the way we conceive of ourselves and our environment. The U of T Campus as a Living Lab of Sustainability (ENV 1103) is a joint undergraduate/graduate course, as described on page 13.

Environment and Health Collaborative Specialization

The School's graduate Collaborative Specialization in Environment and Health provides an interdisciplinary perspective on 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. This program is offered in conjunction with degree programs in Adult Education and Community Development (OISE), Chemical Engineering & Applied Chemistry, Community Health, Environmental Science, Geography, Medical Science, Program in Planning (Geography), Public Health Sciences, and Women & Gender Studies. Students from other units such as Adult Education & Community Development (OISE), Chemical Engineering, Forestry, Global Affairs, and Mechanical Engineering have also been admitted on an individual basis.

The public Environment and Health Seminar Series and spring term core course (ENV 4001) bring in top academics and experts to present their research and introduce students to a variety of interdisciplinary perspectives, methods, and concepts. The 2016-17 series, for instance, included presentations on the following topics: "Opioid Epidemics, Environmental Injustice, and the Right to Remain in Vancouver's Downtown Eastside" (Jeff Masuda, Queen's University), "Estimating Children's Exposure to Persistent Organic Pollutants Using Pharmacokinetic Modeling" (Marc-Andre Verner, Université de Montréal), "Plastic Debris in Aquatic Habitats" (Chelsea Rochman, U of T), and "Infectious Diseases in an Era of Globalization" (Kamran Kahn, U of T and Alexander Watts, BlueDot).

For more information, contact Dr. Clare Wiseman, Associate Professor and Coordinator of the Graduate Collaborative Specialization in Environment and Health.

Graduate Faculty

The following individuals have graduate faculty appointments at the School of the Environment.

Full Members

Grant Allen, Chemical Eng. & Applied Chem.
Robert Andrews, Civil Engineering
George Arhonditsis, Physical & Environ. Sci., UTSC
Spencer Barrett, Ecology & Evolutionary Biology
Steven Bernstein, Political Science
Alana Boland, Geography
Arthur Chan, Chemical Eng. & App. Chem.
Jing Chen, Geography
Donald C. Cole, Public Health
Simon Coleman, Religion
Tenley Conway, Geography, UTM
Paul Corey, Public Health
Sharon Cowling, Earth Sciences
Hilary Cunningham, Anthropology
Amrita Daniere, Geography, UTM
George Dei, Leadership, Higher and Adult Education, OISE
Miriam Diamond, Earth Sciences
Maria Dittrich, Earth Sciences
Birsen Donmez, Mechanical and Industrial Eng.
Steve Easterbrook, Computer Science
Elizabeth Edwards, Chemical Eng. & App. Chem.
Mark Engstrom, Ecology & Evolutionary Biology/ROM
Greg Evans, Chemical Eng. & Applied Chem.
Sarah Finkelstein, Earth Sciences
Roberta Fulthorpe, Physical & Environ. Sci., UTSC
William Gough, Physical & Environ. Sci., UTSC
Mart Gross, Ecology & Evolutionary Biology
L. Danny Harvey, Geography
Yuhong He, Geography, UTM
Matthew Hoffman, Political Science, UTSC
D. Linn Holness, Public Health
Ken Howard, Physical & Environ. Sci., UTSC
Marney Isaac, Physical & Environ. Sci., UTSC
Donald Jackson, Ecology & Evolutionary Biology
Charles Jia, Chemical Eng. & Applied Chem.
Dylan Jones, Physics
Shashi Kant, Forestry
Bryan Karney, Civil Engineering
Thembela Kepe, Geography UTSC
J. Gary Knowles, Leadership, Higher and Adult Education, OISE
Martin Krkosek, Ecology & Evolutionary Biology
Paul Kushner, Physics
Scott Mabury, Chemistry
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 & Environ. Sci., UTSC
G.W. Kent Moore, Physics, UTM
Andrea Most, English
Jennifer Murphy, Chemistry
Michelle Murphy, History
Andrea Olive, Political Science, UTM
W. Richard Peltier, Physics
Blake Poland, Public Health
W. Scott Prudham, Geography/Environment
John Robinson, Munk School of Global Affairs/ Environment
Helen Rodd, Ecology & Evolutionary Biology
Rowan Sage, Ecology & Evolutionary Biology
Mohini Sain, Forestry
Andrea Sass-Kortsak, Public Health
Shiho Satsuka, Anthropology
Lawrence Sawchuk, Social Sciences, UTSC
Stephen Scharper, Anthropology, UTM/Environment
Barbara Sherwood Lollar, Earth Sciences
André Simpson, Physical & Environ. Sci., UTSC
Myrna Simpson, Physical & Environ. Sci., UTSC
Grace Skogstad, Social Sciences, UTSC
C. Tattersall Smith, Geography
Sandy Smith, Forestry
Kimberly Strong, Physics/Environment
Edward Swenson, Anthropology
Susan Tarlo, Medicine
Judith Teichman, Political Science
Ross Upshur, Medical Science
Willem Vanderburg, Civil Engineering
Sarah Wakefield, Geography
Kaley Walker, Physics
Denis Walsh, Philosophy
Frank Wania, Physical & Environ. Sci., UTSC
Peter Wells, Pharmacy
Clare Wiseman, Environment
Debra Wunch, Physics/Environment

Adjunct Members

Jane Ambachtsheer, Environment
Brad Bass, Environment

Associate Members

Christian Abizaid, Geography/Environment
Christoph Becker, Information
Kerry Bowman, Bioethics
Laura Brown, Geography, UTM
Susannah Bunce, Geography, UTSC
Andrew Green, Law
Jacob Hirsh, Management, UTM
Igor Lehnherr, Geography, UTM
Douglas Macdonald, Environment
Barbara Murck, Geography, UTM
Kate Neville, Political Science/Environment
Dennis O'Hara, St. Michael's College
Matthew Ratto, Information
Njal Rollinson, Ecology & Evolutionary Biology/Environment
Marcelo Vieta, Adult Education and Community Development, LHAE/OISE
Helene Wagner, Ecology & Evolutionary Biology
Kathi Wilson, Geography, UTM
Cindy Woodland, Pharmacology
Tanhum Yoreh, Environment

Members Emeriti

Paul Aird, Forestry
Michael Bunce, Social Sciences, UTSC
Ian Burton, Physical & Environ. Sci., UTSC
Catherine Chalin Clark, Public Health
Brian Greenwood, Physical & Environ. Sci., UTSC
Andy Kenney, Forestry

Members Emeriti (continued)

Robert K. Logan, Physics
William Michelson, Sociology
Scott Munro, Geography
Henry Regier, Environment
Richard Sandbrook, Political Science
Beth Savan, Environment
Frances Silverman, Dalla Lana School of Public Health
Ingrid Stefanovic, Philosophy
Richard Stren, Political Science
Dudley Williams, Physical & Environ. Sci., UTSC
G. Ronald Williams, Biochemistry

Graduate Courses

2016-17 School of the Environment graduate course offerings and instructors.

Graduate Courses: Fall 2016

ENV 1001H Environmental Decision Making, *Kate Neville*
ENV 1701H Environmental Law *(also undergrad **ENV 422H**), Paul Muldoon*
ENV 1707H Environmental Finance: Risk Management and Business Opportunities, *Sue McGeachie*
ENV2002H The U of T Campus as a Living Lab of Sustainability, *John Robinson*
JGE 1425H Livelihoods, Poverty and Environment in Developing Countries, *Christian Abizaid*

Graduate Courses: Spring 2017

ENV 1001H Environmental Decision Making, *Doug Macdonald and Tanhum Yoreh*
ENV 1002H Environmental Policy, *Doug Macdonald*
ENV 1008H Worldviews and Ecology, *Stephen Scharper*
ENV 4001H Graduate Seminars in Environment and Health, *Clare Wiseman*
ENV 1704H Risk Analysis & Management, *Chris Ollson*
JSE 1708H The Development of Sustainability Thought, *John Robinson*

For more information, visit www.environment.utoronto.ca or contact Pavel Pripa, Program and Graduate Student Administrator, 416-978-3475; Pavel.Pripa@utoronto.ca

2016-17 Alumni of the Graduate Collaborative Specializations (CS) in Environmental Studies (ES) and Environment & Health (EH)

Student Name	Department	Degree	Program	Supervisor	Research Paper
November 2016 Convocation					
Yukari (Hannah) Hori	Physical & Environ. Sci., UTSC	PhD	EH	Bill Gough	Impact of Climate Change on Winter Road Systems in Ontario's Far North
Malcom Ramsay Shapcott	Anthropology	MSc	ES	Shawn Lehman	Roads Inhibit Movement in Malagasy Primates
Ramona Reece	Political Science	MA	ES	Viktor Falkenheim	From Consultation to Consent: Case Studies on Approaches to Free, Prior and Informed Consent in Belize, Canada and the United States
Alyssa Ann Amrud Scott	Geography	MA	ES	Christian Abizaid	Free, Prior and Informed Consent in Canada: The relationship of FPIC to Canada and Indigenous consultation on uranium mining in northern Saskatchewan
Karley Wong	Civil Engineering	MASc	EH	Ron Hofmann	Preliminary Investigation of Ferrate for Drinking Water Treatment: Mussel Control and Synergy with Powdered Activated Carbon
June 2017 Convocation					
Adeeba Ahmed	Public Health	MPH	EH	Paul Bozek	The Effect of Climate Change on Patterns of Zoonotic Disease, Air Quality and Mental Health
Rebecca Maria Barakat	Forestry	MFC	ES	Danijela Puric Mladenovic	A Comparison of Aboveground Biomass Estimates from Different Allometric Formulas using Vegetation Sampling Protocol in Rouge National Urban Park
Laura Bryson	Geography	MSc	ES	Christian Abizaid	Spatial Patterns of Natural Resource Depletion Among Rain Forest Communities in the Peruvian Amazon: The Role of Protected Areas and Indigenous Territories in the Conservation of Key Species
Shirley Xiaoxue Chen	Public Health	MPH	EH	N/A	Environmental and Ecological Drivers of Emerging Infectious Diseases, Changing Geography of Disease, Climate Change and Health
Shannon Coulter-Low	Geography	MA	ES	Virginia Maclaren	Understanding Organic Waste Behaviour: A Study of Backyard Composting and "Pay-As-You-Throw" in Beaconsfield, Quebec
Kimberly Joy Finuliar-Beckford	Public Health	MPH	EH	Paul Bozek	Mould/Asbestos Exposures in Buildings and Health Effects, Global Food
David Harary	Sustainability Management	MScSM	ES	Laura Derksen (Rotman)	The Use of Environmental Research on Capitol Hill
Kevin Jakiela	Sustainability Management	MScSM	ES	Igor Lehnherr	Determination of optimal growing conditions in geodesic greenhouses to increase food production capacity in northern communities of the Canadian Taiga
Hongri Jia	Chemical Engineering	MEng	ES	Charles Jia	Feasibility of Vanadium Recovery from Oil Sands Delayed Coke via NaOH Chemical Activation and Sequential Water Washing

2016-17 Alumni of the Graduate Collaborative Specializations (CS) in Environmental Studies (ES) and Environment & Health (EH)

Student Name	Department	Degree	Program	Supervisor	Research Paper
June 2017 convocation (continued)					
Emile Lavergne	Global Affairs	MGA	ES	Jutta Brunnée	Rising Tides, Shrinking Presence: Towards a Shared Understanding of the Legal Implications of Sea Level Rise on Small Island Developing States
Maelle Marchand	Public Health	MPH	EH	Sue Bondy	Prenatal Fluoride Exposure and Attention Deficits in Children
McCallum, Lindsay	Physical & Environ. Sci., UTSC	PhD	EH	Ingrid Stefanovic	Development and Application of Strategies for Health Impact Assessment of Projects and Policies
Michael Pahor	Public Policy	MPP	ES	Bill Hughes	Environmental Accomplishments and Commitments
Tea Pesheva	Sustainability Management	MScSM	ES	Harvey Shear	Factors Influencing the Ontario Source Water Protection Plan Implementation: Case Study: Halton-Hamilton and Credit Valley, Toronto Region, and Central Lake Ontario Source Protection Regions
Ashley Racine	Global Affairs	MGA	ES	Scott Aquanno	Can Wealth Accounting and Valuation of Ecosystem Services be Beneficial for Conservation
Keven Roy	Physics	PhD	ES	W. Richard Pelter	High-quality Constraints on the Glacial Isostatic Adjustment Process Over North America: The ICE-7G_NA (VM7) model
Alissa Saieva	Law	JD/ES	ES	Andrew Green	Canada, COP21, and Climate Change
Nicolas Scrivens	Sustainability Management	MScSM	ES	Shashi Kant	An analysis of the relationship between ESG and the financial performance of oil and gas sector firms during the 2014 oil price shock
Zachary Skeith	Global Affairs	MGA	ES	N/A	Sustainability in the private sector; Food sovereignty and security; Political Ecology
Guangyu Song	Chemical Engineering	MEng	EH	Arthur Chan	Activated Carbon Testing for Better Breathing Masks
Nathan Van Beilen	Sustainability Management	MScSM	ES	Shashi Kant	Circular Economy-Based Offsets in Ontario's Cap and Trade Program
Jessica Wilkin	Forestry	MFC	ES	Anne Koven	Bee management: The potential of Ontario's local distribution companies
Yudi Yang	Forestry	MFC	ES	Danijela Puric-Mladenovic	Future of Ash genus (Fraxinus spp.) in Prospect Cemetery--A Management Plan
Samer Yordi	Sustainability Management	MScSM	ES	Sara Hughes	Toronto's TowerWise Retrofit Program: An Assessment of its Success and Scalability
Kaijie Zhang	Sustainability Management	MScSM	ES	Matthew Osborne	Sustainability Practices in the Luxury Hospitality Industry: Exploring Effects of Customers' Perspectives on Sustainable Practices of Luxury Hospitality

One of the highlights of the School of the Environment's annual Research Day is the awarding of scholarships to our graduate students. The following awards were presented at Research Day 2017, held on April 19, and at the Eric Krause Memorial Lecture, held on April 5, 2017.

JOHN R. BROWN AWARD

This prize is in memory of the late **John R. Brown**, Professor of Environmental Health and Medicine. It was awarded to **Alison Traub**, a first-year Masters student in Chemical Engineering & Applied Chemistry and the Collaborative Specialization in Environment and Health. Her research focus on airborne particulate matter and associated impacts on air quality has already contributed to improving occupational and environmental health.

Alison Traub, winner of the Brown Award. (Photo by: Nathan Taylor)

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. This year's recipient is **Brianna Botchwey**, a second-year PhD student in the Department of Political Science and the Environmental Studies Collaborative Specialization, is advancing theory and policy around building local adaptive capacity to respond to a changing climate in two of the most vulnerable East African countries: Tanzania and Ethiopia.

Brianna Botchwey, winner of the Langford Prize. (Photo by: Nathan Taylor)

SPERRIN CHANT AWARD IN TOXICOLOGY

This award is given to a School of the Environment graduate student doing research in toxicology. This year's recipient is **Sivani Bashkaran,** a first-year Masters student in the Department of Chemistry and the Collaborative Specialization in Environmental Studies. Sivani's research focuses on factors controlling the potential for bioaccumulation of persistent organic pollutants (POPs) in fish. A modelling approach will be used to enable predictions of climate change impacts on POP distributions in the environment.

(L-R) Sivani Bashkaran and award presenter Clare Wiseman. (Photo by: Nathan Taylor)

ARTHUR AND SONIA LABATT GRADUATE FELLOWSHIPS

These fellowships were established through a generous donation from **Arthur and Sonia Labatt** and given to students enrolled in one of the graduate programs of the School of the Environment or in the JD/Certificate Program offered by the Faculty of Law and the School of the Environment. Preference is given to students who are exploring practical solutions to environmental issues. This year, six scholars received this award.

Esmerelda Bukuroshi, a second-year PhD student in the Department of Chemical Engineering and Applied Chemistry and the Environmental Studies Collaborative Specialization, is designing new kinds of complex organic molecules that can be incorporated into solar cells.

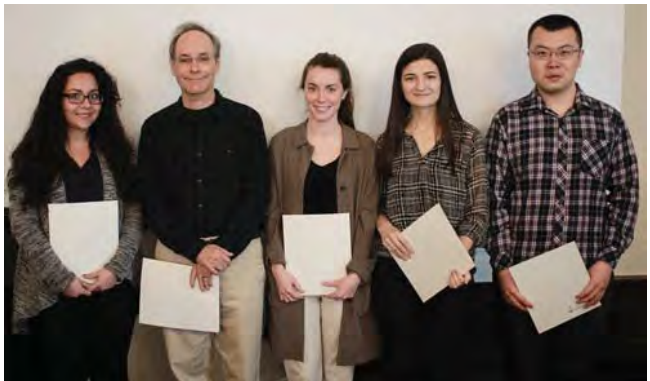
Cadhla Gray, a second-year Masters student at the Munk School of Global Affairs and the Environmental Studies Collaborative Specialization, is formulating policy solutions to environmental issues, with a focus on climate-induced displacement and mass migration.

Mark Hathaway, a senior PhD student and published author in Adult Education at OISE and the Environmental Studies Collaborative Specialization, is developing a pedagogical methodology for promoting meaningful responses to the ecological crisis and ending environmental denial.

Alissa Saieva, a third-year law student in the Faculty of Law enrolled in the JD/Certificate in Environmental Studies and the Certificate in Indigenous Studies, is focusing on the Crown's obligation to Indigenous people and is developing a powerful legal case for climate change action.

Guanyu Song, a second-year Masters student in the Department of Chemical Engineering and Applied Chemistry and the Environment and Health Collaborative Specialization, is developing new strategies for particulate matter detection based on Gas Chromatography-Mass Spectrometry (GC-MS), and on product commercialization for enhanced breathing masks.

Samantha Stead, a first-year Masters student in the Department of Anthropology and the Environmental Studies Collaborative Specialization, is focusing on primate social behavior in response to ecological changes, in Uganda, where oil extraction activities have led to declines in environmental and social wellbeing.



(L-R) Labatt Fellowship recipients Alissa Saieva, Mark Hathaway, Cadhla Gray, Esmerelda Bukuroshi, and Guanyu Song (Photo by: Nathan Taylor)

ERIC DAVID BAKER KRAUSE GRADUATE FELLOWSHIP

(***Presented at the Eric Krause Memorial Lecture on April 5, 2017)*** This fellowship is in memory of the late **Eric Krause**, a U of T Master's graduate of Geography and Environmental Studies.

(L-R) Katy Krause (Eric's sister), fellowship recipients Esmerelda Bukuroshi and Fantin Tawfig, and Arnald Krause (Eric's father) at the 2017 Krause Memorial Lecture (Photo by: Lauren Differ)

Esmerelda Bukuroshi, received an undergraduate degree in Biological Chemistry at University of Toronto Scarborough. She was a Dean's List Award recipient and the winner of the Chemical Industry Student Merit Award. She is presently a second-year PhD student in the Department of Chemical Engineering and Applied Chemistry, holds an NSERC Canada Graduate Scholarship and is enrolled in the Environmental Studies Collaborative Specialization. Esmerelda's research is in the area of emerging solar energy technologies. She is working on designing new kinds of complex organic molecules that can be incorporated into solar cells to vastly improve their efficiency and scalability.

Fatin Tawfig, received an undergraduate degree in Political Science and Psychology from Trinity College at the University of Toronto, and was a Dean's List award recipient. Fatin is presently an MA student in the Department of Political Science and is also enrolled in the Environmental Studies Collaborative Specialization. Fatin's research involves the role of the European Union in the international fight against climate change, and has a very timely focus on the effect of the rise of populist parties on the EU's leadership on climate action.

ALEXANDER B. LEMAN MEMORIAL AWARD

This award was established by the Leman family, friends and colleagues of **Alexander B. Leman**, an architect and urban planner who founded his own architectural firm (as well as Leman Group Inc., an urban development and planning consulting company). It is awarded to a graduate student enrolled in a collaborative program at the School of the Environment and the Department of Geography's Program in Planning; and is based on academic merit and financial need. This year's recipient is **Jielan Xu**, a fourth-year PhD student in the Department of Geography's Program in Planning and School of the Environment's Collaborative Specialization in Environment and Health. Her research looks at how the built-environment can potentially affect active lifestyles and the health and well-being of the aging population.

(L-R) Jielan Xu with Tamara Stefanovic, grand-daughter of Alexander Leman and daughter of Ingrid Stefanovic, former Director of the Centre for Environment. (Photo by: Nathan Taylor)

BEATRICE AND ARTHUR MINDEN GRADUATE RESEARCH FELLOWSHIP

This fellowship is awarded annually to one or more PhD students enrolled in the School of the Environment's graduate programs to provide them with support during the research stage of their dissertations, including enabling their involvement in conferences, summer schools, field work and collaborative visits to research groups across Canada and around the world. The four exceptional students who received the Minden Graduate Research Fellowship span the physical and life sciences, social science and health studies, showing the outstanding breadth of environmental research happening at U of T and at the School of the Environment.

Joaquin Bardallo Bandera, a fourth-year PhD student in the Department of Political Science and the Environmental Studies Collaborative Specialization. Joaquin's research examines relationships between natural resource extraction, and the protection of social and environmental rights in Latin America. The Minden Award will allow Joaquin to conduct field-based interviews in Peru, Bolivia and Chile to develop new insights into the role of policy in protecting social and environmental rights.

(L-R) Joaquin Bardallo Bandera with Jo-Ann Minden at Research Day 2017. (Photo by: Nathan Taylor)

Ellen Gute, a second-year PhD student in the Department of Environmental and Physical Sciences at UTSC and the Environmental Studies Collaborative Specialization. Ellen's research focusses on atmospheric processes involved in cloud formation using cutting-edge measurements and experiments. Ultimately this work will enable better predictive models of cloud formation and associated climate impacts. The Minden Award will allow Ellen to test new instruments for measuring aerosols as part of the CLACE (Clouds and Aerosol Characterization Experiment) field campaign at the High Altitude Research Station at Jungfraujoch, Switzerland.

(L-R) Ellen Gute and Jo-Ann Minden, daughter of Beatrice and Arthur Minden. (Photo by: Nathan Taylor)

BEATRICE AND ARTHUR MINDEN GRADUATE RESEARCH FELLOWSHIP (CONTINUED)

Nicole Spiegelaar, a fourth-year PhD student in Environment and Health at U of T. Nicole is engaged in multi-disciplinary research on mental health in indigenous communities in Northern Ontario through the lens of environmental psychology. Through collaborations with the James Bay Cree, Nicole is developing a resilience-building conceptual framework for mental health using principles of Ecosystems Psychology. The Minden Award will enable Nicole to present her findings at an international conference in the emerging area of environmental psychology.

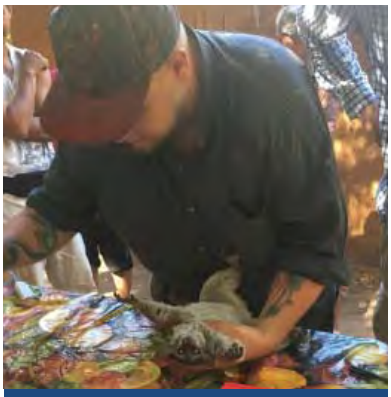
(L-R) Nicole Spiegelaar and Jo-Ann Minden. (Photo by: Nathan Taylor)

Malcolm Ramsay, a first-year PhD student in the Department of Anthropology and the Environmental Studies Collaborative Specialization. Malcolm's doctoral research looks at the effects of forest fragmentation on endangered mouse lemurs in Ankarafantsika National Park, Madagascar. The Minden Award will be used to support field work in Madagascar where he will collect data on lemur populations in the poorly studied dry forest region.

(L) Photo of a baby lemur in Madagascar. (Photo by: Malcolm Ramsay)

Joaquin Bardallo Bandera in Bolivia

Ellen Gute at the Aletsch Glacier



Malcolm Ramsay examining a lemur in Madagascar

ALAN H. WEATHERLEY GRADUATE FELLOWSHIP IN ENVIRONMENTAL LEADERSHIP

(L-R) Dan Weaver and Robena Weatherley (Photo by: Nathan Taylor)

The Alan H. Weatherley Graduate Fellowship in Environmental Leadership is awarded annually to one PhD student enrolled in the School of the Environment's graduate program who demonstrates exceptional academic and/or practical leadership related to environmental issues. This year, the second annual award was presented to **Dan Weaver.**

Dan Weaver is a senior PhD student in the Department of Physics and the Environmental Studies Collaborative Specialization. Dan's research involves the use of infrared spectroscopy to measure atmospheric composition in order to improve our understanding of the processes controlling the Arctic atmosphere. He has led an international team in a meticulous assessment of water vapour products from a suite of instruments in the Canadian high Arctic, which he has visited on four field campaigns.

Dan is also an exceptional student leader and has done much to promote awareness and positive change on environmental issues, including leading town hall meetings on climate change research, speaking to elementary and high school students in Nunavut, teaching at the Toronto Public Library, serving as a trainer for teaching assistants at U of T and teaching in a highly inter-disciplinary U of T course "Science for Change". He was of President the Graduate Environmental Students Association, directed the Science Rendezvous for Educators Program, and served as secretary and treasurer for Evidence for Democracy, a national organization promoting transparent use of evidence in government decision-making in Canada.

Environmental Finance Advisory Committee

The Environmental Finance Advisory Committee (EFAC) consists of 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 on topics within the field of environmental finance to promote dialogue among business, industry, government, academia and the private sector.

Environmental Finance Advisory Committee Events

(June 2016 to July 2017)

November 23, 2016 – Fourth Annual Willis & White Thought Leadership Event: **"Update from the 2016 Marrakech UN Climate Negotiations: Conference Highlights & Considerations for Canada and the Provinces Under the Paris Agreement"**.
Panelists: The Honourable **Glen Murray** (Ontario Minister of Environment & Climate Change), Lisa DeMarco (Partner, DeMarco Allan LLP), **Erik Haites** (President, Margaree Consultants and Advisor to UNFCCC on Biennial Assessment and Overview of Climate Finance), **Robert Page** (IETA Fellow; Board Chair of the ISO 14000 international environmental standards board (Geneva); member of the Climate Action Group to the Ontario Minister of the Environment and Climate Change), and **Katie Sullivan** (Director of The Americas & International Climate Finance, International Emissions Trading Association), with moderator **Gray Taylor** (Counsel, Climate Solutions Group; Distinguished Visiting Fellow, School of the Environment; Principal, Gray Taylor Law). This event was co-sponsored by the **Ivey Foundation** and **Navigant**, and held at the Faculty Club.

November 24, 2016 – "Investing in Low Carbon Assets: How to Unlock Carbon Opportunities"
Panelists: **Dianne Saxe** (Environmental Commissioner of Ontario), **Deborah Ng** (Director, Strategy and Risk, Ontario Teachers' Pension Plan), and **Paul Manias** (Managing Director, OMERS Platform Investments), with moderator **Keith Ambachtsheer** (Adjunct Professor of Finance, Rotman School of Management and President, KPA Advisory Services). This event was jointly hosted by the School of the Environment's Environmental Finance Advisory Committee and the Rotman School of Management. It was also co-sponsored by the Ivey Foundation and Navigant.

February 7, 2017 – One-day workshop on **"Today's New and Developing Carbon Markets – Part 2"**. Speakers: **Gray Taylor** (Gray Taylor Law), **Jessica Butts** (Delphi Group), **Michael Tubman** (Director of Outreach Center for Climate and Energy Solutions, C2ES), **Julie Desjardins** (Julie Desjardins Consulting), **Patricia Koval** and **Tyson Dyck** (Torys LLP), **Rob Wilson** (Director, Carbon Finance, Nature Conservancy of Canada). This event was hosted at Torys LLP.

June 21, 2017 – "Financing Stormwater Management – Infrastructure Funding Gap"
Panelists: **Helge Daebel** (Investment Director, Water – Emerald Ventures), **Phil James** (Manager, Integrated Water Management, Credit Valley Conservation Authority), **Victoria Kramkowski** (Stormwater Charge Program Coordinator, City of Mississauga), and **Tracy Patterson** (Principal Freeman Associates), moderated by **Katherine Balpataky** (Editor of Water Canada). This event was held in conjunction with Water Summit Canada, and was hosted at Bennett Jones LLP.

June 26, 2017 – "Discover International Market Opportunities through the Climate Technology Centre and Network (CTCN) and the Climate & Clean Air Coalition (CCAC)". Speakers and Guests: **Diana Cartwright** (Canada's National Designated Entity for the CTCN, Natural Resources Canada, Government of Canada), **Dan McDougall** (Senior Fellow, CCAC), **Gray Taylor** (General Counsel, Climate Solutions Group Limited), **Sandra Odendahl** (Incoming President and CEO, CMC Research Institutes), **James Larsen** (Director, Business Development, MaRS Advanced Energy Centre), and **Petia Tchoukaeyska** (Trade Commissioner, Global Affairs Canada), with moderator **Katie Sullivan** (Managing Director, IETA). Sponsors and organizers of this event included: MaRS Advanced Energy Centre, Natural Resources Canada, Global Affairs Canada, Climate Solutions Group, International Emissions Trading Alliance, CMC Research Institutes, Climate & Clean Air Solutions, and the School of the Environment's Environmental Finance Advisory Committee. It was held at the Ontario Investment and Trade Centre in Toronto.

NEW MEMBERS

We would like to thank retiring EFAC member Michael Barrett (Partner, Corporate, Bennett Jones LLP) for his service to the committee, and to welcome the five new members highlighted in blue.

COMMITTEE MEMBERS

Amanda Ackerman - *Managing Consultant, Energy, Navigant Consulting (2018 Committee Co-Chair)*

David Berliner - *Co-Founder and CEO, CoPower*

Richard Blundell - *Adjunct Professor, Executive-in-Residence, Business Sustainability, Rotman School of Management*

Jessica Butts - *Director, The Delphi Group*

Samantha Cameron - *Junior Analyst, Sustainable Investing, Addenda Capital*

Lisa DeMarco - *Senior Partner, DeMarco Allan LLP*

Julie Desjardins - *President, Desjardins & Associates Consulting Inc.*

Toby Heaps - *President and Co-Founder, Corporate Knights*

Peter Johnson - *Senior Manager Environmental and Social Risk, Scotiabank*

Sarah Keyes - *Sustainability Principal, Research, Guidance & Support; Chartered Professional Accountants of Canada*

Hyewon Kong - *Associate Portfolio Manager, AGF Investments Inc.*

Patricia Koval – *former Partner, Torys LLP*

Sonia Labatt - *School of the Environment, Dean's Advisory Board Member, Faculty of Arts & Science*

Todd Latham - *President, Actual Media*

Rosemary Martin – *former Chief Sustainability Officer, First Capital Realty (2016/2017 Committee Co-Chair)*

Susan McGeachie - *Market Leader, Climate Change and Sustainability Services, E&Y and Adjunct Faculty, School of the Environment*

Andrea Moffat - *Vice President, Ivey Foundation*

Donna Nielsen - *Manager, Program & Partnership Development, School of the Environment*

Sandra Odendahl - *President & CEO, CMC Research Institutes*

Susan Sheehan - *Vice President, Sustainability Consulting, G&S Business Communications; Founder, President & CEO, Getcleantech*

Chris Snyder - *Senior Director, Environmental Risk Management, Corporate Credit Canada, CIBC*

Kimberly Strong - *Director, School of the Environment (2016/2017 Committee Co-Chair)*

Katie Sullivan - *Director, North America Policy and International Climate Finance, International Emissions Trading Association*

Gray Taylor - *Barrister and Solicitor, Gray Taylor Law and Distinguished Visiting Fellow, School of the Environment*

Bill Tharp - *CEO, Climate Change Infrastructure Corporation*

Rob Wilson - *Director, Carbon Finance, The Nature Conservancy of Canada (2018 Committee Co-Chair)*

Laura Zizzo - *Founder and CEO, Zizzo Strategy Inc.*

Fourth Annual Willis & White Thought Leadership Event

The Hon. Glen Murray, Ontario Minister of the Environment and Climate Change, with University of Toronto School of the Environment students at the 2016 Willis and White Thought Leadership Event held at the Faculty Club on Nov. 23 (Photo by: Nathan Taylor)

Update from the 2016 Marrakech UN Climate Negotiations: Conference Highlights & Considerations for Canada and the Provinces Under the Paris Agreement

The School of the Environment's fourth annual **Willis and White Thought Leadership Event** on November 23, 2016 provided insight into the 22nd Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), dubbed COP22, that took place in Morocco that year. The event, **Update from the 2016 Marrakech UN Climate Negotiations: Conference Highlights & Considerations for Canada and the Provinces Under the Paris Agreement**, included an expert panel on issues related to climate change, some of whom were part of the discussions at the UN conference in Morocco. The event was organized by the School's Environmental Finance Advisory Committee (EFAC) and hosted by Director **Kimberly Strong**.

Gray Taylor (Counsel of the Climate Solutions Group and Distinguished Visiting Fellow at the School of the Environment) moderated the discussion. The speakers reported on developments from COP22 and their implications for Canada and Ontario and shared their thoughts on the outlook for the Clean Power Plan, the Paris Agreement, and potential for cooperation and markets at home and abroad, given the outcome of the US election.

The panel proclaimed that Canada is making strides toward finding cooperative market-based solutions to reducing greenhouse gas emissions. According to Minister Murray, an alliance with Quebec and California puts Ontario at the forefront of a new de-carbonized economy that will generate six times the economic expansion created during the information technology revolution.

The panel consisted of international and Canadian climate policy and finance experts, some of whom were on the ground in Marrakech earlier in November for COP22 and the First Meeting of the Parties under the Paris Agreement (COP21) to combat climate change. The panellists were:

Katie Sullivan (Director of The Americas & International Climate Finance, International Emissions Trading Association - IETA),

Lisa DeMarco (Partner, DeMarco Allan LLP),

Erik Haites (President, Margaree Consultants and Advisor to the UNFCCC),

Robert Page (IETA Fellow, Chair of the ISO 14000 international environmental standards board, and member of the Climate Action Group to the Ontario Minister of the Environment and Climate Change), and

The Hon. Glen Murray (Ontario Minister of the Environment and Climate Change).

The panel discussion was followed by the presentation of two scholarships (see page 19) established by family and friends to honour the memory of Errick "Skip" Willis and Rodney White, both former members of the School's Environmental Finance Advisory Committee (EFAC). EFAC members **Katie Sullivan** and **Sue McGeachie** spoke about Skip and Rodney, their many accomplishments, and their dedication to education and mentoring.

Proceeds from the evening are being distributed equally between the two scholarships. The generous contributions of co-sponsors, the Ivey Foundation and Navigant also represent a significant addition to the scholarship funds.

The formal proceedings were followed by a reception at the Faculty Club attended by members of the business community, students, faculty, and members and friends of the Willis and White families. The audience of more than 100 included graduate students in ENV1707, Environmental Finance and Sustainable Investing, who attended as part of their course. This annual event continues to foster interaction and engagement between the School of the Environment and the wider community.

Online Certificate Programs & Courses

The School of the Environment's Professional Development Program
The need for solutions to environmental issues has never been greater. Sustainability, energy, climate change, mitigation and adaptation, extreme weather, biodiversity, land use, air quality, conservation, water, resource use, and health are among the challenges we face.

With a focus on interdisciplinary studies, the School of the Environment at the University of Toronto has an opportunity to make a difference. By bringing together scholars from many disciplines, students interested in the environment, and the wider community beyond the University, we are well placed to contribute to understanding and improving the complex relationships between humans and the environment in which we live.

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

Learn more: https://www.environment.utoronto.ca/professional-development or contact Donna Nielsen, Manager, Professional Development Programs, 416-978-7077, d.nielsen@utoronto.ca

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 four compulsory courses:

CCP 400 Climate Policy
CCP 401 Sustainability Reporting
CCP 402 GHG Accounting and Reporting (ISO 14064-1)
CCP 403 Greenhouse Gas Validation and Verification (ISO 14064-3)

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 441 Urban Sustainability
CEM 402 Strategies in Environmental Management
CEM 403 Environmental Risk Assessment

Advanced Study in Environmental Management

This course focuses on key approaches, processes, challenges, and problems related to the field of environmental management. Through the introduction of a wide variety of course materials, on-going discussions, and assignments, students will become familiar with, and equipped to engage in, the cooperative resolution of complex environmental issues.

When one thinks about the natural environment, often images of majestic waterfalls, pristine forests and wild animals wandering endless savannah come to mind. In recent years, these images are being overshadowed by the impact of human activities on the environment - images of melting polar ice-caps, reports of depleted fish stocks, satellite imagery showing large tracts of burning forests due to anthropogenic effects, and increased incidence of diseases like SARS and swine flu that are a result of globalization and other factors.

We are becoming increasingly aware of the far-reaching impacts of humans on the natural environment. The study of environmental management requires an understanding from a multitude of perspectives, drawing upon skills from numerous areas. The effects of environmental management can be critical for both developed and developing countries, often requiring different approaches and decision-making processes.

Through an interdisciplinary approach, CEM 400 engages students in various environmental issues and imparts a set of skills they can utilize in the decision-making process for environmental management.

The Advanced Certificate Program is comprised of six courses:

CEM 400 Fundamentals of Environmental Management
CEM 441 Urban Sustainability
CEM 402 Strategies in Environmental Management
CEM 403 Environmental Risk Assessment
CEM 444 Global Environmental Issues
WRM 402 Urban Water Issues

Online Certificate Programs & Courses

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 rates of development.

The program will explore historical and current perspective on forms of renewable energy, their current usage in developed and developing nations, drivers in forming markets, and political will. The interdisciplinary approach of this program challenges the learner to explore the impacts of renewable energy on the current global energy picture.

Grounded in a holistic approach to sustainable development, the program aims to develop strategic, consensual, and inclusive solutions to the renewable energy and environmental management case studies. The Certificate Program is comprised of four courses:

Two compulsory courses:
CRE 400 - Principles of Renewable Energy
CRE 401 - Biofuels

Two of the following courses:
CRE 402 - Wind Energy
CRE 403 - Urban Energy Systems
CRE 404 - Solar Energy

Geographic Information Systems (GIS) for Environmental Management

GIS (Geographic Information Systems) is a rapidly expanding computer technology field involving mapping and analysis of spatial data. GIS is a powerful tool for the analysis of geographic information and in decision making. It is a technological application, which can be used across various disciplines.

GIS enables the user to assess and manage existing conditions, and help predict future conditions. GIS is used today in fields as diverse as criminal justice, marketing, economic development, public health administration, environmental assessment, risk analysis, ecology, urban planning, emergency management, real estate, education etc.

The Certificate in GIS for Environmental Management provides students with a broad exposure to the principles and applications of GIS. Students will develop a strong foundation in GIS and Remote Sensing theory and techniques and GIS software skills.

The Certificate in GIS for Environmental Management is comprised of four courses.

Required Courses:
GEM 400- Introduction to GIS for Environmental Management
GEM 401- Advanced GIS for Environmental Management

And any two of the following:
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

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.

The Certificate in Water Resource Management aims to increase participants' water IQ, as well as provide a coherent basis for learning about current and emerging water issues at the global, regional and local scale. We will focus on institutional and economic aspects of water in the context of climate change and expected water scarcity. Specifically, the course will present a critical overview of the value placed on water – both explicit and implicit – in today's societies. Courses from other program streams complement the focus on the significant role that water development and responsible use play in energy, cities etc. as well as useful techniques (e.g. GIS) for further research and learning.

Three compulsory courses are required:
WRM 400 - Water Resource Management
WRM 401 - Water Auditing
WRM 402 - Urban Water Issues

And one of the following courses:
CRE 400 - Principles of Renewable Energy
GEM 400- Introduction to GIS for Environmental Management

In-Class Certificate Programs

Greenhouse Gas (GHG)

GHG Inventory, Accounting and Reporting ISO 14064-1

Climate change has become an issue of critical importance to business as regulations continue to emerge and stakeholders demand increasing levels of information related to environmental performance. Many companies are seeking to manage their exposure to climate risks and realize the growing opportunities through developing a carbon management strategy.

This course covers the principles and process of preparing a facility or company-wide greenhouse gas'(GHG) inventory. Participants will become very familiar with the International Organization for Standardization (ISO) standard, ISO 14064-1 and the World Business Council for Sustainable Development and World Resources Institute Greenhouse Gas Protocol. These standards have become the foundation for most regulated and voluntary GHG reporting systems in North America.

GHG Project Quantification, Monitoring and Reporting ISO 14064-2

Climate change policy and programs are developing quickly in jurisdictions around the world. A large focus of this activity is to mitigate greenhouse gas (GHG) emissions with discrete projects. GHG projects that are quantified, monitored and reported using recognized standards, such as the International Organization for Standardization (ISO) standard, ISO 14064-2, may result in a commoditized "credit" that is traded in regulatory and voluntary schemes. This course covers the principles and process of preparing a GHG project. Participants will become very familiar with ISO 14064-2 and the World Business Council for Sustainable Development and World Resources Institute's Greenhouse Gas Protocol for Project Accounting. Anyone intending to develop or manage GHG projects will benefit from the information and interactive exercises in this course. People intending to become a GHG verifier will also benefit from this course (additional courses specifically focused on GHG verification are available).

Greenhouse Gas Validation and Verification

The projected environmental impacts of greenhouse gas (GHG) emissions are driving many organizations to reduce their GHG emissions, using independent, third-party verifiers to measure and verify their GHG emissions as part of an overall strategy that could lead to becoming net carbon neutral. This two-day course will provide detailed training on the approach to using the ISO 14064-3 standard, with specific examples of how verification would be applied to a GHG inventory prepared according to the ISO 14064-1 standard, or a project that conforms with the ISO 14064-2 standard. An overview of GHG Inventory and Project accounting (following ISO 14064-1, ISO 14064-2, respectively) is also provided.

Energy Programs

Renwable Energy Technologies

As we move into a carbon-constrained era, the use of available sources of carbonfree energy will intensify. Coupled with continuing price decreases that move renewable energy systems towards price-parity with fossil fuels, owners, utilities and governments will intensify their interest in these technologies. Yet they are poorly understood and mistakes are made as systems are integrated into buildings and utility systems without proper understanding. This intense, one-day course covers five key renewable energy technologies: solar photo-voltaics, solar thermal hot water, solar thermal air, geo-exchange and air source heat pump technology, and, wind energy systems.

Implementing Energy Systems Management (ISO 50001)

Energy is critical to organizational operations and can be a major cost to any business. Although organizations cannot control energy prices, government policies or the global economy, how their energy is managed can be improved.
This one-day course is based on the energy management planning principles of ISO 50001 and the broader energy management process. We will follow ISO 50001's main premise of a process from development of an energy policy through energy management planning to implementation, measurement and verification.

This course will provide owners, managers, consultants and other building professionals a road map to assess utility costs and consumption; how to develop retrofit programs; and detail the various methods employed to identify, implement, monitor and sustain conservation programs.

Sustainability Reporting

The objective of this two--day course is to provide participants with the knowledge to start or enhance their organization's sustainability reporting projects through providing a current and relevant overview of the Sustainability reporting universe. Students will gain a strong understanding of sustainability reporting practices, pitfalls to avoid, and ways to ensure their sustainability reporting is meaningful and value-added to their organization. This will be done through discussion, review of up-to-date research, and analysis of current existing sustainability reports. Additionally, participants will gain an enhanced ability to assess and evaluate other organization's sustainability reports.

Water Auditing ISO 14046

An expanding population, urbanization, escalating standards of living, and climate change all place pressure on the world's water resources. This program will provide a thorough background to understand and manage issues facing the world's water Water Auditing (ISO 14046) supply, including current best practices to manage and reduce a water footprint. Ensure your organization is managing its water footprint effectively and economically.

ENSU 2016-2017 Update

The Environmental Students' Union (ENSU) is a student-run organization representing the undergraduate students enrolled in the programs at the School of the Environment with the goals of increasing student involvement and building student community and identity. As well, ENSU strives to increase environmental awareness on campus. In their 2016-2017 mission statement they outlined their mandate:

"We seek to bring students and faculty together to create an inclusive, fun, educational community that is environmentally engaged and aware. We will do this by providing tools and resources through events that are sustainable, informative and relevant to students' interests."

Throughout the year, ENSU organized socials, fundraisers, seminars and community initiatives. In addition they facilitated the successful Peer Mentorship program. Listed are the 2016-2017 events organized by ENSU:

- Food Recovery Gleaning Trips (June, July, August)
- Month of Local Greenspace tours (September)
- ENSU Pub night (October)
- Documentary Screening (Mentorship Event) and Academic seminar on Urban Sustainability Panel (November)
- Dakota Pipeline Fundraiser (December)
- Vegetarian cooking workshop (Mentorship event), General meeting, BYO Social (January)
- Young Farmers event (Mentorship event), Plan Spirit Wear (February)
- Pub night, Networking event (Mentorship event), Ecofestà waste sorting workshop
- Academic Seminar - Environmental Activism Panel (March)
- Mentorship Closing Ceremony (April)

Students at a Peer Mentorship Networking event

Students enjoying the ENSU vegetarian cooking workshop

2016-17 ENSU EXECUTIVE

- **Adriana Shu-Yin and Daphne Wang**, Co- Presidents
- **Jennifer Del Riccio**, Secretary
- **Gregory Diebold,** Treasurer
- **Soverna Lindo,** Director of Mentorship
- **Danielle Owusu**, Social Media and Communications Coordinator
- **Zoe Zhao,** Webmaster
- **Victoria Shirriff**, Sustainability Officer
- **Rachel Sutton**, Sustainability Officer
- **Farida Abdelmeguied,** Newsletter Editor
- **Natalie Cresswell**, Newsletter Editor
- **Monika Filiks**, Upper Year Representative
- **James Povilonis**, Upper Year Representative
- **Jared Connoy,** Lower Year Representative
- **Nicole Logtenberg**, Lower Year Representative

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ENSU 2016-2017 Peer Mentorship Program

This year ENSU's mentorship program, started in November 2015, had a total of 42 participants. The program pairs an upper year student with a lower year student who serves as a guide/ facilitator for environmental courses, networking with professors, exams aid, and other opportunities within the school centered around the environment. Mentors and mentees meet once per month in an informal setting, including four monthly themed events hosted by ENSU. This program offers students an opportunity to build an environmental community on campus, network and improve their communication and leadership skills.

The ENSU Mentorship program hosted monthly themed café nights for the participants offering the students the opportunity to explore topics outside the classroom, as well as implement classroom materials into personal interests and activities.

The first café, in collaboration with another ENSU event, screened "The Clean Bin Project" on waste reduction. The Second Café was a vegetarian cooking event geared towards promoting sustainable and healthy ways of food preparation. The third was the Young Farmer's night which was developed to encourage students to start planting their own backyard vegetables such as tomatoes, herbs, etc.
The final event was a networking session with grad students, professors and professionals from the environmental sector.

At the closing ceremony, the director for the University of Toronto Mentorship program presented certificates for successful completion of the program and awards to outstanding mentor and mentee pairs.

Students participating in the Young Farmers Night

GESA 2016-2017 Update

The **Graduate Environmental Students' Association (GESA)** represents graduate students enrolled in the School of the Environment Collaborative Specializations. They organize both social and academic events to bring light to relevant environmental issues in an informal setting.

The aim of GESA is to foster collaborative dialogue on a range of topics and to liaise with other environmental groups on campus.

GESA had a very productive 2016-2017. They started off the semester with a summer picnic on Toronto Island and a visit to Evergreen Brickworks where members sampled some great local food and enjoyed some urban hiking. Throughout the year GESA held several Brown Bag lunches on a variety of themes such as endangered species conservation, pipelines, and Trump's environmental policy.

In the spirit of collaboration, GESA worked with the Forestry Graduate Students' Association (FGSA) and the Graduate Geography and Planning Student Society (GGAPSS) to host the first "Environmental Pub Night" which brought together students from Geography, Forestry and the School of the Environment. They also held a networking event with the Environmental Students Union (ENSU) which saw attendance from faculty, graduate and undergraduate students from the School.

The main academic event for the year was a documentary film screening of "After the Last River", a film that follows the Indigenous community of Attawapiskat's journey from obscurity and into the international spotlight during the protests of Idle No More. The screening was followed by a discussion with the filmmaker VIcki Lean.

GESA looks forward to another great year for graduate students at the School of the Environment!

(Back row L-R) Joaquin Bardallo Bandera, Brendan Byrne and Charlie White. (Middle) Janina Kowalski (Bottom row) Fantin Tawfig and Edward Kim

2016-17 GESA EXECUTIVE

- **Brianna Botchwey**, GESA President
- **Joaquin Bardallo Bandera**, GESA Vice-President
- **Melissa Lavigne**, GESA Secretary
- **Brendan Byrne** and **Edward Kim,** GESA Treasurers
- **Janina Kowalski**, GESA Events Coordinator
- **Fatin Tawfig** and **Katie Valentine**, GESA Communications Coordinators
- **Jennifer Langill** and **Charlie White**, UTGSU Representatives
- **Courtneay Hopper,** Member-at-Large

Contact:
http://gesa.sa.utoronto.ca
https://www.facebook.com/GESAatUofT
https://twitter.com/gesa_uoft
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GESA at the Evergreen Brickworks

Environment Students Plan Legal Action Against the Canadian Government for Climate Change Inaction

U of T Students rally to safeguard children's rights through key recommendations in a 52-page report delivered to their local MPs and the Minister of Foreign Affairs

Two dozen environment and law students from the **University of Toronto Environmental Action (UTEA)**, and their supporters, some as young as 15, gathered on the landing outside Sidney Smith Hall on February 1, 2017 charging that government inaction on climate change issues is a morally unfair "intergenerational injustice," one that contravenes the laws created to protect children's rights. Those same laws dictate that the government has a moral and legal obligation to intervene if children's rights are not being protected. To prevent that from happening, they planned to take the Canadian government to court.

"The current generation of decision-makers are not paying the price of ineffective action on climate change and are passing that price on to young people, who will pay a much greater price in the future," explained **Douglas Macdonald**, a senior lecturer at the School of the Environment. He is an environmentalist with expertise on the politics of Canadian environmental policy-making and particularly federal-provincial climate-change policy and advisor to the students.

UTEA received the help they needed in the form of legal advice from the David Asper Centre for Constitutional Rights, which is a part of U of T's Faculty of Law that focuses on "advocacy, research and education in the area of constitutional rights in Canada," to create a case.

The result was **Give our Children a Future: The moral and legal obligation of the Government of Canada to act on climate change**, a 52-page report outlining the steps that the Canadian government should take to lessen the impact of climate change. Written and published by the students of UTEA, with assistance from the Asper Centre under the supervision of faculty members like **Cheryl Milne** and Macdonald, the report boldly addresses the Government of Canada, and makes specific recommendations on how to proceed to meet its climate change commitments and obligations under its own Charter of Rights and Freedoms.

The legal obligation comes in two forms, Macdonald explains. "Canada has an international commitment under international law to the UN Convention on the Rights of the Child and this is in violation of that convention."

The Government of Canada is bound by the Charter of Rights and Freedoms, adds Macdonald. "Section 15 of the Charter says that the Government of Canada cannot discriminate on the basis of race or religion or gender, or age; and our argument is that this is discrimination on the basis of age because young people are being treated differently from the rest of the population because current Government of Canada policies result in a much greater future cost for young people."

Also under the Charter, section 7 says that governments have an obligation to protect the security of the person, this is all people, regardless of age, and they're failing to do that, says Macdonald. The government's failure to act amounts to discrimination against young people .

Students rally at Spadina and Bloor

UTEA's report highlights Environment Canada's 2013 analysis identifying the primary sources of emissions by economic sector. Oil and gas, transportation and electricity are the top three emitters by industry. It also highlights the fact that for the past twenty-odd years, successive federal governments have taken almost no regulatory action to identify specific sources of emissions.

UTEA believes that as a first measure the government should work with the provinces to strengthen the Framework agreement and take action to increase the national carbon price - a GHG emissions fee charged to companies for each ton of carbon dioxide that they release into the air. The idea is that the more they pollute, the more they pay, and the higher the price, the greater the incentive for these companies to pollute less.

The second category of actions is about what the Government of Canada could do by itself, separate from the provincial government. UTEA suggests that the government exercise its own constitutional authority to end oil extraction in the North. Macdonald expands on the group's position, by adding, "We're saying don't approve more pipelines that cross provincial borders."

Macdonald adds, "the third thing the Government of Canada should do is to stop making the problem worse, for instance, by giving subsidy to the oil industry." The federal Liberal party ran on a platform of ending government subsidy to the oil industry. Since the election, they've backtracked.

Despite the government's failure to fully commit to their promises and act on the obligations they've outlined in the report, the students firmly believe that Prime Minister Trudeau remains "committed to protecting our children against future climate change impacts."

"We know from his October 3, 2016, statement in the House of Commons that the Prime Minister shares our concern. We want to help his government take the necessary action," says **Nancy Xue**, one of the co-presidents of UTEA.

The other co-president, **Julia Chen**, says, "Like every father, he is concerned about his children and climate change. We know he will listen to our message."

The students intentionally released the UTEA report on the day of the rally as a tactic to bring attention to the future injustice of climate change. At the end of the march from St. George and Willcocks St. over to Bloor St., Chen and Xue handed over the yellow manila envelope they were carrying to a delegate from the Ministry of the Environment who invited a smaller group of them into the boardroom to state their case at a boardroom table. Local MP and Foreign Affairs Minister Chrystia Freeland was out of town.

Give our Children a Future: The moral and legal obligation of the Government of Canada to act on climate change has been distributed to the media. UTEA are asking supporters to contact their local MPs. They are working on the next step, which is planning the litigation to achieve climate justice for young people.

Backpack to Briefcase (b2B): Mentorship Dinners

At the Faculty of Arts & Science's Backpack to Briefcase (b2B) events, School of the Environment undergraduate and graduate students meet with alumni from their programs, who are invited back to share their education and career experiences and to offer encouragement and advice. b2B dinners were held on November 22, 2016 and February 9, 2017 at the U of T Faculty Club. The events provide opportunities for students to understand their education in a broader context – opening discussions with alumni, faculty members, staff and peers about life after graduation.

Environment alumni guests in November 2016:

- **Coralie D'Souza, HBA 2007**
- **Bryan Purcell, HBA 2005**
- **Amy Stein, BA 1991 / MA 1996**
- **Ana Tinta, HBSc 2008**

Environment alumni guests at the February 2017 dinner:

- **Olivia Chan, HBSc 2009**
- **Angela Garvey, HBA 2009**
- **Stephen Lee, BA 2000**
- **Felicity Ni, HBSc 2013 / MESC 2014**

For more information, please contact Carlo Siochi, Alumni Relations Officer, Office of Advancement, A&S, carlo.siochi@utoronto.ca

November (above) and February (below) b2B dinners

Marketing Critical-Thinking Skills to Employers

For the third year, the School of the Environment held a workshop on Marketing Your Critical Thinking Skills for undergraduate and graduate students in School programs. It took place on Saturday, March 11, 2017, in conjunction with the Faculty of Arts & Sciences' STEP Forward program.

Led by workshop facilitators **Rachel York-Bridgers**, PhD, Professor, Western Carolina University, and **Jonathan Turner**, PhD, Career Educator, U of T Career Centre, the objective was to help prepare students for pursuit of a career through the provision of tools and strategies to market and present themselves effectively to employers. Interactive sessions were used to help students gain:

• a better understanding of the importance and shortage of critical-thinking skills in the workforce, and the high employer demand for these skills

• an understanding and awareness of the critical-thinking skills that students have acquired during their undergraduate studies

• an understanding of how employers and graduate schools assess and review critical-thinking skills, and strategies and opportunities for marketing them with employers

• the opportunity to work with a career educator on enhancing their resumes, cover letters, and interview skills, and to meet a great group of peers, which is a networking opportunity!

York-Bridgers reviewed why employers value critical-thinking skills, and explained how to utilize them in developing a career path, apply them to professional, personal and community development, and create a professional profile or narrative to develop and present them.

Rachel York-Bridgers holds a doctorate from OISE/UT in Curriculum, Teaching and Learning, and completed the School of the Environment's graduate Collaborative Program in Environmental Studies.

Jonathan Turner provided valuable guidance and insight, through the use of exercises, about creating effective resumes and cover letters, and conducting excellent employment interviews. Jonathan has a BA (Philosophy and History) from York University, a BSc (Physics) from the University of Waterloo, and both an MA and a PhD (History and Philosophy of Science and Technology) from the University of Toronto.

For more information on the STEP workshop, please contact David Powell, Undergraduate Student Advisor, David.Powell@utoronto.ca.

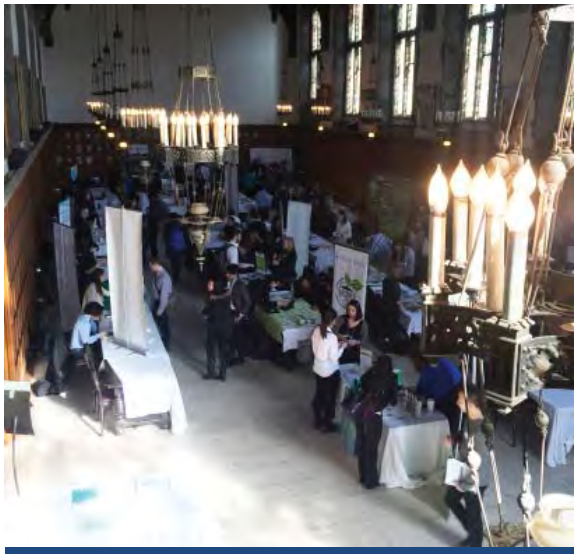
Rachel York-Bridgers leads the "Marketing Your Critical Thinking Skills" workshop

2017 Environmental Career Day: Students Prepare for the Future

BY DAVID POWELL
Undergraduate Student Advisor and Placement Coordinator

The School of the Environment co-presented the **2017 Environmental Career Day**, a day-long event open to all registered undergraduate and graduate students, at the University of Toronto and other universities in southern Ontario. This annual event was a collaborative effort with the School's Environmental Students' Union (ENSU), the Graduate Environmental Students' Association (GESA) and the Toronto Undergraduate Geography Society (TUGS).

Held at Hart House Great Hall, with 320 undergraduate and graduate students in attendance (almost double the attendance of the previous year), the event included 37 exhibitors from government, consulting and non-governmental organizations, as well as from professional graduate programs and student unions at U of T, all of whom provided students with useful information, career advice and many potential career, job and volunteer opportunities.



Students attend 2017 Environmental Career Day in the Great Hall, Hart House (Photo by: David Powell)

The day included presentations by speakers from various sectors in the environmental field: **Jennifer McKay**, Regional Director, Environmental Protection Operations Directorate, Ontario Region, Environment & Climate Change Canada; **Dr. Lindsay McCallum**, Environmental Health Scientist/HIA Specialist, Intrinsik Corporation; **Jordan Wilson**, Engineer-in-Training at Dillon Consulting; **Dorothy Gordon**, Human Resources Professional and HR Consultant; **Olivia O'Connor**, Canvas Manager, Toronto Environmental Alliance; and **Ruth Midgely**, fourth-year Honours BSc student. They discussed and answered questions from students about current actions and post-graduation preparation for the job market that included this advice:

- Enhancing basic skills (communication, critical thinking) and knowledge is an ongoing process.
- Networking on and off campus is essential, including arranging informational interviews with people doing the work in which you are interested.
- Volunteer experience on and off campus, while still at school and after graduation, is key to building your resume and reputation.
- Take advantage of career resources, such as your university's career centre.

Students attending a Career Day presentation (Photo by: David Powell)

For more information, please go to: http://careerday.environment.utoronto.ca

Jane Goodall Institute of Canada

Celebrating 10 years with the Jane Goodall Institute of Canada

The Jane Goodall Institute of Canada (JGI Canada) continues to play an important role within University of Toronto's School of the Environment. Many of our students have had the opportunity to volunteer for, and intern with, this important organization and learn about JGI Canada's research in the field, community conservation projects, and Jane Goodall's Roots & Shoots youth-action program.

As participants in JGI Canada's Roots & Shoots, graduate students from UTSC's environmental science department played a key role in JGI's cell phone recycling challenge in 2016/17. Working with three high schools in the Greater Toronto Area, **Timothy Damdar**, **Vicky Do** and **Brittney Helm** (who studies International Development) made presentations at each school. Using graphics, photos and video, they explained the importance of recycling cell phones which contain minerals mined from the Democratic Republic of Congo where JGI works. Timothy, Vicky and Brittney described the environmental impact of mining on forest habitat and explained the ecological footprint of consumer patterns, locally and globally.

Undergraduates have also taken advantage of leadership opportunities through the JGI Canada office, located in U of T's Earth Sciences building in the downtown campus. Long-time volunteer **Sabrina Lau** leads U of T's Roots & Shoots group and was selected as the Canadian delegate to represent JGI Canada at an annual Roots & Shoots conference at Windsor Castle. There, Sabrina organized a No Waste November campaign where people pledged to cut out one wasteful habit for the month.

Dr. Goodall and JGI volunteer Brittney Helm

Hossana Chongo and **Genevieve Wakutz**, students at the School of the Environment, both interned at JGI Canada, contributing valuable assistance to JGI programs. U of T student **Allegra Bethlenfalvy** is a regular volunteer who assists with programs and advises on youth engagement initiatives.

Professor **Shawn Lehman** in the Department of Anthropology remains on JGI Canada's board of directors which he joined in 2013, bringing his expertise in primates and conservation.

The Jane Goodall scholarship was awarded in 2016-2017 to **Ruth Midgley**, a BSc student who majored in Biodiversity, Conservation Biology and Environmental Studies.

Jane Goodall Institute volunteers Vicky Do and Timothy Damdar

For more information and volunteer opportunities, visit:
www.janegoodall.ca
416-978-3711
info@janegoodall.ca

2016-17 ENVIRONMENT AND ENVIRONMENT & HEALTH SEMINAR SERIES

KERRY BOWMAN, *Bioethicist*, *Mount Sinai Hospital, University of Toronto Joint Centre for Bioethics*
Facing the Complex Threats to the Eastern Lowland Gorilla of the Eastern Congo

MICHEL BOURQUI, *President and Founder, Climanosco, Zurich; Adjunct Professor, Dept. of Physics, Université de Montréal; and formerly Professor, Dept. of Atmospheric and Oceanic Sciences, McGill University*
Communicating Climate Sciences and Engaging the General Public in the Process – The Climanosco Initiative

HIH C. CHAO, *Honorary Professor, Tunghai University, former Vice President of Tunghai University, Taiwan*
Zero Waste: Fictional or Achievable Goal?

CHUNG-WAI CHOW, *Assistant Professor, Department of Medicine, University of Toronto CHRIS YACCATO, Provincial Manager, Government Relations and Public Affairs, Ontario Lung Association*
The Air We Breathe - Role of Rechnology, Industry and Regulations

OLIVER T. COOMES, *Professor, Department of Geography, McGill University*
What Fate for Swidden Agriculture under Land Constraint in Tropical Forests? Lessons from a Long-Term Study in an Amazonian Peasant Community

CAROL GIMBEL, *Founding Artistic Director, Music in the Barns*
The Symbiosis of Musical Art and Environmental Consciousness

KAMRAN KAHN, *Associate Professor, Department of Medicine, University of Toronto, BlueDot Founder*
ALEXANDER WATTS, *Team Leader, Analytics and Research, BlueDot*
Infectious Diseases in an Era of Globalization

JEFF MASUDA, *Associate Professor, School of Kinesiology and Health Studies and the Department of Geography, Queen's University*
Opioid Epidemics, Environmental Injustice, and the Right to Remain in Vancouver's Downtown Eastside

ANDREA MOST, *Professor, Department of English, University of Toronto*
A Pain in the Neck: The Role of the Humanities Scholar in the Time of Environmental Crisis

JOHN MAIORANO, *Ph.D. Candidate, Adult Education and Community Development, OISE, and Environmental Studies Collaborative Program, School of the Environment*
Understanding Variation in Energy Efficiency Practices in Ontario Hospitals

NEIL EVER OSBORNE, *Partner at Evermaven Inc. and PhD Candidate at York University*
Reframing Environmental Discourse: The Way We Talk about Environmental Issues Really Does Matter

CHELSEA ROCHMAN, *Assistant Professor, Department of Ecology and Evolutionary Biology, University of Toronto*
Plastic Debris in Aquatic Habitats

Dr. Dianne Saxe speaks at the "Investing in Low Carbon Assets: How to Unlock Carbon Opportunities" Event on November 24, 2016 (Photo by: Cherryl Bird)

NJAL ROLLINSON, *Assistant Professor, Department of Ecology & Evolutionary Biology and School of the Environment, University of Toronto*
Turtles, Toads, and Teleosts: How Evolutionary Ecology Informs Conservation and Management

DIANNE SAXE, *Environmental Commissioner of Ontario*
Ontario's Action on Climate Change

NICOLE SPIEGELAAR, *Ph.D. Candidate, Department of Physical & Environmental Sciences, and Environment & Health Collaborative Program, School of the Environment, University of Toronto*
Traditional Indigenous Food Systems and Psychological Resiliency: An Ecosystems Psychology Framework

MARC-ANDRE VERNER, *Assistant Professor, Department of Occupational and Environmental Health, School of Public Health, Université de Montréal*
Estimating Children's Exposure to Persistent Organic Pollutants Using Pharmacokinetic Modeling

MARTIN VEZÉR, *Associate Analyst, Research Products, Sustainalytics*
Oil, Gas and the Pressure of Protest: Dakota Access Pipeline

STEVE WILLIAMS, *President, Constructive Public Engagement and PhD Candidate in Resources, Environment and Sustainability (RES), University of British Columbia*
The Splash and the Ripples: Evaluating the Societal Effects of Social Innovation Lab Processes

TANHUM YOREH, *Assistant Professor, School of the Environment, University of Toronto*
Greening Faith: Between Theory and Practice

HIGH SCHOOL VISIT

Northern Secondary School Visit

The School of the Environment hosted students from Northern Secondary School's grade 11 Environmental Science Program. Organized by Professor **Sarah Finkelstein**, Academic Associate Director at the School of the Environment. The program introduced students to the breadth of research conducted at the school from earth science and geochemistry to ecology and physics.

Kicking-off the afternoon was a talk and lab tour from Professor **Njal Rollinson** (Ecology and Evolutionary Biology) on the the Ecology and Evolution of Reptiles and Amphibians. The students were then welcomed by the School of the Environment Director Professor **Kimberly Strong** who also gave a tour of her lab and introduced them to the Atmospheric Physics research group. The afternoon culminated with a seminar "**What Fate for Swidden Agriculture under Land Constraint in Tropical Forests? Lessons from a Long-Term Study in an Amazonian Peasant Community"** which was presented by **Oliver Coomes**, Professor, Department of Geography, McGill University.

The students had an amazing experience and rated it a huge success. These outreach experiences provide an opportunity to introduce the next generation to our programs and spark excitement and curiosity about the research we are doing.

Professor Kimberly Strong (centre) with graduate students (L-R) Sabastian Roche, Dan Weaver, and Joseph Mendonca in the University of Toronto Atmospheric Observatory (Photo by: Aubyn O'Grady)

MEMORIAL LECTURES

Robert Hunter Memorial Lecture - Confronting Thermageddon in Our Lifetime: Where We Are Post-Paris and How Badly the Trudeau Liberals Are Letting Us Down

Elizabeth May, Leader of the Green Party of Canada was the keynote speaker at this year's Robert Hunter Memorial Lecture that took place on May 19, 2017. Ms. May spoke about the importance of how everyday citizens could help get Prime Minister Trudeau to live up to his environmental promises.

The current climate target under Prime Minister Trudeau remains unchanged from that of the previous Harper government. Ms. May added that there will be a carbon price, but the political trade-offs to secure this carbon price include approving projects that increase GHG emissions- such as Kinder Morgan, Woodfibre and Petronus LNG.

Professor **Kimberly Strong**, Director of the School of the Environment, opened the lecture and introduced **Adriana Shu-Yin** the 2017 recipient of the Robert Hunter Undergraduate Scholarship. Introducing Ms. May was Professor **Stephen Scharper**, Associate Professor in the School of the Environment and in the Department of Anthropology at U of T Mississauga – who has known Ms. May for many years.

Thomas Hart, Lecturer in Philosophy at Ryerson University, spoke about Robert Hunter and gave a short tribute to **Dan McDermott**, who spoke at last year's lecture. The event served to celebrate and remember **Bob Hunte**r, as well-known environmentalist, journalist, co-founder of Greenpeace, and one of the top ten eco-heroes of the 20th century, according to Time magazine.

***Elizabeth May** is Leader of the Green Party of Canada and its first elected Member of Parliament, representing Saanich-Gulf Islands in southern Vancouver Island. In 2005, Elizabeth May was made an Officer of the Order of Canada in recognition of her decades of leadership in the Canadian environmental movement. She graduated from Dalhousie Law School and was admitted to the Bar in both Nova Scotia and Ontario. She practiced law in Ottawa with the Public Interest Advocacy Centre prior to becoming Senior Policy Advisor to the federal minister of the Environment (1986- 1988). For seventeen years Elizabeth served as Executive Director of the Sierra Club of Canada. A proud mother and grandmother, she lives in Sidney, British Columbia. Elizabeth is the author of eight books, including her most recent book Who we are: Reflections on my life and on Canada.*

Douglas Pimlott Memorial Lecture - What Would Doug Have Thought? - The Canadian Environment at 150

Mark Pimlott, Policy Analyst; Legislation and Conservation, Department of Environment, Nunavut provided information and personal insights about his father Doug Pimlott, and about his belief systems and personal philosophies at this year's Douglas Pimlott Memorial Lecture, which was held on March 22, 2017.

Mark shared some insights into the forces which drove his father's love for wildlife and for wildland, and about Doug's mission to work to achieve a greater level of environmental integrity and harmony. In the process, he raised questions about the state of the Canadian environment on the 150th anniversary of this great and vast country.

Douglas Pimlott, as one of the founders and leaders of the environmental movement in Ontario and in Canada during the 1960s and '70s, had a major impact on its development and accomplishments. Having died in his late 50s during the late 1970s, many have wondered what more Doug and the many friends, supporters and colleagues whom he inspired, might yet have accomplished. Many were inspired nonetheless to continue 'to carry on the good fight' which he seemed to tirelessly endorse, and much has been accomplished by them during the four decades since his passing.

However, conservation successes rarely solve any problem for all time. Victory in the skirmishes does not mean that the war to protect nature and natural habitats can ever be truly won.

Mark Pimlott explored "what would Doug have thought" about the ongoing threats to the maintenance of fully functioning ecosystems which are necessary to support wolves, bears, caribou and other keystone species, and about the ongoing battles to save important and missing elements to our national and international system of parks, protected areas and ecological reserve. He spoke to the challenge of providing support for the development of fully-functioning indigenous-led governments and enterprises, especially in the remote areas of northern Canada, and about the restrictions which have been placed on citizen conservation organizations and even upon scientists by governmental systems, which have tolerated criticism or dissent to a greatly varying degree.

Mark Pimlott

In some ways, **Mark Pimlott** *has followed both literally and figuratively in his father's footsteps. However, as he would report, at a much less dogged pace and with a far less significant impact on the people and the environment that have surrounded him, than did his father. Mark pursued those interests and involvements by attending the University of Waterloo in the Faculty of Environmental Studies.*

Mark subsequently moved to British Columbia in 1974 and worked for 30 years with the BC Wildlife Branch. In 2004 Mark moved to the Nunavut community of Igloolik where the Nunavut Wildlife Service had recently based its decentralized operations. Serving as the territorial Manager of Legislation and Compliance for the Department of Environment, Mark continued his career in wildlife conservation and management based about 200 miles north of the Arctic Circle. Mark has more recently served in the position of Policy Analyst; Legislation and Conservation, continuing his life and employment in Igloolik through 2015. Currently on a leave of absence from his position with the Nuanvut DoE, Mark is 'practising for retirement' after a more than 40 year career in the field in which his father's life and work, inspired him to follow.

Eric Krause Memorial Lecture - Learning to Steer: New Directions for Urban Climate Change Mitigation

The Eric Krause Memorial Lecture took place on April 5, 2017. **Sara Hughes**, Assistant Professor, Department of Political Science, and Senior Fellow, Global Cities Institute, University of Toronto & University of Toronto Mississauga drew on the experiences of New York City, Los Angeles, and Toronto with reducing greenhouse gas (GHG) emissions. Her findings showed that there are shared practices these cities have used that are foundational to the task of steering for climate change mitigation, and that can provide lessons for other cities going forward.

The increasingly ambitious GHG reduction targets being set by city governments raise questions about how and whether city governments can deliver on the kind of fundamental changes they would require. In many ways, reducing urban GHG emissions means city governments will have to act in partnership and cooperation with other actors. According to Professor Hughes, the next step is to scale up many of the interventions cities are already experimenting with and she argues that steering practices can help to facilitate this shift.

Professor Sara Hughes

Sara Hughes *is an Assistant Professor in the Political Science Department, a Bissel-Heyd Fellow with the Center for the Study of the United States, and a Senior Fellow with the Global Cities Institute at the University of Toronto. Her research and teaching focus on urban governance and urban environmental politics and policymaking. Current projects examine the implementation of climate change policy in large cities, transitions in urban waste management, the determinants of policy attention in local governments, and community engagement practices for sustainable* cities.

Christian Abizaid

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Licenciatura (International Relations), Iberoamericana, Mexico; MA and PhD (Geography), McGill

Promoted to Associate Professor, effective July 1, 2017.

2016-17 Instructor of: ENV 223H Fundamental Environmental Skills; JGE 321H Multicultural Perspectives on Environmental Management; JGE 1425H Poverty, Livelihoods and Environment in Developing Countries

Research Interests:
Environment and development; Indigenous and peasant livelihoods and resource use in Latin America; Vulnerability and resilience; Rural poverty; Forest and biodiversity conservation; Social networks; Neotropical forests; mainly Amazonia and Mexico.

Featured Research Projects:

Floodplain Dynamics, Socioeconomic Change, and Traditional Livelihoods in the Upper Amazon.

This project examines the prospects for economic livelihood within the context of rapid environmental and socioeconomic change. As part of my dissertation, I studied the origins, and the (social and economic) consequences of a large 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.

Peruvian Amazon Rural Livelihoods and Poverty (PARLAP) Project

PARLAP is large-scale interdisciplinary study of rural poverty among folk and indigenous people in western Amazonia, conducted in collaboration with Yoshito Takasaki (University of Tokyo), Oliver T. Coomes (McGill University), and Margaret Kalácska (McGill). The study combines 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 rural poverty, vulnerability, and community-based conservation and development in a data-poor region.

Recent Presentations:
Professor Christian Abizaid was invited to talk about his research from the PARLAP Project at the University of Texas (UT-Austin) and at the Regional Office for Fisheries in Ucayali, Peru. In his presentation at UT-Austin, he showed some of the ways in which large-scale surveys can contribute to our understanding of rural livelihoods and their implications for rainforest conservation and development. In Peru, he provided an overview of the state of fish resources, based on a large-scale community survey.

Findings from the PARLAP project have also been presented in the Frontiers Seminar Series at the University of Toronto-Scarborough (UTSC) and at the Meeting of the Conference of Latin Americanist Geographers (CLAG) and the Annual Meeting of the Association of American Geographers. Dr. Abizaid has been granted tenure and promotion to associate professor, effective July 1, 2017 and was also re-elected to the board of directors of the Conference of Latin Americanist Geographers (2017-2020).

Recent Publications:

Abizaid, C., O.T. Coomes, Y. Takasaki, and J. P. Arroyo-Mora. 2017. Rural social networks along Amazonian rivers: seeds, labor and soccer among rural communities on the Napo River, Peru. The Geographical Review DOI: 10.1111/gere.12244.

Abizaid, C., O.T. Coomes, and M. Perrault-Archambault. 2016. Seed sharing in Amazonian indigenous rain forest communities: a social network analysis in three Achuar villages, Peru. Human Ecology 44(5): 577-594.

Coomes, O.T., Y. Takasaki, C. Abizaid, and P. Arroyo-Mora. 2016. Environmental and market determinants of economic orientation among rain forest communities: Evidence from a large scale survey in western Amazonia. Ecological Economics 129:260-271.

Webster, K., J.P. Arroyo-Mora, O.T. Coomes, Y. Takasaki, and C. Abizaid. 2016. A cost path and network analysis methodology to calculate distances along a complex river network in the Peruvian Amazon. Applied Geography 73:13-25.

Photos from the Peruvian Amazon Rural Livelihoods and Poverty (PARLAP) Project in Ucayali, Peru

Sarah Finklestein

Associate Professor, Department of Earth Sciences
Academic Associate Director, School of the Environment (until Nov. 2017)
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finkelstein@es.utoronto.ca
http://paleoecologylab.com
BSc (Ecology & Evolutionary Biology), Princeton; M.Phil. (Plant Sciences), Cambridge; PhD (Physical Geography), Toronto

Research Interests:
Quaternary paleoclimates in Arctic and sub-Arctic regions, landscape evolution and ecological change in response to long-term natural climate variability, northern wetlands, lake sediment records, Quaternary glacials and interglacials, and the impacts of recent climate warming on freshwater ecosystems.

Featured Research Projects:
Wetland dynamics in the Holocene and Pleistocene: hydro-climatic change and carbon storage
Wetlands are vitally important ecosystems. One critical area is carbon storage, yet information is lacking on how carbon storage in wetlands responds to climate change. Through analysis of peat cores, our group is developing new reconstructions of paleoclimatic changes over recent millennia, and associated impacts on wetland vegetation, peat and carbon accumulation. These results can be integrated into process-based models used to predict impacts of climatic changes and other disturbances on these important areas. A major area of focus is the Hudson/James Bay Lowlands, one of Canada's most extensive and most important wetlands

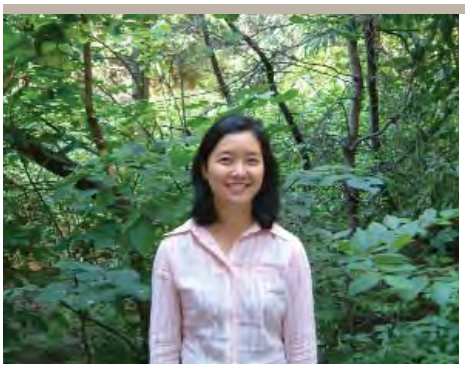
Paleoclimatology and paleolimnology in Arctic Canada
Arctic ecosystems are changing rapidly in response to climate change, but the impacts of these changes are not yet fully understood due to lack of information about long-term climate history. Paleoenvironmental records document the effects of past climatic changes on ecosystem dynamics. We are using the sediments of Arctic lakes to reconstruct spatial and temporal patterns of climate change over past centuries and millennia in the Canadian Arctic and to determine relationships between aquatic biodiversity and responses to paleo- and recent climatic changes. Some of our sites have been selected for specific examination of recent human impact; for example, we are collaborating on a paleolimnological study to track the effects of urbanization on fish populations in an urban lake in Yellowknife, NWT.

Recent Publications:
Dalton AS*, Finkelstein SA, Barnett PJ, Forman SL. 2016. Constraining the late Pleistocene history of the Laurentide Ice Sheet by dating the Missinaibi Formation, Hudson Bay Lowlands, Canada. Quaternary Science Reviews 146: 288-299.

Packalen MS*, Finkelstein SA, McLaughlin, J. 2016. Climate and peat type in relation to the spatial distribution of the peat carbon mass in the Hudson Bay Lowland, Canada. Journal of Geophysical Research – Biogeosciences, doi:10.1002/2015JG002938.

Finkelstein SA, Bunbury J*, Gajewski K, Wolfe AP, Adams JK*, Devlin J*. 2014. Evaluating diatom-inferred Holocene pH reconstructions for arctic lakes derived from an expanded 171-lake training set. Journal of Quaternary Science 29(3): 249-260.

**indicates student co-authors*



Karen Ing

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Interim Academic Associate Director, School of the Environment (from Dec. 2017 to June 2018)
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MSc (Zoology), Toronto

2016-17 Instructor of: ENV/SII 199H Debating and Understanding Current Environmental Issues, ENV 200H Assessing Global Change: Science and the Environment, ENV 221H Multidisciplinary Perspectives on Environment ENV 432H Urban Ecology.

Teaching and Research Interests:
Environmental education, interdisciplinary team teaching, urban ecology.

Development of International Opportunities for School of the Environment undergraduate students: As part of her role as the School's International Liaison representative within the Faculty of Arts & Science International Liaison Committee, the goal is to promote international opportunities for students and to support any international students within our unit.

Featured Research Projects:
Incentive Mechanisms for the Provision of Ecosystem Services in Ontario
The provision of ecosystem services poses challenges similar to 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. BA, MA, Toronto; PhD (Environmental Studies), York

Retired effective July 1, 2017.

2016-17 Instructor of: ENV 222H Interdisciplinary Environmenta Studies, ENV 320 National Environmental Policy, ENV 493 Independent Studies Course Ontario Energy Policy: Political Activity by the Renewables Industry, ENV 1001H Environmental Decision Making (co-taught with Tanhum Yoreh), ENV 1002H Environmental Policy

Research Interests:
Politics of Canadian environmental policy making; business as an environmental policy actor, Canadian national, federal-provincial climate-change policy; distributive effects of climate policy and associated political resistance; theoretical approaches to interdisciplinary environmental studies.

Featured Research Projects:
Carbon Province, Hydro Province: The Challenge of Canadian Energy and Climate Federalism. *(Working title of a book presently in preparation, scheduled to be completed in 2018).*

Articles on different aspects of the political implications of the distributive effects of climate policy; being drafted, revised or currently under consideration by journals:

Political Implications of the Distributive Effects of Canadian Climate Change Policy, *Douglas Macdonald and David Houle.*

Influence of the renewable energy industry on Ontario electricity policy, *Douglas Macdonald.*

Key changes in the evolution of the human-nonhuman relationship in the past 200,000 years, *Douglas Macdonald and Laura Eastham.*

Kate Neville

Assistant Professor, Department of Political Science and School of the Environment

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BScH, Queen's; MESc, Yale; PhD, British Columbia

2016-17 Instructor of: ENV 322H International Environmental Policy and Co-Instructor of ENV 1001H Environmental Decision Making

Research Interests:
Global environmental politics, with a focus on the dynamics of state-society-corporate relations, environmental activism, resource governance, and contested water and energy developments.

Featured Research Projects:
The Politics of Open Spaces
This work involves an ongoing series of projects on resource extraction and land use debates in northern Canada, linking the politics of global markets with those of local communities and ecosystems. With a focus on contested energy projects, particularly hydraulic fracturing ("fracking"), this research examines the emerging relationships between communities, governments, and corporations around controversial development proposals in sparsely populated, politically remote, resource-rich regions. In collaboration with Erika Weinthal at Duke University, this project has examined the challenges of public consultation processes and their implications for public trust, as well as issue-linkage strategies of local activists and communities. Current work includes studies of: legal challenges to land use planning processes; alliances among Indigenous and environmental activists; and corporate strategies to gain and assert political and financial power.

Recent Grants/Awards:
Professor Kate Neville was awarded a SSHRC SIG by the Department of Political Science, University of Toronto, in May 2017, for the project: "Don't Frack with the Peel? Water/Energy Debates in the Yukon."

Recent Publications:
Neville, Kate J., Baka, Jennifer, Gamper-Rabindran, Shanti, Bakker, Karen, Andreasson, Stefan, Vengosh, Avner, Lin, Alvin, Nem Singh, Jewellord, & Weinthal, Erika. 2017. Debating unconventional energy: social, political, and economic implications. Annual Review of Environment and Resources, 42: https://doi.org/10.1146/annurev-environ-102016-061102.

Weinthal, Erika, Vengosh, Avner, & Neville, Kate J. 2017. The nexus of energy and water quality. Chapter in K. Conca and E. Weinthal (eds.), The Oxford Handbook of Water Politics and Policy, Oxford University Press.

Neville, Kate J., and Weinthal, Erika. 2016. Mitigating mistrust? Participation and expertise in hydraulic fracturing governance. Review of Policy Research, 33(6): 578-602.

Hui Peng

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BSc and PhD (Environmental Science), Peking University

Research Interests:
Research in our group relies on the interface between chemistry and biology to answer fundamental environmental questions. We focus on the development of novel techniques to address the following bottlenecks of current environmental science research: i) the limited capacity of traditional targeted chemical analysis strategies to monitor the growing number of known and unknown environmental chemicals introduced into commerce ; ii) limited information is available regarding toxic mechanisms (i.e., protein targets) for the vast majority of environmental chemicals. We are currently focusing on three research directions:

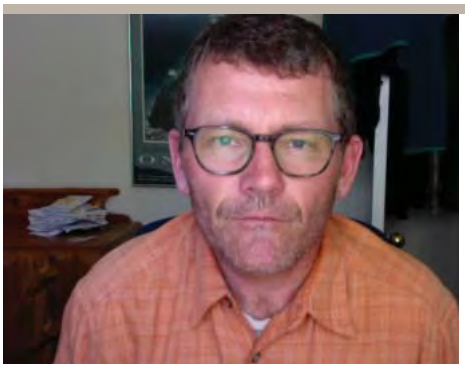
- Untargeted identification of novel environmental chemicals
- Investigation on sources and behaviors of environmental chemicals
- Unbiased identification of protein targets by chemical proteomics

Recent Publications:
Peng H, Guo HB, Pogoutse O, Wan CH, Hu ZL, Ni ZY, Emili A. (2016) An unbiased chemical proteomics method identifies FabI as the primary protein target of 6-OH-BDE-47. Environ. Sci. Technol. 50, 11329-11336.

Peng H, Saunders DMV, Sun JX, Johns PD, Wong CKS, Liu HL, Giesy JP. (2016) Mutagenic Azo dyes, rather than flame retardants, are predominant brominated compounds in house dust. Environ. Sci. Technol. 50, 12669-12677 (Featured in C&EN).

Peng H, Sun JX, Alharbi HA, Jones PD, Giesy JP, Wiseman S. (2016) Peroxisome proliferator-activated receptor γ is a sensitive target for oil sands process-affected water: effects on adipogenesis and identification of ligands. Environ. Sci. Technol. 50, 7816-7824.

Peng H, Chen CL, Cantin J, Saunders DMV, Sun JX, Tang S, Codling G, Hecker M, Wiseman S, Johns PD, Li A, Rockne K, Sturchio NC, Giesy JP. (2016) Untargeted screening and distribution of organo-bromine compounds in sediments of Lake Michigan. Environ. Sci. Technol. 50, 321-330.



W. Scott Prudham

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BA & BSc, McMaster; MA (Geography), Victoria; PhD (Energy and Resources), California, Berkeley

Professor Scott Prudham completed his term as **President, University of Toronto Faculty Association** on June 30, 2016.

Professor Prudham was on a research and study leave in 2016-2017 and spent the year as a **Visiting Professor, Center for Space, Place and Society, Wageningen University**, Wageningen, Netherlands, July 1, 2016-August 31, 2017.

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.

Featured Research Projects:
A Special themed collection of papers in Environment and Planning
Published in 2015 and co-edited with Mike Ekers of UTSC dealing with the concept of the socio-ecological fix, that is, broadly, the relationship between capitalist crises, their resolution through long term investments in the built environment, environmental change and environmental politics. We also have two theoretical papers on the subject forthcoming in the Annals of the Association of American Geographers.

Exploring theoretical foundation of the socio-ecological fix.
Researching the dramatic uptake of organic wine production in Languedoc (France) and the role of and implications for village level co-operatives.

Recent Publications:
Boyd, W. and S. Prudham (2017). On the themed collection, 'the formal and real subsumption of nature'. Society and Natural Resources 30(7): 877-884.

Ekers, M. and S. Prudham (2017). The Metabolism of socio-ecological fixes: capital switching, spatial fixes and the production of nature. Annals of the Association of American Geographers 107(6): 1370-1388.

Ekers, M. and S. Prudham (2017). The Socio-ecological fix: fixed capital, metabolism and hegemony. Annals of the Association of American Geographers, 108(1): 17-34.

John Robinson

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BA, U of T; MES, York; PhD (Geography), U of T

2016-17 Instructor of: JSE 1708 The Development of Sustainability Thought and ENV 481/ ENV 2002 The U of T Campus as a Living Lab of Sustainability.

Research Interests:
Climate change and sustainability, urban sustainability, building sustainability, community engagement processes, university sustainability programming, environmental philosophy.

Featured Research Projects:
Sustainability Groundswell at U of T
I am interested in exploring the potential for U of T to play a more active role in the transition to sustainability. The overall idea is simple: U of T could transform itself into a sustainability test-bed, a living lab and agent of change that would integrate academic and operational sustainability activities to advance learning, provide extremely useful and popular teaching, transform the physical campus, and contribute to the sustainability agendas of partners in the private, public and NGO sectors. The goal is to contribute to a groundswell of sustainability projects at U of T that combine operations, research and teaching in a living laboratory approach. I will be pursuing this agenda in my role as Presidential Advisor and Chair of the U of T Committee on the Environment, Climate Change and Sustainability.

I am leading the creation of a new research cluster at U of T called ***Sustainable Built Environment Performance Assessment (SBEPA)***, with faculty from Architecture, Engineering, Computer Science, Public Health and Environment. The research will focus on the intersection of quantitative and qualitative assessment of the sustainability performance of the built environment, and will look at both environmental and human performance from a regenerative sustainability (net positive) perspective. Our first postdoc, Terri Peters, has just started her work on developing metrics on the intersection of health and human wellbeing in the built environment.

FutureTalks: Engaging Citizens in Exploring Toronto's Future
The goal of FutureTalks is to engage tens of thousands of citizens of Toronto in a dialogue about the future of the city of Toronto. Our Letter of Intent to the Partnership Program of the Social Sciences and Humanities Research Council of Canada was successful and the research team (myself, Sara Hughes, Geography; Wendy Wong, Munk School and Political Science; Tamer El-Diraby, Civil Engineering; Blake Poland, Dalla Lana; and two PhD students: Kim Slater and Steve Williams) will be submitting a full proposal to SSHRC in Nov 2017. The projects includes 10 Partner organizations in Toronto, and 17 Collaborators from universities in 8 countries. If the full proposal is successful, the project is expected to begin in May, 2018.

Recent Publications:
Bendor, R., Maggs, D., Peake, R., Robinson, J., and Williams, S. 2017. The imaginary worlds of sustainability: observations from an interactive art installation. Ecology and Society 22(2):17.
Maggs, D. and Robinson, J. (2016).

"Recalibrating the Anthropocene: Sustainability in an Imaginary World", Environmental Philosophy, 13(2), 175-194.

Munro, A., Marcus, J., Wahl, J., Dolling, K., Robinson, J. (2016) "Combining Forces: Fostering Sustainability Collaboration between the City of Vancouver and The University of British Columbia", International Journal of Sustainability in Higher Education 17(6), 812-826.

Beth Savan

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Hon. BSc. Toronto; PhD, Imperial College of Science and Technology, University of London, UK

Research Interests:
Active transportation, institutional sustainability, community-based research.

Featured Research Projects:
Together with Nancy Smith Lea, the Executive Director of TCAT, ***Beth was asked to support both Windsor and Halton in their efforts to increase local cycling trips***. Her partnership with CultureLink Settlement Services is continuing through support for their program to increase cycling to schools in the Toronto area. Also, her team is supporting the ***TCAT research into the economic impacts of the proposed cycle track on Bloor Street***, through a grant from the City of Toronto, local Business Improvement Areas and the Metcalf Foundation.

Recent Grants:
Social Sciences and Humanities Research Council Insight Grant of $408,657 over five years from 2014-2019 to research Increasing Cycling for Transportation in Canadian Communities, with Co Investigators Paul Hess, Kevin Manaugh, Ray Tomalty, Meghan Winters, at McGill and Simon Fraser; one research paper was published recently with several others in preparation. This grant has been supplemented by a contract, through the Toronto Centre for Active Transportation (TCAT), to support cycling uptake in Scarborough. A MITACS grant for Trudy Ledsham supplements this research effort.

The Metcalf Foundation recently awarded $50,000 to investigate indicators of societal benefits of cycling with Swerhun Associates, and a previous Metcalf Foundation grant resulted in a major report on cycling in Toronto, recently published, with Trudy Ledsham, which received positive press.

Recent Publications:
Savan, B. Cohlmeyer, E. and Ledsham, T. (2017), Integrated Strategies to Accelerate the Adoption of Cycling for Transportation, Transportation Research F, Volume 46, Part A, April, 236–249.

Ledsham, T. and Savan, B. (2017). Building a 21st Century Cycling city, Metcalf Foundation, http://metcalffoundation.com/stories/publications/building-a-21st-century-cycling-city/.

Wittmann, K., Savan, B., Ledsham, G. and Lay, J. (2015), Cycling to High School in Toronto: An Exploration of School Travel Patterns and Attitudes by Gender, Transportation Research Board, 2500, 9-16.

Njal Rollinson

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BScT, Nipissing; MSc, Guelph; PhD Biology, Dalhousie

2016-17 Instructor of: ENV 316H Laboratory & Field Methods in Environmental Science

Research Interests:
Evolutionary ecology and conservation; use of long-term monitoring data and metadata to test theory, understand ecological and adaptive processes, and to inform conservation decisions; evolutionary ecology of reptiles, amphibians, and cold-water fishes near their northern range limits.

Featured Research Projects:
Predicting adaptation in invasive species
With my PhD Student (Hollis Dahn), we are investigating whether there are predictable genetic, physiological, and morphological signatures of successful biological invasions in the common bullfrog.

Climate change and population ecology of salamanders
Using long-term data from a population of spotted salamanders in Algonquin Park, Ontario, my PhD student (Patrick Moldowan) and I are exploring how environmental change over the last decade has affected the life history and population ecology of this species.

Temperature-dependent sex determination and climate change
Many reptiles, like the snapping turtle, have temperature-dependent sex determination, where sex is determined by temperature during the egg incubation period. Using 20-years of data on naturally-produced sex ratios, my MSc student (Melanie Massey) and I are investigating whether sex ratios have been skewed recently, and how decadal changes in temperature have affected egg hatching success.

Recent Publications:
Edge C.B., Rollinson N., Brooks R.J., Congdon J., Iverson J., Janzen F., and Litzgus J. 2017 Phenotypic plasticity of nest timing in a post-glacial landscape: how do long-lived reptiles adapt to thermal time constraints? Ecology. 98 512-524.

Rollinson N., Rowe L. 2016. The positive correlation between maternal size and offspring size: fitting pieces of a life-history puzzle. Biological Reviews 91:1134-1148.
Rollinson N., Rowe L. 2016. The positive correlation between maternal size and offspring size: fitting pieces of a life-history puzzle. Biological Reviews 91:1134-1148.

Stephen B. Scharper

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BA Hons., Toronto; MA (Theology), Toronto; PhD (Religious Studies), McGill

2016-17 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.

Featured 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 Presentations:
Professor Stephen Scharper was invited as a delegate to the 2016 Canada/UK Colloquium in Edmonton November 24-28, 2016 with the focus on "The Transition to a Low-Carbon Economy." Hosted by The Hon. Jean Charest, and featuring Alberta Premier Rachel Notley and the UK High Commissioner, the colloquy of these proceedings were published formally at a reception in Ottawa in 2017.

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).

Kimberly Strong

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BSc 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 on Ellesmere Island; Co-I on the ACE and Odin satellite missions; PI of the AVATARS project.

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. Science activities are currently supported by NSERC's Climate Change and Atmospheric Research program for the project "Probing the Atmosphere of the High Arctic (PAHA)". 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.

AVATARS (Arctic Validation And Training for Atmospheric Research in Space). This three-year project supported by the Canadian Space Agency is using PEARL as a "space station on the ground" as its remote location provides an environment that simulates many of the constraints and challenges of a space mission. AVATARS is supporting several end-to-end projects that extend from the development of techniques for remote operation and automation of instruments, through improved data analysis methodologies, to the use of PEARL measurements of composition, aerosols, and clouds to validate satellite data products. Student training is a large focus of the project, and AVATARS is supporting eight graduate students and a postdoctoral fellow across six universities over a three-year period.

Recent Publications:
K. Strong, *E. Lutsch, and *X. Zhao, Using ground-based UV-VIS-IR spectroscopy to probe atmospheric composition over Canada. Physics in Canada, 73 (1), 3-11, 2017.

*J. Mendonca, K. Strong, et al., Using high-resolution laboratory and ground-based solar spectra to assess CH_4 absorption coefficient calculations. J. Quant. Spectrosc. Rad. Transfer, 190, 48-59, 2017.

*P. Godin, K. Le Bris, and K. Strong, Conformational analysis and global warming potentials of 1,1,1,3,3,3-hexafluoro-2-propanol from absorption spectroscopy. J. Quant. Spectrosc. Rad. Transfer, 203, 522-529, 2017.

*B. Byrne, D.B.A. Jones, K. Strong, Z.-C. Zeng, F. Deng, and J. Liu, Sensitivity of CO_2 surface flux constraints to observational coverage. J. Geophys. Res. Atmos., 122, 6672-6694, 2017.

*D. Weaver, K. Strong, et al., Intercomparison of atmospheric water vapour measurements at a Canadian High Arctic site. Atmos. Meas. Tech., 10, 2851-2880, 2017.
**indicates student co-authors*

Clare Wiseman

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2016-17 Instructor of: ENV 341H Environment and Human Health and ENV 4001H Graduate Seminars in Environment and Health

Promoted from Assistant to Associate Professor, effective July 1, 2017.

Research Interests:
Metal exposures in urban environments and their human health impacts; road dust sources, emissions and fate; in vitro methods for assessing metal bioaccessibility.

Featured Research Projects:
Assessing Metal and Metalloid Concentrations and their Bioaccessibility in Urban Road Dust
(In collaboration with Health Canada and the City of Toronto). This research examines the metal and metalloid concentrations and their patterns of distribution among particle size fractions in road dust collected from Toronto streets. In vitro techniques using simulated human lung fluids are applied to fine fractions of road dust, capable of being respired by exposed individuals, to assess metal bioaccessibility and toxic potential. The goal is to help inform Canada's Chemicals Management Plan and the Clean Air Regulatory Agenda. Data collected will also help support the City of Toronto's Clean Roads to Clean Air program.

Metals in Newcomer Women (In collaboration with Public Health Ontario, Health Canada and the City of Toronto).
This research characterizes the blood concentrations of toxic metals (lead, mercury and cadmium) among newcomer women of reproductive age (19-45 years of age) living in the Greater Toronto Area, Canada and assess environmental sources of exposures. This study contributes needed information on the body burden levels of priority metals of human health concern and exposure sources to aid in the development of culturally-sensitive health interventions to promote maternal and fetal health in newcomers.

Recent Publications:
Zereini F, Wiseman CLS, Vang M, Albers P, Schneider W, Schindl R., Leopold K (2017). Assessing the potential of inorganic anions (Cl^-, NO_3^-, $SO_4^{2-}$and PO_4^{3-}) to increase the bioaccessibility of emitted palladium in the environment: Experimental studies with soils and a Pd model substance. Environmental Pollution 220: 1050-1058.

Wiseman CLS, Parnia A, Chakravartty D, Archbold J, Zawar N, Copes R, Cole DC (2017). Blood cadmium concentrations and environmental exposure sources in newcomer South and East Asian women in the Greater Toronto Area, Canada. Environmental Research 154: 19-27.

Debra Wunch

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BSc, MSc, PhD (Physics), U of T

Research Interests:
Experimental atmospheric physics, carbon cycle, remote-sensing measurements of trace gases in the atmosphere.

2016-17 Instructor of: ENV 316H Laboratory & Field Methods in Environmental Science

Featured Research Projects:
Greenhouse gas emissions from Toronto
Much recent activity has focused on quantifying and attributing the sources of emissions of greenhouse gases from large urban centres. We have just begun a project to build an urban greenhouse gas monitoring system in Toronto, with an initial focus on emissions of methane. There are many sources of methane in Toronto, including delivered natural gas, landfills, wastewater treatment plants, agriculture, and ruminants. With a variety of atmospheric sampling techniques, we are beginning to reveal a picture of methane concentrations and emissions throughout the city.

The Orbiting Carbon Observatory-2 (OCO-2)
OCO-2 is a NASA satellite that was launched in 2014, and was designed to measure precise and accurate atmospheric abundances of carbon dioxide (CO_2). After almost three years of measurements, we are beginning to see the crucially important patterns of the carbon cycle emerge from the data: the strong seasonal cycle driven by the Boreal forest's growth in the summer and dormancy in the winter, and the changes in CO_2 with latitude due to the strong CO_2 emissions in the northern mid-latitudes. To achieve data of this quality, the satellite measurements are continuously validated against "ground truth" provided by the Total Carbon Column Observing Network (TCCON). Our recent work comparing OCO-2 measurements to those from TCCON showed that while some biases remain in the OCO-2 measurements, they are generally of high quality and are very promising for scientific studies.

Recent Awards and Grants:
Received the NASA Group Achievement award for "Outstanding achievement in developing and executing an overall program for validation of Orbiting Carbon Observatory-2 science measurements from space" in October 2016.

Received a research grant from the Canadian Space Agency for the project "Carbon Monoxide in the Canadian Boreal Forest and Urban Centres" in March 2017.

Received an NSERC RTI grant for the research project "Interpreting Greenhouse Gas and Air Pollution Surface Measurements to Quantify Urban Emissions" in April 2017.

Recent Publications:
Wunch, D., et al.: Comparisons of the Orbiting Carbon Observatory-2 (OCO-2) XCO_2 measurements with TCCON, Atmos. Meas. Tech., 10, 2209-2238, https://doi.org/10.5194/amt-10-2209-2017, 2017.

Wunch, D., et al.: Quantifying the loss of processed natural gas within California's South Coast Air Basin using long-term measurements of ethane and methane, Atmos. Chem. Phys., 16, 14091-14105, doi:10.5194/acp-16-14091-2016, 2016.

Saunois, M., et al.: The global methane budget 2000–2012, Earth Syst. Sci. Data, 8, 697-751, doi:10.5194/essd-8-697-2016, 2016.

Tanhum Yoreh

Assistant Professor, School of the Environment
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BA (Environmental Studies) McGill University; MA (Geography) Hebrew University; PhD (Humanities) York University

2016-2017 Co-instructor of ENV1001H

Research Interests:
Religion and environment, religious legal approaches to environmental protection, religious values and environmental behaviour, faith-based environmentalism.

Featured Research Projects:
Greater Toronto Area Green Faith Database Initiative
The goal of this research is to create a database of religious/faith based organisations, institutions and communities based in the Greater Toronto Area (GTA) that are environmentally proactive. This database will be a critical resource in helping us understand (1) the extent of environmentally-oriented religious mobilisation in the local context and (2) the way in which faith-based environmental values are translated into behavior.

Environmental Decision Making in Faith Based Contexts
There are two approaches that I'm taking to the topic. The first looks at faith communities that are engaged in environmental initiatives and analyzing the values that give rise to such proactive behaviour. From this angle I'm looking at decisions such as communal divestment from fossil fuels, programs to green sacred spaces through building retrofits, and the institution of sustainable food policies in communal gatherings. The second approach is historical, and here I'm mainly looking at Jewish legal documents in which rulings have been issued that have environmental ramifications. Approaching environmental decision making from this perspective gives insight into the values of the day that took precedence prior to the age of environmental knowledge and awareness.

Energy Efficiency as a Gateway to Further Greenhouse Gas Reductions in Faith Communities
The premise to this study is that in addition to directly reducing GHG emissions, building retrofits undertaken in a communal space have the potential for spillover impacts as community members are inspired to take action at home. This program will investigate and quantify the impact of sacred space "greening" - with a focus on energy retrofits – to inspire GHG reducing behaviour changes among community members.

Recent Publications:
Yoreh, T. "Rethinking Jewish Approaches to Wastefulness." Review of Rabbinic Judaism. Accepted for publication.

Yoreh, T. and R. Horne (2014): "Recycling in Jerusalem: Right or Privilege?" Local Environment: International Journal of Justice and Sustainability 19, no. 4 417-432.

Jane Ambachtsheer

Ms. Ambachtsheer is Partner and Chair, Responsible Investment at Mercer Investments. She is consultant to the UN through the development of the Principles for Responsible Investment; Trustee of the Carbon Disclosure Project; member of the Financial Stability Board's Task Force on Climate-related Financial Disclosures. She has previously taught the School of the Environment's graduate course ENV 1707H Environmental Finance and Sustainable Investing.

Brad Bass

Dr. Brad Bass works with the Great Lakes Harmful Pollutants Section in Environment and Climate Change Canada, the Foundation for Student Science and Technology and the School as the Instructor for the Research Opportunity Program courses, ENV299/399. His current work includes socioeconomic influences on the adoption of innovation, green infrastructure and water quality, and agent-based simulation.

Satyendra Bhavsar

Dr. Bhavsar is a Research Scientist in the Environmental Monitoring & Reporting Branch at the Ontario Ministry of the Environment and Climate Change. His research interests include environmental behaviour of contaminants, monitoring, fate and transport in a multimedia environment, exposure and risk assessment, mathematical modelling, and identification and understanding of contaminant patterns. He is currently assessing the status of Fish Consumption Beneficial Use Impairment at two Areas of Concern in the Great Lakes in a School of the Environment research project.

Paul Helm

Dr. Helm is a Senior Research Scientist for contaminant issues in the Great Lakes with the Ontario Ministry of the Environment in the Water Monitoring Section of the Environmental Monitoring & Reporting Branch. His research interests include: fate and transport of emerging organic contaminants in aquatic and urban environments; sources and impacts of microplastics in the Great Lakes; passive sampling approaches for contaminant monitoring, reconnaissance, and assessment; and, non-target mass spectrometric analysis and screening for unknown contaminants/ transformation products. He is also a member of the School's graduate faculty.

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 and is Instructor (Sessional Lecturer) of the graduate course ENV 1707H Environmental Finance and Sustainable Investing.

Paul Muldoon

Mr. Muldoon is Associate Chair, Assessment Review Board. He is the former Executive Director of the Canadian Environmental Law Association. He has graduate degrees from McMaster University and McGill University (MA, LLM) and has written and co-written books and articles on Canadian environmental law and policy including the textbook *An Introduction to Environmental Law and Policy in Canada*. He is also Instructor (Sessional Lecturer) of the School of the Environment's graduate and undergraduate course ENV 1701H / ENV 422H Environmental Law.

Namrata Shrestha

Dr. Shrestha is a Landscape Ecologist, Research & Development at the Toronto and Region Conservation Authority (TRCA). She holds a PhD 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.

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, playing a major role in planning events and raising funds for scholarships.

PROFILES - GRADUATE INSTRUCTORS & SESSIONAL LECTURERS

Charles Jia

Professor, Department of Chemical Engineering & Applied Chemistry, U of T
JNC 2503 Environmental Pathways
Dr. Jia is Associate Chair-Graduate Studies in the Department of Engineering & Applied Chemistry. His research concerns sustainable energy and the environment. His current projects address clean air, clean water and climate change through the development of new technologies. He is also interested in the fate, transport and impact of pollutants in the natural environment.

Susan McGeachie (bio page 49)

Christopher Ollson

Sessional Lecturer
ENV 1704 Risk Analysis & Management
Dr. Ollson is Owner of Ollson Environmental Health Sciences. He has been practicing in the field of environmental risk and toxicology for almost 20 years and has an active research program in the field of Health Impact Assessment and health issues associated with living in proximity to Renewable Energy projects. He also teaches in the Deparment of Physical and Environmental Sciences at UTSC.

Paul Muldoon (bio page 49)

PROFILES - UNDERGRADUATE INSTRUCTORS & SESSIONAL LECTURERS

Ben Akrigg

Associate Professor, Department of Classics, U of T
ENV 282 Big Ideas in Energy I: Technology & Society
ENV 382 Big Ideas in Energy II: Economics, Politics & Security
Dr. Akrigg's principal area of research is the economic history of archaic and classical Greece. Current projects include the historical demography of Athens in the fifth and fourth centuries BC, Athens' fuel supply, and the mobility of labour in antiquity.

Simon Appolloni

Sessional Lecturer
ENV 100 Introduction to Environmental Studies
Dr. Appolloni received his PhD in the Study of Religion with the Collaborative Program in Environmental Studies, School of the Environment (Toronto). His focus is on the intersection of religion, science, environmental and social ethics. He has taught an array of courses on ethics, worldviews, religion and environment, world religions, religion-science, and cultural heritage, at Brock University, Humber College and U of T.

Jörg Bollman

Associate Professor, Department of Earth Sciences, U of T
ENV 234 Environmental Biology
Dr. Bolmann received his PhD in 1995 from the Swiss Federal Institute of Technology Zurich, and a Diploma in 1990 from the Free University of Berlin, Germany. His research focus is Marine Geobiology, particularly the history of the global oceans including paleo-ecology, paleo-biogeography and the evolution of calcareous marine microorganisms.

Hélène Cyr

Associate Professor, Department of Ecology and Evolutionary Biology, U of T
ENV 234 Environmental Biology
ENV 334 Environmental Biology: Applied Ecology
Dr. Cyr's interests are in the ecology of littoral areas in lakes (spatial and temporal distribution of habitats and benthic communities), foodwebs (feeding interactions in planktonic and benthic communities, especially between invertebrates and algae), and macroecology.

Jessica D'eon

Assistant Professor, Teaching Stream, Department of Chemistry, U of T
ENV 233 Earth System Chemistry
Dr. D'eon earned a PhD in Environmental Chemistry from the Univeristy of Toronto. Her research interests involve understanding the disposition of xenobiotic chemicals both in the environment and the body.

Miriam Diamond

Professor, Department of Earth Sciences, U of T
ENV 281 Big Ideas in the Digital World I: Is the Internet Green?
ENV 381 Big Ideas in the Digital World II: Social Media & Environmentalism
Dr. Diamond earned a PhD in Chemical Engineering and Applied Chemistry and a BSc from Toronto, an MScEng. in Mining Engineering (Queen's) and an MSc in Zoology (Alberta). She examines chemical contaminants from emission, to transport indoors, and on human and ecological exposure to inform regulation, policy and public health.

Steve Easterbrook

Professor, Department of Computer Science, U of T
ENV 281 Big Ideas in the Digital World I: Is the Internet Green?
ENV 381 Big Ideas in the Digital World II: Social Media & Environmentalism
Dr. Easterbrook received his PhD from Imperial College, London. He studies the development of computational models for understanding climate change, along with the role of models and data visualizations for sharing that knowledge about climate and sustainability with other communities. He teaches courses on Systems Thinking, Climate Literacy, and Software Design.

Grant Henderson

Professor, Department of Earth Sciences
ENV 233 Earth System Chemistry
Dr. Henderson's research interests include the structure of glasses, melts and amorphous materials. His work focuses on Magmas which are generally considered to be mixtures of silicate melt, crystalline products and evolved fluids and gases. Studies of the structure of the silicate melt phase is an area of geological research that has been ongoing since the 30s and continues to be an area of intense interest for several large research groups in Japan, USA, England, France, Germany, Italy, and Australia.

Donald Jackson

Professor & Chair, Department of Ecology & Evolutionary Biology, U of T
ENV 432 Urban Ecology
Dr. Jackson is former Interim Director of the School of the Environment. His research examines the structure and composition of ecological communities in aquatic ecosystems. His work focuses on comparing fish communities in lakes and streams to determine the relative importance of environmental factors in determining the species composition. His current work looks at the colonization and extinction of fish species in lakes and connecting waterways.

Stephen W. Morris

Professor, Department of Physics, U of T
ENV 282 Big Ideas in Energy I: Technology & Society
ENV 382 Big Ideas in Energy II: Economics, Politics & Security
Dr. Morris is the J. Tuzo Wilson Professor of Geophysics. Prof. Morris research interests are in the area of experimental nonlinear physics and pattern formation, especially in fluids, icicles, mud cracks and other geomorphological systems. He has appeared frequently on the Discovery Channel. He sometimes passes his scientific photographs off as art.

Monika Havelka

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

Russ Houldin

Sessional Lecturer
ENV 323 Ontario Environmental Policy
ENV 347 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.

Karen Morrison

Sessional Lecturer
ENV 223 Fundamental Environmental Skills
Dr. Morrison is Vice-President of the International Association for Ecology and Health and a member of the Steering Committees of Ecohealth Ontario and the Ontario Biodiversity Council. Her work focuses on the intersection of ecology and public health, with a particular focus on watersheds as settings for health and well-being. She is an adjunct professor in the Faculty of Environmental Studies at York University.

Barbara Murck

Senior Lecturer, Department of Geography, UTM
ENV 395 Special Topics Field Course: Ecology and Conservation in the Andes, Western Amazonia & Galápagos
Dr. Murck received her undergraduate degree from Princeton and her PhD 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.

Paul Muldoon (bio page 49)

James Nugent

PhD Candidate and Course Instructor, Geography and Planning, U of T
JGE 331 Resource & Environmental Theory
Mr.Nugent, a Vanier Scholar, teaches political ecology and urban politics through a service-learning approach. His action-based research with social movement coalitions connects struggles for employment, social justice, and the environment. He helped negotiate Ontario's first Community Benefits Framework, linking employment equity policy with environmental infrastructure construction.

David Sider

Sessional Lecturer
ENV 421 Environmental Research
ENV 307 Urban Sustainability
ENV 440 Professional Experience Course
Dr. Sider is an instructor in the Environmental Management and Water Resources Management certificate programs and teaches in the undergraduate program at the School. He completed his PhD in Geography and Environmental Studies (Toronto), doctoral research on community-based environmental management in low-income urban settlements in India, and worked with environmental groups in Nicaragua, Malaysia and Canada.

Romila Verma

Sessional Lecturer
ENV 200 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 the Mahanadi river basin in India. Her current interest is finding a sustainable solution to the water crisis in the Sahel region of Africa.

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.

Adonis Yatchew

Professor, Department of Economics, U of T
ENV 282H Big Ideas in Energy I: Technology & Society
ENV 382H Big Ideas in Energy II: Economics, Politics and Security
Dr. Yatchew's research focuses on energy and regulatory economics, and econometrics. Since completing his PhD (Harvard) he has taught at U of T and has held visiting appointments at Trinity College, Cambridge, Australian National University and the University of Chicago. His work on semiparametric regression techniques has been published by Cambridge University Press. He is the Editor of The Energy Journal.

David Pond

Sessional Lecturer
ENV 320 National Environmental Policy; ENV 221 Multidisciplinary Perspectives on Environment
Dr. Pond teaches environmental politics and public policy in the Department of Political Science at U of T. He has 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).

Keith Stewart

Sessional Lecturer
ENV 350 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.

Erich Vogt

Sessional Lecturer
ENV 451 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.

Kaley Walker

Associate Professor, Department of Physics, U of T
ENV 237/8H Physics of the Changing Environment
Dr. Walker's research group uses spectroscopic remote sounding techniques to study the composition and chemistry of the Earth's atmosphere. They use instruments carried by balloons and satellites as well as those located at the Earth's surface. These atmospheric composition measurements provide the data needed to investigate stratospheric ozone depletion, tropospheric air pollution and climate change.

Oliver Bussler

Climate Change Policy and Practice Program (DE)

Mr. Bussler is a distance education (DE) instructor who developed the materials for the Climate Policy and Corporate Responses course, co-developed and instructs the Sustainability Reporting course, and is an expert in climate change policy and sustainability reporting. He holds an MSc in Agricultural Economics from the University of Saskatchewan and an undergraduate degree from the Royal Military College of Canada.

Gennady Gienko

GIS for Environmental Management Certificate Program (DE)

Dr. Gienko is a School DE instructor, and Professor in the Department of Geomatics, College 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.

Michael Govorov

GIS for Environmental Management Certificate Program (DE)

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 15 years and currently teaches and prepares undergraduate and postgraduate courses at the Vancouver Island University.

Rosemary Martin

Sustainability Reporting (In-Class)

Ms. Martin has 20 years' experience identifying environmental opportunities and risks, developing environmental strategies and implementing environmental programs in the steel, chemical, R & D, financial, real estate and consulting sectors. She is a former Vice-President and the Chief Sustainability Officer at First Capital Realty Inc. She wrote the first Global Reporting Initiative (GRI)-compliant, externally assured, Corporate Responsibility and Sustainability (CRS) Report in the Canadian real estate sector.

Aaron Schroeder

Climate Change Policy and Practice Certificate Program (DE and In-Class courses)

Mr. Schroeder has eleven years of professional experience analyzing, quantifying and auditing greenhouse gas emissions in North America. Prior to forming Brightspot Climate Inc. in 2015, Aaron worked for several years leading a team of greenhouse gas verification and policy analysts across Canada. His verification experience exceeds 150 greenhouse gas project and facility verifications.

David Sider

Environmental Management and Water Resources Management certificate programs (DE)

Dr. Sider is a DE instructor and also teaches in the undergraduate program at the School. He received his PhD in Geography and Environmental Studies from U of T and did his doctoral research in India, investigating community-based environmental management in low-income urban settlements. He has worked with environmental organizations in Nicaragua, Malaysia and Canada.

Ian Sinclair

Terrestrial Energy Systems (DE and In-Class courses)

Ian has worked in the energy and water management field since immigrating to Canada from the UK in 1997, focusing on the built environment. He has worked on a full range of building types: industrial to commercial, campus-wide to multi-residential, in a wide range of service types. These have included energy and water audits, building retrofits, recommissioning, renewable energy studies, measurement and verification, green certification, engineering and project management.

Lucy Sportza

Environmental Management, Renewable Energy, and Water Resource Management Certificate Programs (DE)

Dr. Sportza is a DE instructor who also teaches in the online environment and undergraduate program at the University of Guelph. She has an MA and PhD in Planning from the University of Waterloo. Her current interests focus on the use of parks and protected areas as part of urban sustainability.

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Cover photo:

Wetland landscape - Lake Sasjewun, Algonquin Park (Photo: Njal Rollinson).