a place of mind

UBC

IRES Annual Report 2010

Cover image: Matt Dolf

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Photo: Conor Reynolds

"fostering sustainable futures through integrated research and learning"

Photo: Danika Kleiber

Introduction from Director

The year that passed has been a year of reviews: IRES was externally reviewed in March 2011 shortly after our administrative home, the College for Interdisciplinary Studies (CFIS), was reviewed in November 2010.

IRES external review

Our self-study was well received, the external review was glowing and the review team was immensely impressed by our students. They told me that they had never in their entire careers experienced such collaborative spirit, drive and enthusiasm, as that demonstrated by our students; their curiosity and willingness to go beyond the traditional while conducting research of highest quality.

The report starts with three key findings:

1. *IRES is arguably the strongest environment / sustainability program in Canada, and ranks among the top 10 in North America.*
2. *The strength of the program comes from regular interaction around use-focused research problems and teaching by faculty who span the physical, ecological and social sciences/...*
3. *The very high quality graduate students attracted by the program come because of the interdisciplinary, use-focused character of IRES research and teaching.*

IRES external review, 2011, p1

With this in mind, one would think the team would paint a rosy picture of IRES future, but they express serious concerns. While discussions with representatives from different UBC bodies outside IRES revealed a deep interest for interdisciplinarity in general, very little understanding was expressed regarding the characteristics that have made it possible for IRES to develop into the unique and successful unit it is today. The review team writes:
... in our conversations outside of IRES, interdisciplinary research often seemed to be interpreted as small teams of a few faculty members from 2-3 disciplines working on a specific project or series of projects. This is a basic form of interdisciplinary research and we have no doubt that it is common within and across the disciplinary Faculties at UBC. However, this is far different from the sustained interaction among a critical mass of faculty from multiple disciplines who are professionals committed to "real world" or use-focused research. It is this feature that gives IRES its continental strength.

The review team concludes that the major challenge facing IRES lies in UBC's organizational structure and their recommendations are all directed to the levels above IRES: how UBC might organize its financial, administrative and governance structures to support the kind of work IRES conducts. Their analysis is accurate: Five years ago, IRES was still in a turbulent transformation phase with few solidified internal structures - it was a vulnerable and unstable unit, seemingly at the verge of self-implosion. Today, it is a mature and highly efficient organization, ready to run at full speed. It is a dynamic and creative, yet stable place. Unfortunately, the external stress imposed by the unresolved organizational structure is increasingly impeding our ability to carry out our mission, and it is threatening the new-won stability.

CFIS external review

This brings us to the review of CFIS, which has been running in parallel with the review of IRES. The outcome of CFIS external review was rather ambiguous and resulted in a still ongoing investigation. During the spring of 2011, the process moved from engaging mainly unit directors, to asking for deep and time consuming involvement by all faculty members as well as student representatives. The fatigue at all levels is palatable. I look forward to the report, soon to be presented to the provost by a team from UBC treasury, and I trust that a new organizational structure will emerge – one that enables units like IRES to thrive. To help move the process forward, IRES identified a list of general considerations that apply, irrespective of the structure of the overarching institutional home:

- Mutually beneficial for the involved Faculties - a successful governance structure requires buy-in from these Faculties.
- Each faculty member contributes to a unit in another Faculty, through teaching, supervision, research partnerships, and engagement, development and management of cross-faculty programs.
- At least the same degree of control over annual reviews, tenure, promotion and hiring decisions as currently.
- Adequate administrative support.
- Fair and transparent criteria for distribution of resources to units.
- A formula for funding that supports the kind of interdisciplinary research and graduate education conducted in IRES.

The year that has passed

Even though the year has been overshadowed by the uncertainty surrounding CFIS - from the director's point of view - IRES students and faculty members have continued to conduct studies driven by an intriguing combination of pure curiosity and deep concerns regarding current societal challenges, resulting in original studies of highest quality. It is an amazing unit and I have truly enjoyed the five years I have been its director. Whatever happens at the higher organizational levels, I rest assured that IRES will continue to be *a stellar example of what one would want from an environment/ sustainability program at a world class university.*

IRES external review, 2011, p5

Gunilla Öberg
Spring 2011

Photo: Lydia Teh

Photo: Jacquie Belzile

Highlights from RMES Students

World-class students create an environment where excellence is expected - and achieved; where faculty are challenged - and they rise to meet that challenge; and where industry / government demand insights and solutions - and they get more than they ever dreamed of getting.

IRES external review 2011

The external review team rightly point out that our student body is a major reason why we successfully attract outstanding students. Quality attracts quality, and our intention is to push the bar even further. We continue to admit promising students with interest in any area that fits our mission statement, provided that we can provide supervision. In September 2010, 9 new masters and 8 new Ph D students started their studies in the RMES program and they are now in the process of identifying their research topics, with, for example, Kim Lau focussing on critical evaluation of British Columbia's Carbon neutral government, Margaret Morales on waste water management in informal settlements and Sara Elder on food security.

During the year, 22 of our students graduated, (5 MAs, 5 MSc and 12 PhDs).

Photo: Olivia Freeman

Sarah Klain
Vanier Award Winner

For Vanier award winner Sarah Klain, 2010 was an eventful year. She completed her MSc and commenced studying towards her PhD.

What do you see when you look at a map of your home? Where are the places that are important to you and why are they important? I posed variations of these questions to my interviewees for my master's thesis. One interviewee closed his eyes, letting his mind wander over the archipelago he calls home. He told me he saw clam gardens, village sites, whales and salmon. He saw potlaches and kids, life and death and tragedy, all part of this historically rich landscape. He told me, "This is a wonderful place and the core of this place is the ocean, the core of life here, the core of culture is the ocean and for me it's very very painful right now." I documented these values and attitudes linked to the marine environment in Northern Vancouver Island where fishery policy and economic changes have been challenging for residents. Using spatial interview data, I mapped out the relative importance of places and perceptions of environmental threat. I did this research to inform marine spatial planning, an ongoing process to zone the ocean for different purposes.

In January, I presented my research at the International Association for Sustaining the Commons, where I met and was further inspired by one of my academic heroes, Elinor Ostrom. I am using frameworks from her research on factors associated with the long term success and failure of social-ecological systems as well as my background in marine resource management and geographic information systems to design my PhD.

Photo: Sarah Klain

Christian Beaudrie
Les Lavkulich Award Winner

When renowned physicist Richard Feynman dreamed of writing the Encyclopedia Britannica on the head of a pin during his famous "There's Plenty of Room at the Bottom" lecture in 1959, he captured the imagination of scientists worldwide who have since made feats of this scale possible. This burgeoning field of research and development, coined nanotechnology, involves manipulating materials one ten-thousandth the width of a human hair to make new nanomaterials with unique and often unexpected properties. By leveraging these exciting and unusual physical, chemical, or biological properties, new technologies can be engineered that vastly improve efficiencies in material and energy use, and revolutionize electronics, energy production, drug delivery, and medical treatment.

While nanotechnologies offer tremendous benefits for society, their unique properties and small size may also lead to negative health and environmental consequences. Christian Beaudrie's PhD research addresses the growing gap between the rapid development of novel engineered nanomaterials and our lagging ability to assess and manage potential environment, health, and safety risks. Using a mixed-methods approach, Christian's research bridges disciplinary domains to investigate challenging problems in risk analysis, risk perceptions, and regulatory policy across the life-cycle of nanomaterials. His accomplishments thus far include presentations at several academic conferences, a white paper on the Life-Cycle Regulation of Emerging Nanotechnologies for the Chemical Heritage Foundation, and co-authored papers in Nature Nanotechnology and the Journal of Nanoparticle Research. He is currently investigating the use of expert judgment for decision-making under high uncertainty, and integrating 'screening-level' risk assessment into life-cycle approaches for assessing and managing health and environmental risk from emerging nanomaterials.

Christian's academic work is complimented by his involvement in the UBC community, where he has worked with UBC Waste Management and the Campus Sustainability Office to develop undergraduate student-led studies of UBC's waste and compost operations, and has led the development of a pilot program to expand UBC's e-waste recycling program across campus. Outside of UBC, Christian has drawn upon his past volunteering experience with Engineers Without Borders (EWB) in Tamale, Ghana to establish and direct a not-for-profit running team to build support for capacity building and human development initiatives in sub-Saharan Africa. In the past three years the Run To End Poverty team has grown to involve more than 500 runners in nine cities across Canada, and has raised more than $150,000 to support EWB's initiatives in Burkina Faso, Ghana, Malawi and Zambia.

Christian works with supervisors Terre Satterfield and Milind Kandlikar within IRES, and with the risk perceptions and risk assessment research groups at the Center for Nanotechnology in Society at the University of California Santa Barbara, and the Center for Environmental Implications of Nanotechnology at University of California Los Angeles.

Photo: Julia Reckermann

Photo: Danika Kleiber

Marleen de Ruiter

Marleen de Ruiter is in the second year of her masters and is working on her thesis. She studies the linkages between the environmental and economic recovery of the city of Biloxi, MS in the Gulf Coast after hurricane Katrina and the 2010 BP Deepwater Horizon oil spill focusing on the tourism and fisheries industries. Her work is part of a collaborative research project with several American universities and a British consultancy. In October Marleen completed her fieldwork project in the US Gulf Coast where she interviewed stakeholders and other people involved about the recovery of the local tourism and fisheries industries. She is also studying the correlation between earthquake vulnerability and casualties for developing and developed countries with her co-supervisor Professor Clague and other researchers from SFU's Earth Sciences department. Currently, she is collaborating on a project studying Japan's recovery after the Sendai earthquake.

In March 2011, Marleen received the UBC Student Leadership award from Professor Toope in recognition for her contribution to UBC's student community. She has organized several debates about current topics such as the 2011 Canadian elections, the fall of the Egyptian regime and the Israel-Gaza flotilla conflict to raise awareness for these issues and increase interaction between UBC's students and professors. She also helped IDRN organize talks related to the topic of natural hazards and disasters.

Photo: Tom Green

Jacquie Belzile

Motivated by a decade long drought and a shift towards Ecologically Sustainable Development, Australia's federal government has invested billions of dollars in the water sector, spurring significant progress in data gathering, modelling, best management practice development and policy reform. With thousands of people working in water, Australia is currently leading the world in innovative water management and policy.

To explore how Canada, British Columbia, and the Okanagan in particular can learn from Australia's drought management and water reform experiences, Jacquie organized a two week water management tour to Australia in May 2010, taking with her two water experts from British Columbia – Ted van der Gulik (Senior Engineer at BC's Ministry of Agriculture and Lands) and Dr. Anna Warwick-Sears (Executive Director of the Okanagan Basin Water Board). They travelled from Sydney to Canberra, then out to the Murray-Darling Basin, meeting with stakeholders from a variety of government, research, water supply and irrigation organisations to discuss their experiences of drought and water policy reform. By driving through part of the Snowy Mountain Scheme and following the Murrumbidgee River into the outback, they were able to see some of the huge water infrastructure that makes possible large-scale irrigation and water markets in the Murray-Darling Basin (along with a number of kangaroos, emus and a few other Australian fauna).

What they learned shed light on the many similarities and differences (geographic, climatic, political, and cultural) between the Canadian and Australian water contexts. Thereby providing a framework within which to understand the development of innovations such as Australian water markets, Critical Human Need water rights, user-tailored water conservation programs and others. They also met with a number of stakeholders involved in the latest phase of Australia's water reforms: the Murray-Darling Basin Plan (see www.mdba.gov.au for more information); a phase it could be argued represents one of the first attempts at a large-scale application of ecological governance principles in structural water reforms. Finally, by interviewing the BC water experts before and after the tour, Jacquie was able to identify insights, opportunities and barriers to the transfer of lessons from Oz to the Okanagan – all of which have been documented in her masters thesis.

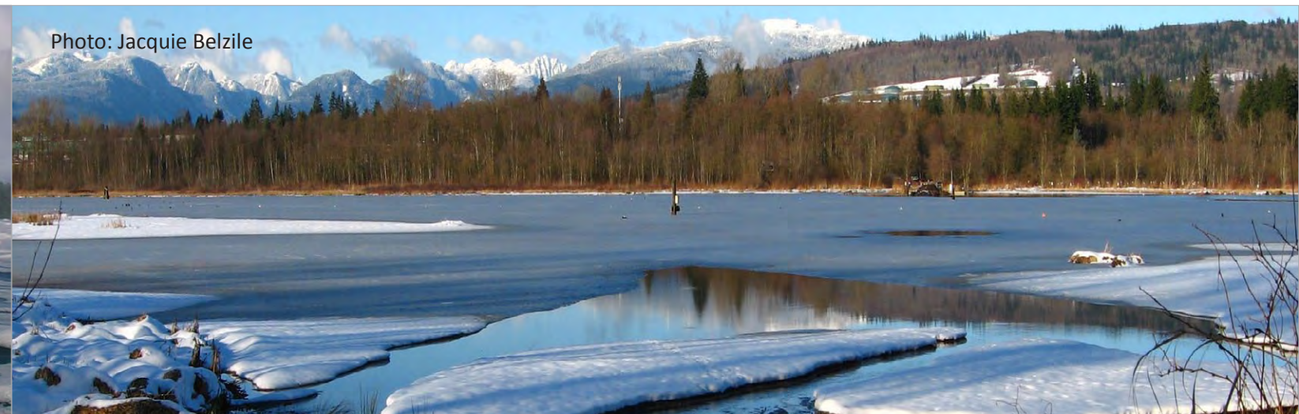


Photo: Jacquie Belzile

Julia Freeman

Biosafety and the Regulation of Agricultural Biotechnology in India

Few studies have taken up the question of how particular risk debates about new technologies unfold in 'developing world' contexts. Julia's research has addressed this gap by focusing on the risk controversy that has emerged over agricultural biotechnology, and specifically the increasing cultivation of Bt cotton in India for the past decade. Analysis of the controversy emphasizes regulatory, economic development and civil society concerns. The work raises theoretical questions as to the extent to which 'social studies of risk', largely developed across North American and European contexts, can aptly characterize risk controversies in the contexts of the global south. It also examines how the twin imperatives of development and democracy have expanded India's biosafety regulation (protecting human health and the environment) in order to address the economic security of farmers and to a lesser extent citizen rights to participation and consultation. To date, changes to the regulatory regime have been realized through public interest litigation (PIL) critical of agri-biotech. Julia has identified three key eras of oppositional claims-making about agricultural biotechnology: the first is focused on social justice for marginal farmers, which then shifts to address agri-biotech's potential environmental impacts, and is most recently followed by a coalescence around the human health effects it may pose to consumers. These shifts reflect a growing disjuncture between farmers and civil society activists, as well as newfound productivity for NGO campaigns focusing on biotech food crops. Finally, Julia calls attention to the unintended effects and missing debates of the controversy, arguing that there is more to the debate than has been considered to date. This stems from stakeholders' incomplete and sometimes plainly incorrect anticipation of an imagined 'farmer', particularly when in comes to the risks and benefits of agri-biotech and the negotiation of its biosafety. Julia has found that there are grounds for a further expansion of the applied concept of biosafety in order to more accurately address farmer's priorities and concerns regarding agri-biotech as a tool among others assessed for a capacity to increase productivity alongside potential economic, environmental or bodily costs.

Photo: Julia Freeman

Laura Cornish

This past year Laura Cornish has been very busy designing and implementing a methodology to test the effectiveness of the Local Climate Change Visioning Project (LCCVP), a new prototype engagement process that uses realistic 3D imagery and spatial modelling at the neighbourhood scale to translate global scientific information and make alternative futures explicit at the local level. In 2006-7, Local Climate Change Visioning Projects were implemented and tested in two case study communities in British Columbia: Delta and North Vancouver. To understand the long-term impact and effectiveness of the LCCVP, semi-structured interviews were conducted with 12 stakeholders who had participated in the project. The purpose of the interviews was to understand more fully what (if any) changes with regards to climate change perceptual shifts and responses the communities had undertaken since the LCCVP process, and also to explore the nuances of the role that the LCCVP may or may not have played. In addition, the interviews were designed to understand effects of the LCCVP process on knowledge, level of concern, and network. Preliminary results indicate that the LCCVP has had some long-term impacts on individuals, and indirectly impacts organizational and policy changes at the local government level.

Photo: Susanna Haas Lyons

Photo: Sarah Klain

Brian Gouge

Making Public Transportation More Sustainable

Public transportation and sustainability are often viewed as synonymous. However, operation of transit systems that employ internal combustion engines produce emissions that contribute to global climate change, regional air pollution and air pollution related health impacts. In collaboration with a team of researchers at IRES and industry partners including Translink and GIRO Inc., Brian is working on developing a method of quantifying the health and climate impacts of these emissions and reducing their impacts by optimizing how bus fleets are operated.

Typically health and climate impacts are estimated over large geographical regions such as Metro Vancouver and the Lower Fraser Valley. However, assessments at this scale can obscure the relationship between emissions and their impacts, often resulting in an underestimate of impacts. Health impacts in particular are sensitive to the scale at which they are assessed. Brian's work has focused on modeling transit bus emissions and human exposure to these emissions at scales that enable the impacts of different bus technologies along specific bus routes to be estimated. This makes it possible to assign buses to routes in a way that optimally reduces the health and climate impacts associated with their operation. The results of this work are in the process of being integrated into GIRO Inc.'s bus scheduling software, which will enable transit authorities around the world to make the operation of their bus fleets more sustainable.

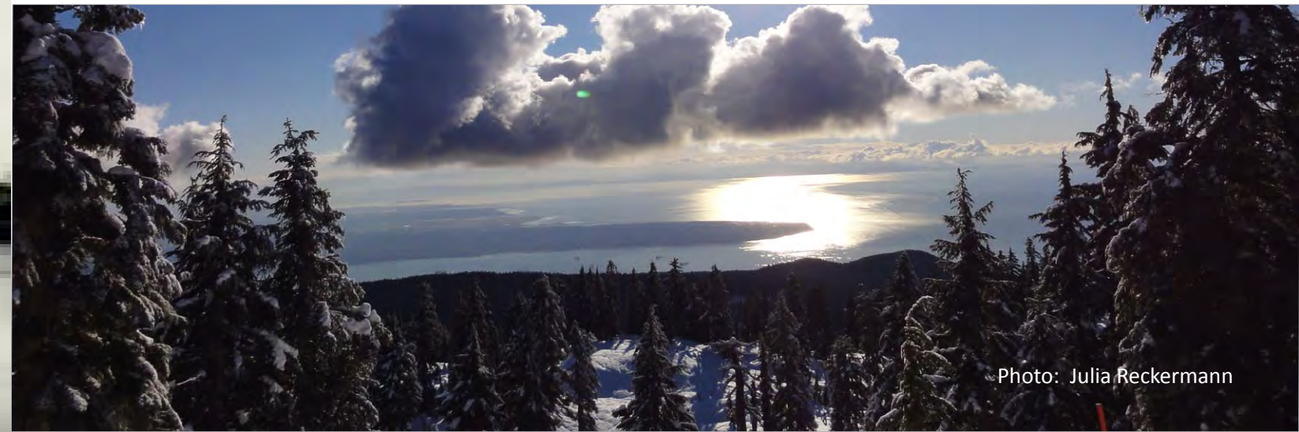


Photo: Julia Reckermann

RMES Student Society

The RMES Student Society has been wonderfully active over the past year in enhancing the quality of our experiences and studies at IRES. Here are the highlights, as they unfolded.

We began the academic year by welcoming the incoming students at the Annual Celebration. We shared some useful/dubious orientation information and paired each incoming student with an established RMES student 'peer mentor'.

A few weeks later, the student society hosted our the first of this academic year's monthly 'Friday Beers'. This 'happy hour' event has provided a fine opportunity for us to get to know fellow RMESers and our neighbors in Fisheries, Zoology, and Botany. The banner RMES social event, however, was the Whistler trip in October. We rented out the AMS Whistler Lodge and filled it with 40 RMESers and friends. The atmosphere was lively and happy, as we shared a wonderful meal (thanks Ben and Claudia) and then later went out dancing in Whistler. Close on the heels of this trip was our January trip to Mt Baker, where around twenty of us filled up two condos. This also saw hiking, hot-tubbing, board games and general merriment – but now with the addition of skiing.

Through the fall and winter we held bi-weekly 'Confabs'. These student-led discussions aim to enrich our learning and experience at IRES. We talked about topics like aquaculture in Chile, how to prepare for Comps exams, positive experiences in sustainability, and blogging. We had a few other similar events, like my short presentation seeing the Sockeye Salmon spawning on the Adams River, and a showing of the movie "Into Eternity" organized by Lisa Westerhoff. This movie eerily described the questions around Norway's ultra-long-term nuclear waste disposal facility. We even had a weekly strength and fitness course, led by Bertine Stelzer.

The RMES student society also worked to improve the already-excellent physical conditions at IRES. We replaced some worn-out microwaves with new ones, found a nice big glass coffee table for the lunch area, and bought a nice kettle. And we began sorting out how to make room to display new student posters on the walls of IRES.

We also acted to support IRES' as an institution. Lisa and I, with help from Darlene Seto, conducted a survey of RMES students to garner their perceptions of IRES and of their studies. An amazing 60 out of 90 students responded to the survey (thank you everyone!), making it an excellent empirical measure of student attitudes and concerns, and a fount of ideas. Reps from the student society also represented student interests at faculty meetings. And we supported the creation of the new IRES website (great job Helen!). We helped tidy up the student profiles section and we supplied a list of classes outside RMES that students may find relevant and helpful.

Getting all this done in a year is a testimony to the spirit and efforts of many of my fellow RMES students. You know who you are – thank you! And now, with Gerald Singh stepping up to take over as Student Society president and Olivia Freeman as treasurer, we're looking at another great year ahead.

James Murphy
RMES Student Society President, April 2010-April 2011

Photo: Stephanie Grand

Photo: Claudia Ho Lem

Photo: Louise Teh

The Environment & Development: Gender, Equity, and Sustainability perspectives (EDGES)

The Environment & Development: Gender, Equity, and Sustainability perspectives (EDGES) Research Collaborative was launched in this past year. EDGES focuses on the intersection of environment and society in developing contexts, and foregrounds investigations of the key concerns highlighted in our group title. The research group consists of Dr. Leila Harris, RMES students Danika Kleiber (PhD), Margaret Morales (MA), and Cynthia Morinville (MA), as well as Andrea Marston (MA - geography), Cecilia Roa-Garcia (Postdoctoral researcher), and Mine Islar (visiting scholar).

In the second year of her PhD Danika Kleiber conducted a two-month pilot study of gender and small-scale fisheries in the Central Philippines. With the assistance of local marine biologist Kristina Pahang, Danika conducted 80 interviews of women, men and children in two communities in the Danajon Bank. Danika will present the results of this study at the International Marine Conservation Conference held in Victoria in May 2011. This year Danika also successfully defended her project proposal Gender and Marine Protected Areas in the Central Philippines and took Dr. Harris's course Gender, Space, Inequality, and Environment. In February Danika received an International Federation of University Women Recognition Award for her proposed PhD research.

Margaret Morales is completing the first year of her Masters, supervised by Dr Harris and Dr Öberg, and her project work with the BRIDGE program and is getting ready to conduct fieldwork in Buenos Aires in the upcoming months. Her research in Argentina will be looking at the gender specific effects of the absence of sanitization treatment in the informal settlements surrounding the capital, some of which are prone to flooding during the rainy season.

Cynthia Morinville, also a first year MA student, will be conducting fieldwork in Accra, Ghana this summer. Cynthia's research investigates private sector involvement in water supply in Accra. More specifically her research looks at underserved communities' engagement, participation and negotiation around water access; as well as the implications for questions of citizenship and democracy. Cynthia was recently awarded a SSHRC Scholarship for this work.

In the coming year the research collaborative looks forward to the addition of several new members, with two MA students and one PhD student to be joining this fall, and also continuing to support each other in our work as we move towards completion of our research and our degrees.

IDRN

INTERNATIONAL DEVELOPMENT RESEARCH NETWORK @ UBC

This past academic year a number of IRES students have been involved with the International Development Research Network (IDRN). IDRN is a UBC graduate student initiative sponsored by the Liu Institute for Global Issues. IDRN aims to be a network of development researchers who advance insightful, integrated research that effectively influences decision-making. This network is made up of graduate students, academics and practitioners. Since its creation in September 2010, the network has been expanding largely due to a number of events that have been put on throughout the year including: a debate, field debriefs from member experiences abroad, guest speakers and movie nights. The culminating event this year was a one and half day conference that brought graduate students, academics and practitioners mostly from around the Pacific Northwest Region together, to participate in a dialogue on a number of different themes related to research in international development. The keynote speakers for the event were, Mr. Khalil Shariff, CEO Aga Khan Foundation Canada and Mr. Robert Fox, Executive Director of Oxfam Canada.

IDRN encourages UBC graduate students from any department interested in international development issues to get involved in this coming academic year. There are many opportunities for involvement on many different levels. More information can be found at: http://www.idrn-ubc.org/ or by contacting: idrn.ubc@gmail.com.

Photo: Sara Elder


Photo: Sara Elder

RMES Graduates 2010

MA Graduates

Student		Thesis Title	Supervisor
Anderson	Emily	Can planting trees bring co-benefits? : smallholder tree planting for development and carbon mitigation	Hisham Zerriffi
Burke	Lenore	When the fishing's gone : understanding how fisheries management affects the informal economy and social capital in the Nuxalk Nation	Ralph Matthews
Devlin	Andrew	Structural effects of the built environment on vehicle greenhouse gas emissions : evidence from Vancouver, Canada	Larry Frank
Elder	Sara	Fair Trade certification and social determinants of health : the case of coffee producers in Rwanda	Philipe Le Billon
Pettipas	Donna	Dwelling, tourism and sustainability on the rural-urban fringe : a Bowen Island case study	Les Lavkulich
Tam	Jordan	Understanding preferences for climate change adaptation for protected areas : the psychology of individual risk perceptions	Timothy McDaniels

MSc Graduates

Cisneros	Andres	Ecosystem-based management of transboundary fish stocks: Tools, conditions, and optimal strategies	Rashid Sumalia
Harma	Kirsten	Changing with the flow : an analysis of water supply and demand in a subwatershed of the Okanagan Basin, British Columbia	Mark Johnson
Klain	Sarah	Navigating marine ecosystem services and values	Kai Chan
Maurer	Nathalie	Modelling urban development trends and outdoor residential water demand in the Okanagan Basin, British Columbia	Hans Schrier
Romero Espinosa	Maria	Towards ecosystem-based management : integrating stakeholder values in decision-making and improving the representation of ecosystems in ecosystem models	Kai Chan

PhD Graduates

Student		Thesis Title	Supervisor
Boyd	David	The environmental rights revolution : constitutions, human rights, and the environment	Terre Satterfield
Brown	Zofia	Occupant comfort and engagement in green buildings: examining the effects of knowledge, feedback and workplace culture	John Robinson
Buchary	Eny	Evaluating the effect of the 1980 trawl ban in the Java Sea, Indonesia	Tony Pitcher
Elias	Arnold	High potential : how a framework of criteria for an integrated energy system can initiate a sustainable electricity grid and transportation system	William Rees
Foster	Sarah	Is bycatch a big problem for small fish? Assessing and addressing the impacts of tropical shrimp trawling on small fish species	Amanda Vincent
Hearns	Glen	Analysis of process mechanisms promoting cooperation in transboundary waters	Ian Townsend-Gault
Ishimura	Gakushi	Transboundary management of a fish stock under climate variability : the case of Pacific sardine in the California current ecosystem	Rashid Sumalia
Klinsky	Sonja	Many faces, many frames : exploring the dimensions of justice and climate change policy decision-making	Hadi Dowlatabadi and Terre Satterfield
Mazzi	Eric	An integrated assessment of climate mitigation policy, air quality and traffic safety for passenger cars in the UK	Hadi Dowlatabadi
Pajaro	Marivic	Indicators of effectiveness in community-based marine protected areas	Amanda Vincent
Teng	Jack	Environmental and social determinants of tick-borne zoonoses in the South Okanagan	Karen Bartlett
Whal	Veronica	Why people help : motivations and barriers for stewardship volunteering	Patrick Mooney


Photo: Brian Just


Photo: Danika Keliber

Scott Hinch's students featured by Science

Abundant and sustainable Pacific salmon (Oncorhynchus spp.) stocks are important economically, ecologically, and culturally to Canada. The five species of Pacific salmon represent some of Canada's last remaining large commercial fisheries on wild fish and recreational salmon fishing in British Columbia generates more than $1 billion annually in expenditures, supporting more than 10,000 jobs in communities throughout the province. Salmon are important components of food and nutrient webs in both freshwater and marine environments and they are integral to the mythology, spiritual integrity, and livelihoods of Pacific First Nations. Indeed, Pacific salmon are icons with abundant salmon confirming a healthy and productive environment in British Columbia.

The Fraser River is the largest producer of Pacific salmon in Canada. It is the longest river in British Columbia, flowing more than 2,000 kilometres through the province. It is known for its large salmon runs, where typically several million sockeye salmon return to the river to spawn each year. There are more than 100 distinct populations of sockeye salmon in the Fraser River watershed and to spawn, each population completes a unique migration route that varies in distance, elevation gain, river temperature and river flow.

In a cover article that we published in the journal Science, (Eliason, E.J., Clark, T.D., Hague, M.J., Hanson, L.M., Gallagher, Z.S., Jeffries, K.M., Gale, M.K., Patterson, D.A., Hinch, S.G., Farrell, A.P. (2011) Differences in thermal tolerance among sockeye salmon populations. Science 332: 109-112), we reported the results of a multi-year study of eight populations of adult Fraser River sockeye and found that those with the most difficult migrations were more athletic, displaying superior swimming ability and specialized heart adaptations. We also found that the optimal water temperature for a population, or temperature where the fish performed the best, matched the historical river temperatures encountered by each population on its migration routes. This is the first large-scale study on wild fish to show how different populations of the same species have adapted to such specific migration conditions. As climate change alters the conditions of the Fraser River watershed, our concern is that some populations may not be able to adapt to these changes quickly enough to survive.

Sockeye salmon have been in decline since the early 1990s. Contributing to this has been massive migration mortalities where between 40 and 95 per cent of some salmon populations have died en route to spawning. The Fraser River has warmed by nearly 2ºC since the 1950s, with the last 20 years being some of the warmest on record. High river temperatures have been associated with the high mortality. Some sockeye salmon populations do not cope well with increasing water temperatures such as the Weaver Creek population which spawns about 100 km inland from the ocean, whereas others are more resilient to climate warming. For example, the Chilko Lake population we are calling 'Superfish'. They are able to swim at higher and a broader range of temperatures compared to the other populations we examined. We believe it has to do with how they've adapted to cope with their difficult migration – they must travel more than 650 kilometres upstream, gain one kilometre of elevation, go through Hell's Gate, an area where the Fraser River plunges into a passage only 35 metres wide, and travel during the highest summer temperatures to get to a glacial lake, where they spawn.

To measure the swimming performance of the salmon populations, we monitored the metabolic and heart rates of adult salmon as they were swum them through a "fish treadmill" – a tunnel capable of producing varying water speeds and temperatures. We found that the water temperature where performance was maximal for the fish, which is called the optimal temperature, matched the historical river temperatures encountered by each population on their migration routes. In water temperatures above their optimal temperature, the salmon's swimming ability declined due to a collapse of the cardiovascular system. Currently, the Fraser River's peak river temperatures during the summer months exceeds the optimal temperatures for every population that we examined and temperatures are near lethal for some populations.

Populations of Fraser River sockeye salmon are so fine-tuned to their environment that any further environmental changes caused by climate change could lead to the disappearance of some populations. The science of understanding and predicting adult salmon migration mortality has come a long way and though there is still much to learn, the real challenge ahead lies in how to manage and conserve salmon as the climate, and Fraser River, continues to warm.

Erika Eliason, Tim Clark, Ken Jeffries, Marika Gale

Erika is a PhD student working with Dr. Tony Farrell (Zoology) and Dr. Scott Hinch. Tim is a Research Associate, Ken a PhD student, and Marika an MSc student all working with Dr. Hinch.

Photo: Sarah Klain

Photo: Penny White

RMES MA Students

Student		Thesis Title	Supervisor
Acuna	Victor	Study on Factors that Facilitate Interdisciplinary Collaboration.	Gunilla Öberg
Belzile	Jacqueline	Lessons on Adaption from Oz to the Okanagan: Sustainable Water Use & Conservation in a Changing Climate	Gunilla Öberg
Cornish	Laura	Qualitative Evaluation of Local Climate Visioning Project Case Studies	Stephen Sheppard
Galal	Hana	Wastewater treatment upgrades for Metro Vancouver under the Environmental Sustainability framework	Gunilla Öberg
Haas Lyons	Susanna	Institutionalizing citizen engagement in sustainability governance: the role of capacity building and decision making processes	John Robinson
Lim	Tee Wern	To be determined	Terre Satterfield
Morales	Margaret	Gender and sanitation in Lomas de Zamora, Argentina	Gunilla Öberg
Morgado	Claudia	To be determined	Charles Menzies
Morinville	Cynthia	Private sector involvement in water supply and the renegotiation of citizenship in Accra, Ghana	Leila Harris
Nathaniel	Lindsay	A Visitor's Perspective of Sustainability at Whistler: How to engage visitors in Sustainability A Visitor's Perspective of Sustainability at Whistler: How to engage visitors in Sustainability	Tony Dorcey
Osborn	Jeremy	Consumer Values, Organizational Behavior and Car Sharing: A Case Study of the Co-operative Auto Network	James Tansey
Reckermann	Julia	Centre for Interactive Research on Sustainability: A Pre-Occupancy Evaluation	John Robinson
Rezaei	Maryam	To be determined	Hadi Dowlatabadi
Seto	Darlene	Diversity and Engagement in Alternative Food Practice: Community Gardens in Vancouver, B.C.	Kathryn Harrison

RMES MSc Students

Student		Thesis Title	Supervisor
Beaulieu	Mathieu	Climate change impact in a coastal community watershed: investigating the summer streamflow response to a shifting hydrological regime	Gunilla Öberg
Campbell	Brooke	To be determined	Daniel Pauly
de Ruiter	Marleen	Post-disaster community recovery - linking Environmental and Economic Recovery	Stephanie Chang
Ferris	Liz	What is effective climate policy – the BC case	Gunilla Öberg
Francis	Candace	To be determined	Ken Hall
Freeman	Olivia	Carbon Credit Methodology for Cookstoves	Hisham Zerriffi
Grant	Laura	Source determination of organis matter and metals: a water quality evaluation of Chapman Creek	Hans Schrier
Ho Lem	Claudia	Climate Science, Equity and Development: The Role of International Institutions in Capacity Building for Climate Change	Hisham Zerriffi
Lathuilliere	Michael	Water modeling in Brazil	Mark Johnson
Romero	Jennifer	To be determined	George Hoberg
van der Meer	Liesbeth	Fish Retail sector Contribution to the Global Economy	Rashid Sumalia
White	Penny	Biogeography and Ecosystem Services of Lha'ask (Porphyra Abbottiae) in British Columbia	Charles Menzies
Wilson	Julie	Cumulative Effects Assessment in watersheds with mixed land uses	Hans Schrier
Wilson	Sonja	Understanding biomass gasification CHP systems for off-grid communities in British Columbia	Hadi Dowlatabadi

PhD Students

Student		Thesis Title	Supervisor
Anderson	Emily	To be determined	Hisham Zerriffi
Bailey	Megan	Economics of tuna fisheries in the Western and Central Pacific Ocean	Rashid Sumalia
Beaudrie	Christian	From cradle-to-grave at the atomic sclae: environmental risk and the governance of emerging nanotechnologies	Milind Kandlikar
Berkhout	Thomas	How Can Large-scale Transitions Toward Sustainability be Steered	John Robinson
Chew	Gerard Eng-Yang	Barefoot doctors with satellite phones. Can rural communities become more disaster resilient through the use of technology?	Timothy McDaniels
Cisneros	Andres	Ecosystem-based management of transboundary fish stocks: Tools, conditions, and optimal strategies	Rashid Sumalia
Cohen	Alice	Evaluating Watersheds	Karen Bakker
Coleman	Sylvia	Transitions to Sustainability: an Architecture of Social Change	John Robinson
Cook	Christina	Legal Legacies & institutional Arangements in two Canadian Water Governance Regimes	Karen Bakker
Dusyk	Nichole	Local Energy Planning in BC	John Robinson
Elder	Sara	To be determined	Philipe LeBilion
Eykelbosh	Angela	Examining the health effects of geogenic fluoride and arsenic and the potential for migration through water resource management	Mark Johnson
Findlater	Kieran	Biofuel crops and Land-use	Milind Kandlikar
Freeman	Julia	Biosafety and the Regulation of Agricultural Biotechnology in India	Terre Satterfield
Ganapathiraju	Pramod	A Global Study of Incentives and Disincentives to UN (FAO) Code of Conduct and IUU Fishing	Tony Pitcher
Gouge	Brian	An integrated Assessment of Public Transportation	Hadi Dowlatabadi
Grand	Stephanie	Effects of logging on reactive soil components in podzols of southern coastal BC	Les Lavkulich
Gregr	Edward	Living Ecosystems Dynamics to Decision Making	Kai Chan
Hoover	Carie	Ecosystem Modeling: Antarctic Peninsula	Tony Pitcher
Imo	Roseti	To be determined	Rashid Sumalia
Infante	Maria	Can we estimate a value aat risk for the world's ecosystem services? Building a conceptual framework for an ecosystem services value at rish for sustainable resource management.	Peter Nemetz
Jollymore	Ashlee	Utilizing Dissolved Organic Carbon to Investigate Nutrient Cycling in Disturbed Systems	Mark Johnson
Klain	Sarah	Strategies for empowering threatened people through monitoring and management of their threatened homelands: Analysis of marine conservation and monitoring networks focused on indigenous people	Kai Chan
Kleiber	Danika	Women in Fisheries in the Phillipines: the impact of conservation on the invisible workers	Amanda Vincent
Kotaska	Janalyn	Considering Aboriginal Rights - Resource Management Decision-making and Decision makers in Post Delamuukw British Columbia	Charles Menzies
Kowsari	Reza	Modelling rural household energy services	Hisham Zerriffi
Lam	Wing Yee	Global Fisheries Economics in face of change in Climate and Energy Proces	Rashid Sumalia
Lau	Kim	British Columbia's "Carbon Neutral" Government - A Critical Evaluation.	Hadi Dowlatabadi
Levine	Jordan	Sustainability, Justice and Democratisation of Science: Clayoquot Sound Biosphere Reserve	Kai Chan
Mach	Megan	Science and Management of non-Native Species in Coastal Ecosystems	Kai Chan
Maggs	David	To be determined	John Robinson
Miller	Nicole	Evaluating urban pattersn for energy and greenhouse gas performance	Stephen Sheppard
Murphy	James	The potential of private enterprise and energy cost structuring to accelerate energy efficiency investments in residential heating - Plug-in hybrid electric vehicles - characterizing and overcoming barriers to their adoption.	Hadi Dowlatabadi
O'Shea	Megan	From Compost to Choreography: How Sustainability Performed	John Robinson
Reynolds	Conor	Strategies to Control Transportation Emission in Developing Countries	Milind Kandlikar

Ryan	Teresa	Territorial Jurisdiction; the Economic and Cultural Significance of Eulachon Thaleichthys pacificus	Ronald Trosper
Salter	Jonathan	Evaluation Mental Models of Community-level Energy and their Implications for Participatory Planning Processes	Stephen Sheppard
Saraswat	Arvind	Urban Air Pollution Human Health in Developing Countries	Milind Kandlikar
Singh	Gerald	To be determined	Kai Chan
Storey	Stefan	Transitions to Sustainability: Green Buildings	John Robinson
Swartz	Wilfram	To be determined	Rashid Sumalia
Tam	Jordan	To be determined	Terre Satterfield and Kai Chan
Teehan	Paul	Policy options for mitigating direct environmental impacts of information and communication technology	Milind Kandlikar
Teh	Lydia	Spatial Management of Small Scale Reef Fisheries	Tony Pitcher
Teh	Louise	Fisher's Discount Rates and Fisheries Sustainability	Rashid Sumaila
Tesfamichael	Dawit	Water and Agrarian Society in the Aris Western Himalaya	Tony Pitcher
Tsering	Tashi	Is the city of North Vancouver ready for inovative stormwater management?	Tsering Shakya
Vandeboncoeur	Nathan	Governmental knowledge mobilization for environmental risk management in the Sunshine Coast, BC	Ralph Matthews
Varkey	Divya	Interdisciplinary Approach to Ecosystem-based Management of Coral Reefs	Tony Pitcher
Westerhoff	Lisa	Governance for Climate Change: Understanding Local Decision-Making for Low-Carbon, Resilient Communities	John Robinson
Zhao	Chunxiao	A Sustainable Housing Study in the East Kootenay Area of BC - Present Situations, Gaps and Policy Recommendations	James Tansey

Photo: Sara Elder

Non RMES Students

Kai Chan

NSERC Undergraduate Student
Allison Thompson

BRITE USRA
Christina Mak

Directed studies project
Caitlin Millar

Mentoring through Integrated Sciences Program
Carmen Ho,
Alexis Carter,
Jonathan Lopez

Graduate Student Committee member
Brett Van Poorten (PhD Zoology)
Melissa Cuke (MSc Zoology)
Cathryn Clarke-Murray (PhD EOS)
Virginia Noble (MSc Zoology)
Karina Benessaiah (PhD Arizona State University)

Stephanie Chang

Supervisor, all students in SCARP
Erica Crawford Boettcher (MSc.P)
Karthick Pathman (MA.P)
Martin Gregorian (MA.P)
Heather Fehr (MA.P)
Lilia Yumagulova (PhD)
Dilnoor Panjwani (PhD)
Wendy Tse (MA)

Graduate Student Committee member
Ugo Lachapelle (PhD SCARP)
Soheil Yavari (PhD Civil Enginnering)
William Johnstone (PhD Civil Engineering)
Marit Heideman (PhD Earth Sciences, Simon Fraser University)
Nick Roberts (PhD Earth Sciences, Simon Fraser University)
Mark Seeman (PhD Geography, University of Victoria)

Tony Dorcey

Supervisor, all students in SCARP
Janice Barry (PhD)
Christine Wenman (MA)
Darha Phillpot (MA)
Susan Read (MA)
Spring Ord (MA)
Robin Mills (MA)
Jose Fernandez (MA)
Breanna Bishop (MA)
Ellen Bird (MA)

Graduate Student Committee member
Aftab Erfan (PhD SCARP)
Lily Yumagulova (PhD SCARP)
Jennifer Bedore (MA Masters)
Theresa Fresco (MA SCARP)
Erica Crawford Boettcher (MA SCARP)

Hadi Dowlatabadi

Graduate Student Supervisor
Gabrielle Wong-Parodi (PhD UC Berkeley)
Thor Jensen (PhD University of Versailles)

Graduate Student Committee member
Amanda Proctor (MA SCARP)
James Benoit (MA Applied Ethics)

Leila Harris

Graduate Student Supervisor
Andrea Marston (MA Geography)

Graduate Student Committee member
Tom Green (PhD, Interdisciplinary Studies)
Erica German (PhD History)
Mark Cooper (PhD Geography, University of Wisconsin - Madison
Susan Rottman (PhD Anthropology, University of Wisconsin - Madison

Scott Hinch

Graduate Student Supervisor, all students in Forestry
Natalie Sopinka (PhD)
Matt Drenner (PhD)
Mike Donaldson (PhD)
Ken Jeffries (PhD)
Kendra Robinson (MSc)
Alison Collins (MSc)
Marika Gale (MSc)
Jenn Burt (MSc)

Graduate Student Committee member
Tiphaine Jeanniard du Dot (PhD Zoology)
Elizabeth Macdonald (MSc Forestry)
Stephanie Chalmers (MSc Forestry)
Erika Eliason (PhD Zoology)
Kim Sheldon (MSc Forestry)
Doug Braun (PhD Biology, SFU)
Maggie Branton (PhD Forestry)

Mark Johnson

Graduate Student Supervisor
Iain Hawthorne (PhD EOS)

Graduate Student Committee member
Cindy Starzyk (PhD EOS)
Baozhang Chen (PhD Forestry)
Andres Varhola (PhD Forestry)
Trisha Atwood (PhD Forestry)
Doris Leong (PhD Geography)
Anna Harrison (MSc EOS)
Sheena Spencer (MSc SFU, Geography)
Indira Messias (MSc UFMT, Brazil)

Milind Kandlikar

Graduate Student Supervisor
Brian Just (MSc Mechanical Engineering)

Graduate Student Committee member
Christian Krelling (PhD Planning, McGill)
Dan Baldescu (PhD, Land and Food Systems)
Jason Barton (PhD Land and Food Systems)
Christie Lagally (MSc Mechanical Engineering)

Tim McDaniels

Graduate Student Supervisor, all students in SCARP
Amanda Procter (MA)
Yasmin Banuelas (MA)
Jennifer Pinette (MA)
Erica Lay (MA)

Graduate Student Committee member
Carol Odell (PhD Mining Engineering)
Lil Yamagulova (PhD SCARP)
Cheryl Nelms (PhD Civil Engineering)
Gabrielle Wong-Paradis (PhD UC Berkeley)

Gunilla Öberg

Graduate Student Supervisor
Matt Dolf (PhD Human Kinetics)

Graduate Student Committee member
Erin Empey (MA, Journalism)

John Robinson

Graduate Student Supervisor
Emily Jane Davis (PhD Geography)

Graduate Student Committee member
Roy Bendor (PhD SIAT, SFU)
Jacqueline Koerner (PhD Geography)
Alex Aylett (PhD Geography)

Terre Satterfield

Graduate Student Committee member
Justin Page (PhD Sociology)

IRES Faculty Members

In any university in the world, there are two highly sought-after assets that are more important than any other:

- *The excellence of the faculty. Faculty with reputations that put them at the top tier of international rankings are essential to the success of a world-class university, including its ability to attract other top faculty, the best students, major research investments, positive media attention and the donations of philanthropists.*
- *The quality of the students. World-class students create an environment where excellence is expected - and achieved; where faculty are challenged - and they rise to meet that challenge; and where industry/ government demand insights and solutions - and they get more than they ever dreamed of getting.*

The Institute for Resources, Environment and Sustainability (IRES) has managed to bring together both of these attributes to create a small, but extremely impressive academic unit that would be the envy of any university striving for excellence.

IRES External review, 2011

IRES has twelve core and 38 associate faculty members covering a broad variety of competencies. It is a colourful, hardworking and highly dedicated group who are deeply committed to providing an outstanding graduate education. IRES faculty members work in various interdisciplinary settings with colleagues from across the UBC campus and other universities in Canada and elsewhere. They also collaborate with industries, interest groups and governments in society and play a central role in UBC's new sustainability initiative. The research interests of the core faculty cover areas such as societal resilience to natural disasters, eco-hydrology, sustainable buildings, energy systems, the water-energy nexus, risk perception and values, urban sustainability, ecosystem services and decision making.


Photo: Penny White

Kai Chan

One of my most significant projects in 2010-11 continues to be at the intersection of values and ecosystems, through the entry-point of "cultural ecosystem services". The concept of ecosystem services—the processes whereby ecosystems render benefits to people—is quickly becoming central to the management of ecosystems and natural resources, although one major category of such services has received very little concrete attention (cultural services). This absence of attention by researchers is despite the widespread recognition of the importance of these non-material benefits associated with ecosystems.

With IRES Prof. Terre Satterfield and various international colleagues including Anne Guerry of the Natural Capital Project, we are tackling this topic which is at first blush a neglected subsection of the emerging field of ecosystem service, but which is actually more encompassing than existing ecosystem-service work. Freed of the constraints of a purely economic framing, our expanded notion of ecosystem services provides impetus to re-ignite considerations of how to integrate social and environmental considerations into understandings of and decision-making for environmental systems. Much work has been done on this topic over many decades, but the ecosystem services concept offers one crucial—albeit unexploited and thus far neglected—concrete strength: a focused consideration of the interdependency of and interactions between social and environmental considerations. Whereas conservation biology had addressed social-environmental tradeoffs long before the term 'ecosystem services' was coined, social and environmental considerations were considered separate and often at odds. The ecosystem services concept offers a set of methods and a body of theory for understanding the extent to which social considerations (e.g., the crucial importance of healthy fishing cultures and businesses) depends on and interacts with environmental ones (e.g., ecosystems' provision of fish to be harvested). That is, ecosystem services do not include all that matter in the integration of social and ecological considerations, but they include much that has been missing from previous efforts.

This team takes the form of an international interdisciplinary working group at the National Center for Ecological Analysis and Synthesis in Santa Barbara (co-led by Guerry and including Satterfield, students Sarah Klain, Jordan Levine, and Jordan Tam). We are fleshing out frameworks for characterizing and valuating these non-material values associated with ecosystems, with pilot application in Hawai'i, the Gulf of California (Mexico), and the west coast of Vancouver Island (B.C.). This work is directly linked to the development of Marine InVEST (the Integrated Valuation of Ecosystem Services and Tradeoffs tool), which will also be developed for application on the west coast of Vancouver Island with a regional decision-making board (West Coast Aquatic). In early 2011, Dr. Satterfield and I proposed an Exploratory Workshop to the Peter Wall Institute for Advanced Studies, and we have recently heard that our application was successful. We look forward to a vibrant workshop in February 2012 that involves our international colleagues and a wide range of leading UBC scholars from across campus.

The management of ecosystems and natural resources will continue to be complicated by a wide range of conflicting and intangible values, but perhaps efforts like these will assist decision-making that is ecologically sustainable and socially just.

Stephanie Chang

My research seeks to advance understanding of community vulnerability and resilience to natural disasters. Currently, I am working on two main themes: assessing disaster recovery, and understanding risk dynamics. I am continuing this research while on sabbatical this year.

With an international group of collaborators, I have been working on a study on "New Methods to Measure, Monitor, and Assess Disaster Recovery." We are developing a standardized approach to characterize communities' recovery from disasters. This approach draws on multiple sources of information, including remote sensing satellite imagery, statistical data, and expert interviews. We are focusing on Punta Gorda, Florida, and Biloxi, Mississippi, which had been struck by Hurricanes Charley (2004) and Katrina (2005), respectively. We are developing typologies of recovery to better understand recovery processes and patterns. When the earthquake struck Haiti in January 2010, we secured funding from the U.S. National Science Foundation to extend our methods to characterize community disruption there. The Haiti case demonstrated profound contrasts with our U.S. cases.

My work on understanding risk dynamics focuses on modeling long-term changes in disaster risk in the context of Metro Vancouver. With funding from SSHRC and NSERC, my students and I have developed loss models that estimate casualties, displaced households, and disruption to health care and transportation services in an earthquake. With these models, we are investigating how risk has changed over the last few decades, and how it is likely to change in the future.

Being away this year has allowed me to learn about related research across the Asia/Pacific region and given me fresh perspectives on issues at home in BC. In my sabbatical travels, I have attended conferences, made seminar presentations, and visited dozens of researchers (and their students) working on disaster risk reduction in the U.S., New Zealand, Taiwan, and Japan. It has been a delightfully eye-opening, often humbling, and diverse experience. Coincidentally, I was visiting the Disaster Prevention Research Institute at Kyoto University when the Great East Japan earthquake struck on March 11, 2011. This catastrophe will provide many lessons for disaster preparedness and risk reduction around the world, not least in British Columbia, where we face a similar seismic hazard. I hope to study two aspects of this event in particular: community resilience, and adaptations to energy shortages.

On a more positive note, while traveling, I was surprised and honored to learn that I had been selected to be the 2011 Distinguished Lecturer by the Earthquake Engineering Research Institute (EERI), the leading professional organization in the earthquake field. This award is made "to recognize and encourage communication of outstanding professional contributions of major importance for earthquake hazard mitigation." It entails a unique opportunity to visit EERI student chapters around North America to deliver the lecture. In my lecture, on "Dynamics of Urban Seismic Risk," I am seeking to convey the message that reducing disaster risk must consider and anticipate how this risk is transforming due to underlying changes in the urban environment.

Tony Dorcey

After 40 years at UBC I am retiring in December 2011 and so this, my last annual report, includes a few reflections.

I came to UBC in 1971 to help establish Westwater, an interdisciplinary research centre focusing on the design of public policy and institutional arrangements for the management of water resources. For over 20 years my major appointment was in Westwater until the Centre and its faculty members were absorbed into what is today IRES. In 1983 I took up a joint appointment in the School of Community and Regional Planning (SCARP) and began offering graduate courses, two of which were cross-listed in IRES and SCARP and have continued to be offered every year except twice when I was on leave:

Planning for Water Resources Management: Principles and Practices (PLAN 597) began as a course based on Westwater's research with an emphasis on developing knowledge and skills for productive collaborations among people from diverse natural, applied and social science disciplines and varied stakeholder interests. The content has evolved with newly emerging approaches, giving particular attention in the last decade to Sustainability Principles and Integrated Water Resources Management (IWRM) around the world. This year's class had a focus on the implications of experience with IWRM for the ongoing discussion of reforms in BC water planning and management.

Negotiation Facilitation and Mediation: Principles and Practices (PLAN 595) grew out of an interest in using negotiation techniques to resolve conflict in water management and to foster more productive collaboration in Westwater's interdisciplinary research teams. As the field and my own practice developed, the course broadened to include facilitation and mediation techniques. The class this year focused particularly on the sharply differing views about the future of the field, discipline and profession of dispute resolution.

During the year I was the research supervisor for the following students (*completed):

- Janice Barry* (PhD) Building Collaborative Institutions for Government-to-Government Planning: A Case Study of the Nanwakolas Council's Involvement in the Central Coast Land and Resource Management Planning Process (SCARP)
- Breanna Bishop* (Masters) Integrating Community Sustainability Objectives Within Municipal Government Decision Making (SCARP)
- Robin Mills* (Masters) The Role of Municipalities in Planning for a Sustainable Agri-Food System: A Case Study of Surrey B.C. (SCARP)
- Spring Ord* (Masters) Water in the Okanagan: Perceptions of Governance (SCARP)
- Susan Dean* (Masters) Climate Change in Integrated Marine Planning (SCARP)
- Ellen Bird (Masters) Exploring Community Perceptions of Pacific Spirit Park (SCARP)
- Jose Fernandez (Masters) Implementing Community Greenways (SCARP)
- Lindsay Nathaniel (Masters) A Visitors Perspective of Environmental Sustainability, Whistler, B.C. (IRES)

From the beginning to the end of my UBC career I have emphasized both principles and practice in my teaching and research and been able to enrich my activities as an academic by also being a professional planner and mediator. I hope that others that follow me will chose to follow similar career paths. To learn more about the path I have followed and where I am going next please see tonydorcey.ca

Hadi Dowlatabadi

Only a year to go before 2012, but I am not worried! Our students continue to shine and go from strength to strength. Sonja Klinsky completed her PhD and won post-doctoral fellowships from both the SSHRC and the Pacific Institute for Climate Solutions (PICS). She is working on the justice aspects of the Western Climate Initiative in comparison to the European Union's GHG trading system, splitting her time between Vancouver and Cambridge UK. James Murphy won a Killam PhD Scholarship and spent most of the year looking into the social and private impacts of electric bicycles. Kim Lau won PhD Scholarships from the PICS early in the year and then won an Armand Bombardier Doctoral Scholarship for his work on analysing the BC governments' Carbon Neutral Government initiative. We already have one PICS White Paper and two briefing notes on the topic and are working closely with the Climate Action Secretariat. Sonja Wilson has a Bridge Fellowship working on developing a community energy plan for a remote First Nation community – the idea being to replace diesel and propane use with biomass and many sustainable local jobs. Sonja also joined a MITACS project at the Malcolm Knapp Forest in late Spring that will be developing their biomass management plan and developing a strategy document for the BC Bioenergy Network to be used for scoping opportunities for biomass based energy systems around the province. Maryam Rezaei has been wearing two hats, one working on a MITACS project exploring the regulatory and social determinants of kite-based electricity production in remote communities. The other hat was her explorer's hat looking for a rewarding topic of study. Early in 2011, she decided that we simply know far too little about "energy poverty" to be designing policies for energy security or climate change. A proposal based on her initial ideas garnered a Humanities and Social Sciences UBC grant.

Meanwhile, Brian Gouge continued his research in collaborations with Giro Inc. and TransLink. We now have a full model of the Coast Mountain Bus service area and have modelled how our proposed new approach to bus dispatch can reduce exposure to air pollution. Our studies show that this new approach can reduce public exposure to air pollutants from buses by as much as 70% at no additional capital or operating cost! Translink are in final stages of reviewing the modelled solutions and we are hopeful that they will put it into place for our region sometime in 2011-12. In addition, we have been working with a team of software engineers to automate the characterisation and problem reformulation for other urban centres in developed countries with the hope of rolling out this new approach as widely as possible.

Outside UBC, in collaboration with colleagues at CMU, we won another $6+ M NSF Center of Excellence Award for Energy and Climate Decision-making. I continued with the project at Ethical Bean where we are exploring different technologies for waste-heat to power production in collaboration with BC Hydro. I also helped Rapid Electric Vehicles in developing a strategy for finding a sustainable niche for electric vehicles. I joined the advisory group for CrossWind Power, a novel kite-based electricity generation technology. I was also invited to serve on Mayor Dianne Watts' Clean Energy Advisory Network.

Leila Harris

Leila Harris has continued to settle in as one of the more recent additions to IRES and CWAGS (women's and gender studies), and has several recent accomplishments of particular note. Among them, she is very pleased with the hard work and progress of her research group, the EDGES research collaborative Environment & Development: Gender, Equity, and Sustainability perspectives, and is looking forward to the further development of the group as the students advance their research and publications on these themes (see statement on EDGES Research Collaborative, page 19).

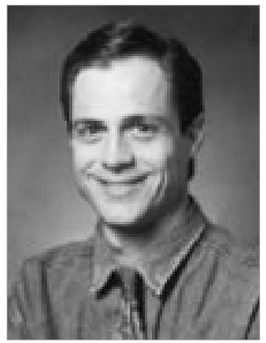
In terms of major research projects, Harris continues to work on comparative water governance with focus on the contexts of Turkey, Ghana and South Africa. A recent publication from this work looks at debates related to the human right to water (Antipode, in press). She will also be presenting on comparative water governance shifts at the upcoming meetings of the International Environmental Economics Society in Istanbul, and will be participating in a UN conference on water access and vulnerability in Geneva this July. Harris was also recently named the Associate Director with the UBC Program on Water Governance (PoWG). The PoWG is a very active research program that has considerable networks and expertise with policy communities. Upcoming efforts of the team will include work with researchers from medicine on the use of genomics technologies to improve water quality monitoring. The PoWG will provide expertise on water governance for this large interdisciplinary project funded by Genome Canada.

Other research efforts completed in the past year include two peer-reviewed articles on shifting state-society relations in southeastern Turkey in relation to developmental and environmental changes associated with Turkey's GAP project in the upper Tigris and Euphrates basin. I argue that the changes underway with respect to diversion of the rivers, including access to irrigation, have been crucial to shifting understandings of the Turkish state among rural residents living in this region. These changing understandings, which are for the most part increasingly positive, are significant given that the region has long been impoverished, and also a context marked by conflict associated with Kurdish separatism and resistance to Turkish state practices. On related themes, another publication (Political Geography, 2010 with S. Alatout) offers a comparative evaluation of the ways that scale has been important to the dynamics of access, use, and politics of the Tigris-Euphrates and Jordan rivers historically and at present, and as such has been central to state and nation building in both Turkey and Israel.

Research on environmental citizenship and subjectivity also continues, with one publication (Citizenship Studies, in press) focused on lay environmentalism in contemporary Turkey in relation to neoliberalism and European Union accession processes, and another that considers environmental narratives in relation to associations with Europeanness and Turkishness, among other operations of socio-spatial difference.

Harris is also pleased to have recently been named an Early Career Fellow with the Peter Wall Institute for Advanced Studies at UBC among other awards of the past year.

Scott Hinch



Dr. Hinch is the Director of the Pacific Salmon Ecology and Conservation Laboratory, a group committed to the study of salmonid ecology, behaviour and physiology, and to providing management systems with information needed for the conservation and sustainable use of fish resources. Abundant and sustainable Pacific salmon (Oncorhynchus spp.) stocks are important economically, ecologically, and culturally to Canada. The five species of Pacific salmon represent some of Canada's last remaining large commercial fisheries for wild fish and recreational salmon fishing in British Columbia generates more than $1 billion annually in expenditures, supporting more than 10,000 jobs in communities throughout the province. Salmon are important components of food and nutrient webs in both freshwater and marine environments and they are integral to the mythology, spiritual integrity, and livelihoods of Pacific First Nations. Indeed, Pacific salmon are icons with abundant salmon confirming a healthy and productive environment in British Columbia.

This past year, Dr. Hinch's group pursued several lines of research into factors influencing sockeye salmon including individual-based investigations utilizing physiological telemetry, genomics and experimental biological approaches to answer questions about the fundamental mechanisms causing fish to behave and survive as they do during ocean and freshwater migrations. They have been addressing these by linking large-scale telemetry observations with physiological and genomic assays on thousands of migrants, and conducting lab swimming performance and thermal tolerance experiments. The work involved large spatial scale tracking of fish over distances of a few to thousands of km, and large-scale intervention and management experiments.

There are more than 100 distinct populations of sockeye salmon in the Fraser River watershed and each must complete a unique migration route that varies in distance, elevation gain, river temperature and flow. In a recent study1 lead by PhD student Erika Eliason and involving other students and colleagues from UBC Forestry and Zoology published as the cover article in the journal Science, we measured the swimming ability of adults from eight populations by monitoring metabolic and heart rates as they were swum through a "fish treadmill". In a recent field telemetry study2 lead by postdoctoral fellow Eduardo Martins published in the journal Global Change Biology we confirmed that river migrating adults perished at rates and temperatures that were population-specific, and also confirmed that Chilko Lake sockeye survival was the least affected by warm river temperatures. However, high river temperatures are but one of several factors contributing to migration mortality. In another recent study3 published in Science we demonstrated that salmon with a gene expression signature reflecting immune-suppression and disease, potentially caused by a virus, were much more likely to die during the migration.

This past year Dr. Hinch contributed to the teaching of three undergraduate courses, and a graduate course, all dealing with aquatic systems and fish, and continues to be the Director of the undergraduate program in Natural Resources Conservation.

1 Eliason, E.J., Clark, T.D., Hague, M.J., Hanson, L.M., Gallagher, Z.S., Jeffries, K.M., Gale, M.K., Patterson, D.A., Hinch, S.G., Farrell, A.P. (2011) Differences in thermal tolerance among sockeye salmon populations. Science 332: 109-112.
2 Martins, E.G., Hinch, S.G., Patterson, D.A., Hague, M.J., Cooke, S.J., Miller, K.M., Lapointe, M.F., English, K.K., Farrell, A.P. (2011) Effects of river temperature and climate warming on stock-specific survival of adult migrating Fraser River sockeye salmon (Oncorhynchus nerka). Global Change Biology 17: 99-114
3 Miller, K.M., Li, S., Kaukinen, K.H., Ginther, N., Hammill, E., Curtis, J.M.R., Patterson, D.A.,
Sierocinski, T., Donnison, L., Pavlidis, P., Hinch, S.G., Hruska, K.A., Cooke, S.J., English, K.K., Farrell, A.P. (2011) Genomic signatures predict migration and spawning failure in wild Canadian salmon. Science 331: 214-217.

Mark Johnson

The past year was one of growth in size, scope and complexity for Dr. Mark Johnson and his research group (nicknamed the Ecohydrology Lab; http://ecohydro.ires.ubc.ca). Kirsten Harma completed her MSc and four other graduate students are advancing their research activities. Jack Zhou completed his Honours BSc in Environmental Sciences at UBC under the supervision of Dr. Johnson and significant interaction and support from the other lab group members. In addition, they were joined by visiting students from Brazil (Nei Leite, a PhD student at the University of São Paulo and Indira Messias, a MSc student from the Federal University of Mato Grosso), Germany (Josefine Walz and Inga Hibert, BSc research interns), France (Julie Boye, a MSc research intern) and the UK (Tahir Nagji, a MSc visiting student).

Two principle focus areas for research over the past year include (i) investigating the impact of forest harvest on water and carbon fluxes in a watershed on Vancouver Island near Campbell River, and (ii) exploring the potential for mitigating greenhouse gas emissions and carbon leaching from forested soils using biochar (charcoal derived from biomass). Graduate students are involved in both efforts for their thesis work, with undergraduate students also participating in the research activities. As an outreach effort related to these two research projects, Dr. Johnson prepared a practitioner-oriented research note titled "Hydrology, greenhouse gases and forestry implications", which was published by the Sustainable Forest Management Network.

Beyond forestry-related issues in British Columbia, Dr. Johnson became one of the co-principle investigators of the Brazilian National Wetlands Research Institute. This led to two IRES-UBC students recently visiting Mato Grosso Brazil. In addition, Dr. Johnson served as a guest editor for a special edition of the journal Biogeochemistry that focused on land-water interactions in the Amazon.

Back at UBC, Dr. Johnson served as undergraduate faculty advisor to 35 students majoring in Environmental Sciences through the Department of Earth and Ocean Sciences. He continues to participate in UBC's Bridge Program as a Faculty Mentor, and was recently named a UBC Sustainability Research Fellow.

Bringing visiting students from Brazil to BC during the very snowy 2010-2011 winter was certainly interesting and provided many laughs. Related social events included snowshoeing to the Hollyburn Lodge at Cypress Mountain for a Saturday evening bluegrass concert. Regarding his experience at UBC, the soon-to-be-Dr. Leite writes: "Undertaking the Visiting Scholar position has advanced my ongoing work on my research project in Forest Ecosystem Ecology. There is no doubt that access to such a productive research environment has been exceptionally useful...and my research project will be significantly improved as a result of the visit".

Milind Kandlikar

The past year saw some significant changes in the nature of my appointment at UBC. I was officially moved to IRES as a core faculty member with a 50% appointment. Thanks to the many IRES faculty members (you know who you are!) who made this possible. The other half of my appointment continues to be the at Liu Institute, where I serve as the associate director.

The academic year that went by was very productive in research terms. The Indian Auto-rickshaw Project (IARP) is slowly winding down. Dr. Conor Reynolds the prime mover behind IARP graduated from RMES and is now an NSERC post-doc at Minnesota; his partner-in-crime post-doc Dr.Andy Grieshop is also leaving UBC and will join NC State as a faculty member. The core findings of IARP relate to the switch to Compressed Natural Gas (CNG) fuel of the entire public transit fleet in New Delhi. We found for Auto-rickshaws that simply phasing out of 2-stroke engines could have been almost as beneficial as the CNG switch for both air quality and climate change. The work has generated significant policy interest and several publications in top-ranked journals. One interesting result was the discovery of carbon nanotubes in the auto-rickshaw PM exhaust which is a nice if serendipitous link with the nanotech work.

The work on risks and benefits of emerging technologies (with Terre Satterfield) moved forward in multiple directions: a survey on expert views of nanoscience and regulation was completed and the data is being analyzed; a study on how expert judgment might be used in regulation of nanomaterials was published, and is the basis of a planned expert and regulator elicitation workshop. These efforts form the core of Christian Beaudrie's thesis. The SSHRC project on GMO risks and regulation in India is progressing well and drawing to a close. Julia Freeman's doctoral work has been at the center of the GMO effort - including a paper published this year, and several in the pipeline.

Research on climate change capacity building funded by Hampton (with Hisham Zerriffi) is also moving apace. Two papers - one a critical review on the capacity in developing countries to cope with climate change risks, and the second a quantitative analysis of developing country participation in the IPCC were both published. RMES Masters student Claudia Ho Lem worked hard on both. Other research included: a cookstove air quality climate-impact tradeoff piece with Andy Grieshop; Doctoral Student Paul Teehan's work on environmental implications of Information Technology; Doctoral Student Arvind Saraswat's work on spatial determinants of air quality in India; and Doctoral Student Kieran Findlater's biofuels work.

The coming year promises to be busy, but there is a light at the end of the tunnel. I hope to wrap up some projects in anticipation of my 2012 sabbatical year, and expect several students will complete their doctorates. I am also looking forward to new teaching avenues - including in the newly defined RMES curriculum and the Engineering and Public Policy Program.

John Robinson

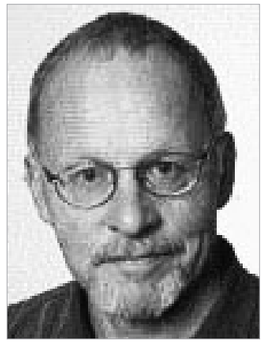
In early 2010 I took on the job of Executive Director of the new UBC Sustainability Initiative (USI). The mandate of USI is to integrate operational and academic sustainability across the entire UBC Vancouver campus. The last year has been a process of establishing the USI presence (we have about 30 staff and faculty working with USI in four offices: Teaching and Leaning, Operational Sustainability, Research and Partnerships, and central administration), and beginning an ambitious set of programs across campus.

This year also witnessed the continuation of the construction process for the new Centre for Interactive Research on Sustainability (CIRS). CIRS will open its doors in August 2011, and the past year has seen a huge number of activities associated with fit-out, occupancy, operations, etc. Sixteen different group from across campus and beyond are moving into CIRS, which will be the home of the USI. We are actively developing a research program around three themes: building sustainability, community engagement, and urban-scale policy and market transformation, including a suite of pre-occupancy research activities focused on the behavioural aspects of sustainable buildings.

On the research front, 2010 saw the instigation of the Greenest City Conversations project, which I direct. This project works in partnership with the City of Vancouver, and BC Hydro, to engage citizens of Vancouver in exploring sustainable futures and the City Greenest City goals, in six channels: scenario visualization workshops, Metroquest gaming, mobile applications, social media events, tabletop games, and performance art.

Finally, I currently supervise 10 graduate students and the range and quality of their work continues to be inspiring.

Tim McDaniels



One highpoint for Tim McDaniels in 2010-2011 was teaching his Plan 545 field studies class regarding ecosystem services and watershed management in Costa Rica, in partnership with CATIE of Turrialba, Costa Rica. The course took place in early May, 2010, and had 14 UBC graduate students from various programs, including SCARP, IRES and Forestry. A second highpoint was creation and submission of a major proposal to IDRC about food security in Latin America and Africa, which is still being reviewed. A third highpoint was having four graduate students from UBC participate in preparing papers under a SSHRC grant in cooperation with CATIE in Costa Rica.

Images below taken in Costa Rica during Plan 545. Courtesy of Susanna Haas-Lyons

Gunilla Öberg

This past year, the directorship has taken more than a fair share of my time, but in spite of this, the four years at UBC, are starting to pay off. My book 'Interdisciplinary environmental studies – a primer' was released in December. As a traditional paper writer, this was a major accomplishment on my end, and it makes me happy that students seem to appreciate it – I truly hope it will be useful for those entering interdisciplinary adventures.

IWEP, the integrated water and energy project, is slowly taking shape with an increasing focus on sustainable waste water solutions in growing urban areas. During the past year, the contacts with the department of computer science at UBC (Drs. Giuseppe Carenini, Holger Hoos and David Poole), has been solidified, and international collaboration through the U21 network with partners in Australia, Singapore and Sweden have been established. Two new masters students started in the fall 2010 (Hana Galal and Margaret Morales) and two doctoral students were admitted in January 2011, who will start in September 2011 (Alicia LaValle and Hamed Taheri). Seed-funding from the Martha Piper Foundation was secured as was financial support for a post-doc from the Real Estate foundation, and I am very pleased that we managed to attracted an outstanding candidate (Brent Chamberlain), who will start in August 2011. The first publications are in the pipe-line, and in the coming year I anticipate a couple of internal reports plus at least a couple of publications in the international academic press.

The past year, my long-term collaboration with David Bastviken at Linköping University in Sweden on chlorine biogeochemistry focussed on transformation rates. I am particularly proud of our joint paper "Transformation of chloride to organic chlorine in terrestrial environments: variability, extent and implications", soon to be published in Critical Reviews in Environmental Science and Technology. We conclude that when the conditions are 'right', transformation of chloride to organic chlorine is likely to consume close to 100% of the chloride – the major problem being that we don't know what those conditions are, and it is thus close to impossible to reliably predict, for example the movement of 36Cl from nuclear waste repositories. In SWAL (UBC's Soil, Water and Air Laboratory), we continued to develop our chamber systems for monitoring of volatile chlorinated compounds (VOCls) and our first publications are in the pipe-line.

The course Applied Sustainability was run in pilot mode in the spring term 2011. I spearheaded its development, and was course instructor during the spring, running the course jointly with a team of three graduate students (Liz Ferris, Nichole Dusyk and Matt Dolf), who did a tremendous job. The course was clearly a success. It is open for third and fourth year students in six of UBCs faculties and it is conducted in close collaboration with UBC Planning and Operations, with among other things an open lecture series where a faculty member and a staff member jointly present various aspects of UBC, from a sustainability perspective.

Two of my students graduated this spring: Mathieu Beaulieu who studied summer streamflow responses on the Sunshine coast, in light of climate change and Jacquie Belzile, who brought two practitioners from Okanagan to Queensland, Australia to discuss what we might learn from the Australians with regards to water management. I took on three new masters students (Margaret Morales, Hana Galal and Victor Acuña) and I accepted to co-supervise (with Dr. Robert Sparks) Matt Dolf, PhD student in Human Kinetics with a focus on sustainable sports events.

Terre Satterfield

Terre Satterfield is an anthropologist by training whose work lies at the intersections of culture and justice with environmental values, sustainable development, environmental health, and environmental risks as her domains of interest. Her research examines this in a variety of contexts including: environmental conflicts (e.g., logging disputes), the politics of biodiversity, First Nations engagement in land management and regulatory contexts, the governance and perceived risk of new technologies (biotechnology and nanotechnology), and the social and cultural consequences of contamination as well as environmental policy more broadly. This work includes both case study and survey approaches, and the development of methods that both contest and engage with the representation of culture and other less 'tangible' considerations in environmental management. A brief summary of this year's publications is: 5 papers out or online, 1 in press; 2 book chapters out (formerly journal articles), 1 chapter in press, 2 papers under review, 4 more near to submissions (these are not listed here). Invited talks were given at Yale and Stanford, last fall and this spring. These (papers and talks) largely reflect project work linked to ongoing studies of the perceived risks of nanotechnologies and the intuitive logics behind understandings of environmental risks; a study of capacity building across new approaches to natural resource decision-making involving indigenous-state partnerships; and the examination of cultural ecosystem services and its critics. Three new grants were funded this year, one SSHRC, one Hampton project, and one Peter Wall workshop grant.

Teaching was busy due in part to usual teaching load alongside efforts as head of the curriculum committee (i.e., seeing through all curriculum changes and development of several new courses). These changes are with CFIS and the Senate at this writing. Two PhD students graduated in May, both were recommended for awards. A post doc has been offered two tenure track decisions and is making that decision now. Two of 5 PhD students finished comps, one MA student graduated, and all others are making good progress. One new PhD student was awarded a SSHRC CGS (highest award), the other was awarded a regular SSHRC. I also agreed to sit on two new PhD committees (Klain and Westerhoff). Service included myriad efforts including membership on the CFIS strategic planning committee, reviewer of multiple CREATE grants, one of which I helped revise through success at the level of funding. As well I continued my work as editor for a monthly column for Anthropology News, reviewed 8 papers for journals and have begun sitting on an international advisory panel: Transforming the UK Energy System, University of Cardiff, April 2011 forward. Lastly, I sat as university examiner for one UBC PhD student, and as reviewer of a tenure file for Oregon State University.

Photo: Danika Kleiber

Faculty Associates

IRES has 38 faculty associates, who supervise our students, sit on their committees and participate in joint research projects. Our faculty associates come from across the UBC Campus with homes in the Faculties of Science, Arts, Applied Science, Sauder School of Business, Law, Forestry, Land and Food Systems as well as sister units in The College for Interdisciplinary Studies (CFIS). Notable for their contributions to a large number of our graduate students are for example Hisham Zerriffi at the Liu Institute for Global Issues, Amanda Vincent, Rashid Sumaila and Daniel Pauly at the Fisheries Centre (FC), Stephen Sheppard, Faculty of Forestry, and Ralph Matthews, Department of Sociology. Below follows highlights from 3 of our faculty associates and reports from two collaborative programs.

Photo: Sara Elder

Hisham Zerriffi

This past year has been an extremely productive year for my research at the intersection of technology, environment and development. My book about the use of small scale electricity generation technologies for rural electrification in the developing world, Rural Electrification: Strategies for Distributed Generation, was published by Springer in January. The book is based on case studies in three countries (Brazil, Cambodia and China) and examines the business model and institutional factors that have led to success and failure across a range of distributed electrification projects. My work in this area also led to a paper in Current Opinions in Environmental Sustainability on innovative business models to scale up energy access in developing countries which will be published in the fall.

An important aspect of my work is my collaboration with graduate students and I have been fortunate to work with a dynamic and motivated set of students. Two students, Emily Anderson and Sara Elder completed their Master's degrees in this last year:

- Sara Elder's (M.A. student, RMES) thesis sought to understand the role of participation in fair trade cooperatives on farmer health, using Rwandan coffee farmers as a case and focusing, in particular, on the social determinants of health. (Co-supervised with Philippe LeBillon of Geography and the Liu Institute for Global Issues)
- Emily Anderson's (M.A. student, RMES) thesis examines the issue of the relationship between carbon credits and development in the agroforestry sector. Agroforestry projects have inspired hope for the realization of co-benefits for rural livelihoods, local environment and global climate. Interviews and focus groups are being conducted to document stakeholder understandings and expectations of costs, benefits and barriers to participating in agroforestry across stakeholders engaged at all levels of project implementation.

Both theses have resulted in a number of papers submitted for publication. I continue to work with Emily as her Ph.D. supervisor. Reza Kowsari (Ph.D. student, RMES) and I continue to work together to examine the use of agricultural residues for rural energy supply in India and its implications for developing viable business models based on local supply and impacts on household welfare. We have also had a paper accepted in Energy Policy on household level decision-making on rural energy. Another ongoing graduate student project (co-supervised with Milind Kandlikar of IRES and the Liu Institute) is that of Claudia Ho Lem (M.Sc. student, RMES). We have recently had a paper accepted in Global Environmental Change analyzing participation trends in the Inter-Governmental Panel on Climate Change (IPCC).

I have also taken on two new graduate students this year. Olivia Freeman (M.Sc., RMES) is a Bridge Fellow looking at how carbon credits are calculated for cookstoves and the health implications of cookstove carbon projects. Pascal Steingruber was an ETH-Zurich Master's student who came to UBC to complete his thesis with me on modeling the possibility of achieving a 2000W society in British Columbia.

Finally, a number of other projects are either on-going or have been recently started. This includes my work with colleagues at Stanford University and the Indian School of Business on commercial cookstove companies and household surveys of cookstove customers in India, a project on water and energy poverty, and a project on household level carbon emissions and equity.

Peter Dauvergne

Peter Dauvergne is Professor of Political Science, Canada Research Chair in Global Environmental Politics, and Director of the Liu Institute for Global Issues. His research focuses on the politics of global environmental change, and he currently holds a Social Sciences and Humanities Research Council of Canada grant (2010-13) on the "Global Environmental Politics of Eco-Consumerism." Prof. Dauvergne is currently supervising one PhD student in the RMES program, Sara Elder, who is investigating global commodity chains and development; and is on the committee of another RMES PhD candidate, Alice Cohen, who studies water governance. Peter also supervises Jane Lister, a Postdoctoral Research Fellow at the Liu Institute for Global Issues, and RMES alumnus, as well as several graduate students in his home department, Political Science.

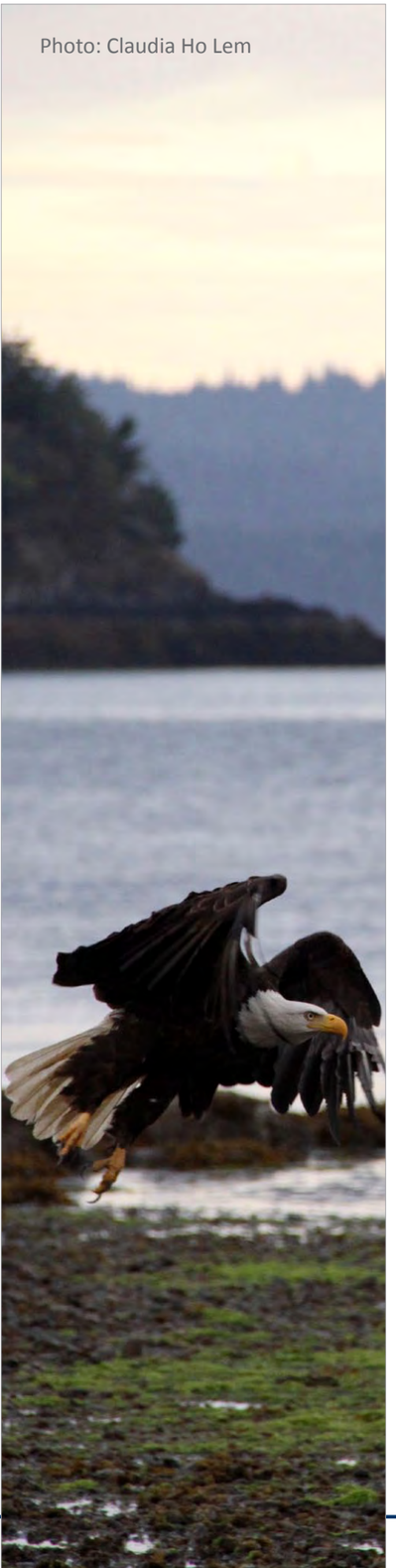
During the past year, Prof. Dauvergne has published a new book, "Timber"; co-authored with Jane Lister, the second edition of "Paths to a Green World: The Political Economy of the Global Environment", written with Jennifer Clapp; as well as several journal articles on the politics of global environmental change. Of these publications, he has co-authored one book and two journal articles with RMES alumnus, Jane Lister:

- "Timber" looks at deforestation in light of what's happening inside global commodity chains, where international timber companies and big box discount retailers have increasing control;
- "The Prospects and Limits of Eco-Consumerism: Shopping Our Way to Less Deforestation?" was published in Organization and Environment and explores the shift by firms and governments toward eco-consumerism as a mechanism for global change, specifically looking at its value for improving forest management globally;
- "The Power of Big Box Retail in Global Environmental Governance: Bringing Commodity Chains Back into IR" was published in Millennium: Journal of International Relations, and analyses the consequences for global forest governance of the growing power of the world's biggest retailers.

Peter Dauvergne and Jane Lister have submitted three further journal articles for peer review, including one co-authored with RMES student, Sara Elder, titled "Big Brand Retail: Driving the Business of Sustainable Coffee". Peter and Jane have also presented their research in a number of different forums, including international

Photo: Danika Kleiber

David Maggs, outdoor ballet production "The Same River Twice"; Candice Pike, Jack Wignall, dancers



Kathryn Harrison

Kathryn Harrison is a professor of Political Science and an Associate Dean in the Faculty of Arts. Her research compares the politics of carbon pricing in different countries, with the goal of developing insights into what conditions or institutions facilitate adoption of effective climate policies. She is currently supervising one MA student in the RMES program, Darlene Seto. Now in her second year, Darlene has been spending much of her time roaming around the growing numbers of community gardens within Vancouver. Darlene's research investigates the intersection of diversity, inclusion, and elitism within alternative food practice. Using community gardens as a medium for this discussion, her work examines the extent to which community gardening in Vancouver is pursued as an activity for those with diverse racial backgrounds, and the perception and allocation of benefits from and interactions in the garden. Mixed methods, including both interviews and survey research with garden members, coordinators, and city officials, are being conducted to better understand the motivations behind and experiences of diverse individuals' participation in urban community gardens. By drawing on interactions with the land and others around them, Darlene seeks to attain a greater understanding of both the material and immaterial benefits which can result from participation in gardens – and how that may vary according to background.

This work is complemented by Darlene's other activities. An article written for Getting to GREENR (an interdisciplinary web portal which supports environmental and sustainability studies), was featured on the Association for the Advancement of Sustainability in Higher Education (AASHE) website in February. In April, she delivered a presentation to the Vancouver Food Policy Council, speaking to the role of academic research in food policy. Upcoming highlights include a forthcoming internship under the City of Vancouver's Greenest City Action Plan, working on the plan's "Zero Waste" goal, as well as a conference presentation at the annual meeting for the Association of Environmental Studies and Sciences (AESS) in Burlington, Vermont.

Karen Bakker

Karen Bakker is the Director of the Program on Water Governance (www.watergovernance.ca). (see page 65), and Associate Professor in the Department of Geography. She holds a Canada Research Chair in Political Ecology and is an Associate of IRES.

My primary research interests span political economy, political ecology, environmental studies, development studies, and resource and environmental management. I conduct research in both the 'developing' and 'developed' world, and consequently have an interest in debates over postcolonialism and development.

As a researcher committed to interdisciplinarity, I collaborate with natural, social and medical scientists across a range of disciplines; I am currently leading a large-scale, interdisciplinary project on water security (www.watersecurity.ca). In recent years I have published research in journals in geography, urban studies, development studies, and environmental studies, as well as water specialist journals. I also regularly act as an advisor to governments, NGOs, and international organizations, including the United Nations, and the Organization for Economic Cooperation and Development.

Recent Highlights:

- In April 2011, I was awarded one of the Canada's Top 40 under 40 awards - one of the only social scientists ever to receive this award http://www.canadastop40under40.com/
- In January 2011, I was awarded a Canada Research Chair in Political Ecology
- My latest book "Privatizing Water: Governance failure and the World's Urban Water Crisis" recently was awarded the 2011 Urban Affairs Association Annual Book Award (honourable mention)

Although most of my supervisory activity is in the Department of Geography (my home department), I am currently supervising two IRES masters students (Jacquie Belzile and Hana Galal), and 2 PhD students (Christina Cook and Alice Cohen) all of whom work with the Program on Water Governance.

Faculty Associates

Karen Bakker	Associate Professor	Geography Department
Richard Barichello	Associate Professor	Land and Food Systems
Karen Bartlett	Associate Professor	School of Environmental Health
Raymond Cole	Professor and Director	School of Architecture and Landscape Architecture
Peter Dauvergne	Professor and Director	Liu Institute for Global Issues
Simon Donner	Assistant Professor	Geography Department
Lawrence Frank	Associate Professor	School of Environmental Health
Sumeet Gulati	Assistant Professor	Land and Food Systems
Ken Hall	Emeritus	IRES
Christopher Harley	Assistant Professor	Zoology
Kathryn Harrison	Professor	Political Science
George Hoberg	Professor	Forestry
Brian Klinkenberg	Associate Professor	Geography Department
Les Lavkulich	Emeritus	IRES
Colin Levings	Scientist	West Vancouver Research Laboratory
Sandra Lindstrom	Adjunct Professor	Botany
Ralph Matthews	Professor	Sociology
Charles Menzies	Associate Professor	Anthropology
Patrick Mooney	Associate Professor	School of Architecture and Landscape Architecture

Daniel Moore	Professor	Geography
Peter Nemetz	Professor	Sauder School of Business
Dianne Newell	Professor	Peter Wall Institute for Advanced Studies
Daniel Pauly	Professor	Fisheries Centre
Tony Pitcher	Professor	Fisheries Centre
William Rees	Professor	Community and Regional Planning
Tsering Shakyra	Assistant Professor	Institute of Asian Research
Stephen Sheppard	Associate Professor	Forestry
Douw Steyn	Professor	Earth and Ocean Sciences
Rashid Sumalia	Professor	Fisheries Centre
Juanita Sundberg	Assistant Professor	Geography
James Tansey	Associate Professor	Sauder School of Business
Frank Tester	Associate Professor	School of Social Work
Ronald Trosper	Associate Professor	Forest Resource Management
Ian Townsend-Gault	Associate Professor	Law
Amanda Vincent	Associate Professor	Fisheries Centre
Carl Walters	Professor	Fisheries Centre
Paul Wood	Associate Professor	Forestry
Hisham Zerriffi	Assistant Professor	Liu Institute for Global Issues

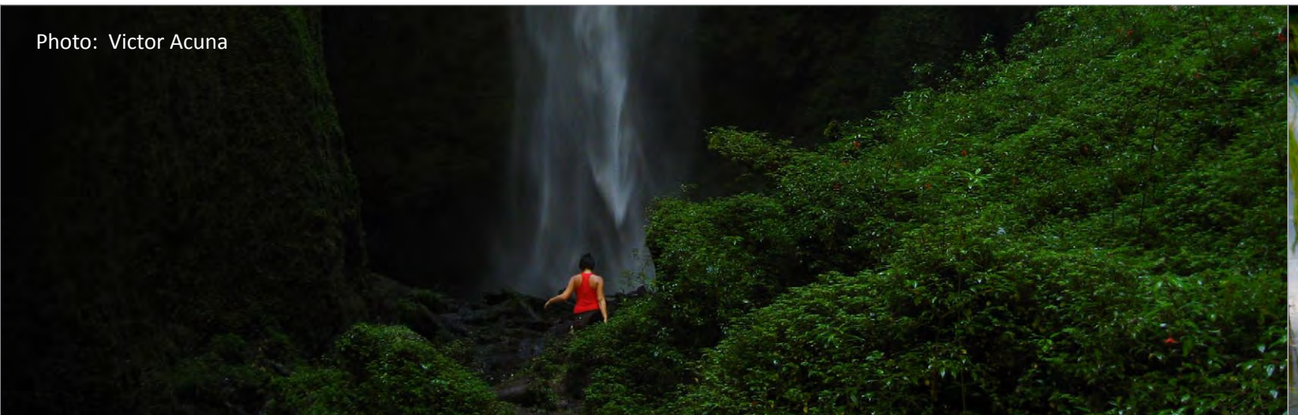


Photo: Victor Acuna


Photo: Matt Dolf

IRES Visitors and Post-docs 2010

IRES continuously receives requests from visitors from around the world who wish to spend time with us and we welcome anyone who brings their own funding, conducts research in one of our relevant fields and has a champion among our faculty members. So far we have been able to provide office space for all who fulfill these criteria and during 2010-2011, we had the pleasure of hosting x post-docs, visiting professors, etc xx who have been visiting for periods of a few weeks up to a couple of years. Below follow highlights from five of our visitors.

Tahir Nagji, Visiting Scholar
May - September 2010
University of Birmingham, UK

Teresia Svensson, Post-doc Research Fellow
May - December 2010
University of Linköping, Sweden

Judit Lienert, Visiting Researcher
October - December 2010
Eawag, Dübendorf, Switzerland

Julie Boye, Research Intern
March - August 2010
ENTPE, Lyon, France

Bertine Stelzer, Visiting Scholar
September 2010 - April 2011
University of Oldenburg, Germany

Pascal Steingruber, Visitng Scholar
March - August 2010
ETH, Switzerland

Tom Sisk, Visiting Professor
July 2010 - July 2011
University of Arizona, USA

Josefine Walz, Research Intern
April - September 2010
University of Bayreuth, Germany

Maria Fierro Jauregui, Visiting Scholar
March - April 2010
CIBNOR, La Paz, Mexico

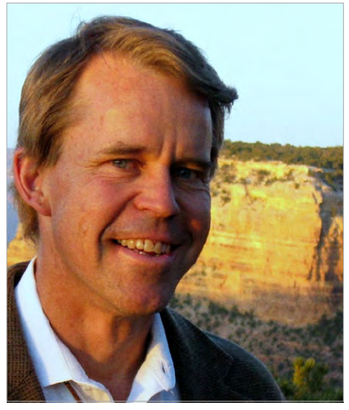
Guilia Bernardi, Visiting Scholar
January - September 2010
Polytechnic University of Marche,
Rome, Italy

Indira Messias, Visiting Scholar
September 2010 - March 2011
University of Mato Grosso, Brazil

Gary Luck, Visitng Professor
May 2010 - May 2011
Charles Stuart University,
NSW, Australia

Fabien Carminati, Internship Student
March - July 2010
Nancy University, France

Thomas Sisk, Visiting Professor Northern Arizona University



Being an IRES faculty member for one fortunate year has been a great experience for me. As a Visiting Professor, on sabbatical leave from Northern Arizona University, I have benefited from the creative, interdisciplinary work environment, while developing a deeper appreciation of the social-sciences dimensions of my career in conservation biology. During my stay at UBC, I was able to explore several new areas of research and link these to my ongoing scholarship and teaching. Interestingly, the new perspective afforded by my time with IRES has allowed me to advance long-term initiatives that I thought I had put on pause during my sabbatical leave. At the same time, I was able to launch new research that I hope will sustain collaborations forged at UBC.

Working with host Kai Chan and his research group, I studied emerging approaches for identifying and valuing ecosystems services that do not lend themselves to economic assessment. The field of ecosystem services has captured the imagination and much of the recent debate in the conservation community, and much of this has revolved around neoliberal economic theory. Yet I have found over the past decade that policy decisions regarding public lands – which comprise the majority of the western United States and are the focus of much of my research – involve a host of intermingled social and cultural values. To have meaning in this policy environment, the ecosystem services perspective must address the full range of values essential to developing a social license for environmental conservation and management. Working with the Chan group and others at UBC, it became clearer to me how this could be managed in Grand Canyon region, where I make my home. I am now involved in launching a new, interdisciplinary landscape planning center, embracing the explicit links between social and ecological aspects of the policy challenge.

During my visit I also helped launch a new research effort aimed at understanding how, why, and to what extent scientists and other environmental professionals engage in policy development and advocacy. This is a controversial topic in many circles, because environmental policy has become politicized, and scientific understanding is not widespread. Many within the scientific community feel the “double ethical bind” of responsibility to protect the integrity of their science, coupled with responsibility to represent scientific understanding appropriately in policy contexts. It is our hope is that the study will produce insights into how the scientific community can become appropriately engaged in policy and advocacy, without the risk – real or perceived – of placing their scientific credentials at risk.

As with any sabbatical, the opportunity to interact informally with new colleagues was a rich reward for a handful of lectures and other contributions to the UBC community. Interacting with IRES graduate students was a wonderful opportunity to expand my focus and learn about interdisciplinarity from those to whom it comes naturally. I’ve vowed to carry that sense of purpose and possibility forward with enthusiasm in the coming years.

Judit Lienert, Visiting Researcher Eawag, Switzerland

From September to December 2010, I was visiting researcher at the Institute for Resources, Environment and Sustainability (IRES) at UBC in Vancouver. In November, I also visited the probably most important US-conference in the field of quantitative decision analysis, the 2010 INFORMS annual meeting in Austin, Texas. At Eawag, the Swiss Federal Institute of Aquatic Science and Technology (www.eawag.ch), I am group leader of ‘Decision Analysis’.

By training I am biologist, with a PhD in ‘population biology of wetland plants in fragmented landscapes’. I was appointed at Eawag ten years ago. First, I was co-project leader of Novaquatis, a transdisciplinary research project focusing on urine source separation. I worked very closely with wastewater engineers, but also chemists, ecotoxicologists, social scientists, and stakeholders. For the past four years, I have been focusing on ‘Decision Analysis’, which gives me the opportunity to continue working in an interdisciplinary manner. I find interdisciplinary collaboration highly important as well as very exciting. I have just terminated a project on ‘how to handle hospital wastewater – Multiple-Criteria Decision Analysis (MCDA) involving many stakeholders’. I have running projects concerning ‘elicitation of expert values for river rehabilitation’, ‘a choice experiment representative for the Swiss population to value the services from wastewater infrastructures’, and ‘sustainable water infrastructure planning (SWIP)’.

My host at IRES, Tim McDaniels was unfortunately ill during my stay. I am very sorry about this and regret that I did not have the opportunity to get to know Tim better. However, this short sabbatical did give me sufficient free time to focus on the conceptual background of Utility Theory. I was able to work through a textbook on Multi-Criteria Decision Analysis (MCDA) in detail and had the time to read some fundamental publications, for instance concerning different methods to elicit utilities in decisions under risk. This conceptual focus was very useful to prepare the lecture ‘Multicriteria Decision Analysis’ that I have been appointed to teach at ETH Zürich starting the Spring Semester 2011. Thanks to the sabbatical I also had sufficient time to prepare the necessary tools for the class, including implementation in decision analysis software.

I had stimulating exchanges with the researchers at IRES; I participated in their bi-weekly IRES-seminar series, and gave a presentation followed by a discussion in November 2010. IRES is a very interesting institute that follows a similar inter- and transdisciplinary research strategy as Eawag. In light of Gunilla Öberg’s new research project, it was very interesting to discuss sustainable wastewater management in growing urban areas. This is also a main focus of my own work at Eawag. It would be nice if this exchange between IRES and e.g., Eawag engineers could be strengthened.

I very much thank the colleagues at IRES for their very friendly welcome during my stay in Vancouver.

Robin Naidoo, Adjunct Professor World Wildlife Fund, US

As a conservation scientist working with the World Wildlife Fund but sitting at IRES as an Adjunct Professor, my first full year at UBC has been an interesting mix of new and old. In the latter category, I continued my primary field project working with African buffalo in Namibia. In October I participated in a third capture operation, where we fitted satellite tracking collars to 12 adult females in several parts of the Caprivi Strip in the northeast of the country. This area is a mosaic of protected areas and communal lands, is the centre of the proposed Kavango-Zambezi Transfrontier (KAZA) conservation area, which, when established, will be the largest conservation area in the world. A key focus of our research on buffalo and other species in this area is how the gazettement of KAZA will affect wildlife movements and population persistence. Our research has demonstrated that wildlife species cross a number of boundaries in the area, including national borders, rivers, highways, and from protected areas to communal lands and back. We are now busy developing quantitative models of space and use and movement for the 31 buffalo we have collared over the last 4 years, using boundaries and other environmental variables to predict where and when buffalo are moving. Ally Thompson, an IRES graduate, will be returning in September 2011 and pursuing a MSc on these and related questions under my co-supervision.

In terms of new research, I have become involved more closely involved with Kai Chan and his research group on questions of integrated ecological-economic modeling. The British Columbia Coastal Ecosystem Services project is a multi-researcher, multi-disciplinary project seeking to examine how the reintroduction of the sea otter to the west coast of Vancouver Island has affected both the ecology of coastal ecosystems and the human communities that are inextricably linked to the ocean. The characterization of the ecological changes has been the subject of most of the research to date, but there is now an interest in investigating how these ecological changes are likely to impact various residents in areas where sea otters are increasing in abundance. We are focusing on the development of stated preference surveys that are able to decompose peoples' preferences into component attributes, which in our case, are the specific coastal resources that are changing due to sea otter recolonization. Using this approach, we will be able to determine the strength of individual responses to changes in coastal marine resources, and how these preferences for various resources differ between communities of varying socioeconomic characteristics. Connecting the well-document ecological changes to peoples' preferences and values will allow a fuller understanding of the sometimes complication relationships between changes in ecosystem condition and the services they generate, and the people such changes will impact.

Teresia Svensson, Visiting Research Fellow University of Linköping

The toxicity of chlorinated compounds to humans and the ecosystems has been an important problem since the 1960's and some of the most effective greenhouse gases and the primary agent for ozone depletion are organochlorines. There is growing awareness among climate modelers about the need to improve our understanding of natural variation of emission of chlorinated compounds from terrestrial sources to make reliable large scale budgets. My previous experience on chlorine biogeochemistry also indicated natural formation of chloroform in soil. With this agenda at hand, I wanted to study the emission of potential ozone depletion compounds from terrestrial environments and more specific the natural variation. During 2010, we established, in co-operation with scientists at Soil, Air and Water Laboratory (SWAL) a new portable flux techniques, which can be used to generate more robust and improved knowledge of the natural variation of emission. Our field studies have primarily been conducted in Campbell River, Vancouver Island, but also at UBC Campus. Fundamental to the proposed project is to assess if there is a risk that the previous flux estimates are underestimated in the light of potential importance of terrestrial sources. In the long-run our techniques would hopefully generate better global extrapolations and predictions. It has been a pleasure to be a guest researcher at IRES and SWAL. I have gained a lot of scientific experiences throughout last year by both specialists in micrometeorology and biogeochemistry. I really enjoyed the interdisciplinary environment of IRES.

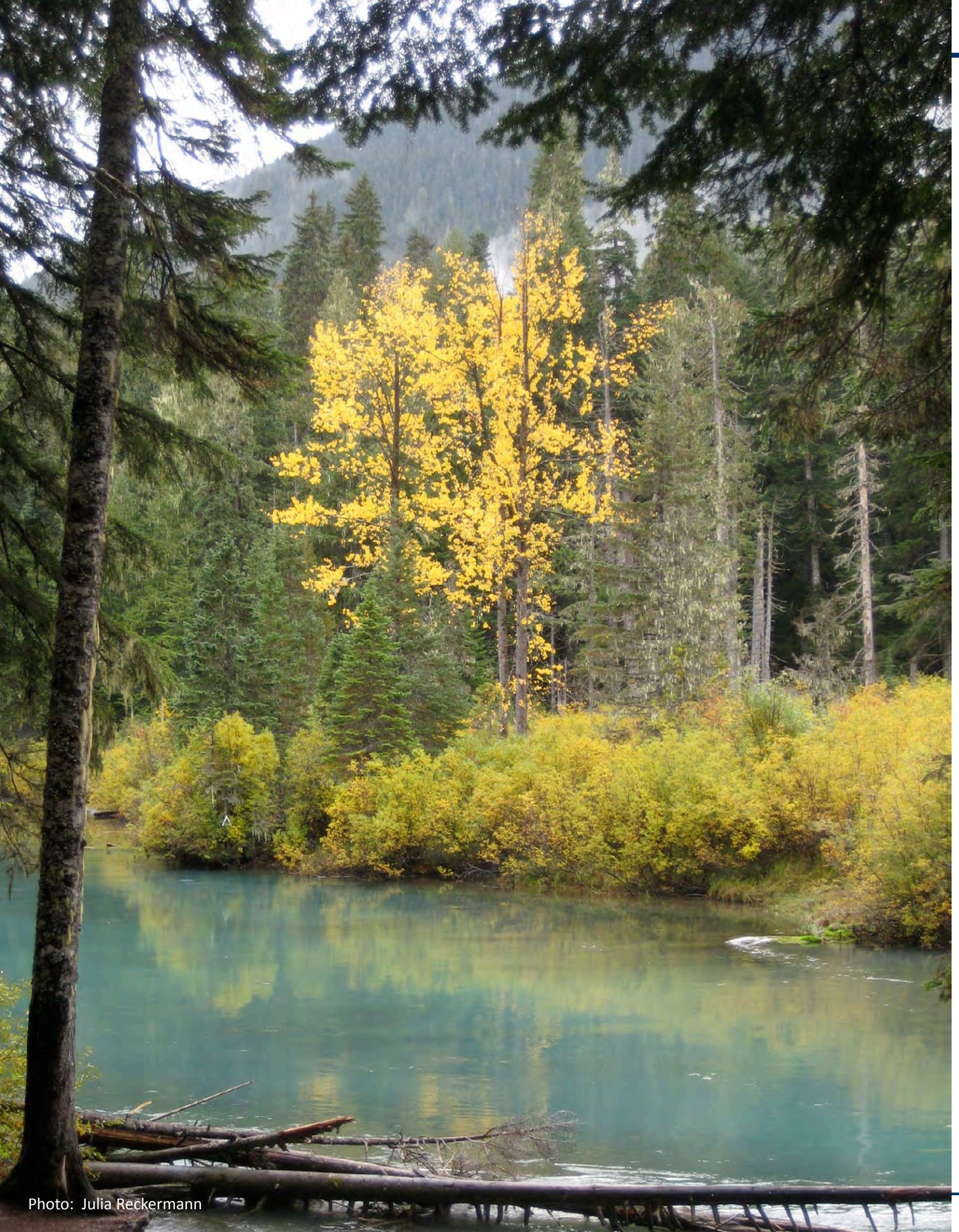


Photo: Julia Reckermann

Chris Barrington-Leigh
Postdoctoral Fellow

Chris Barrington-Leigh, an economist, was a postdoctoral fellow with IRES first as a Junior Fellow of the Canadian Institute for Advanced Research, held under John Helliwell in the Department of Economics, and then as an IRES postdoc supervised by John Robinson. Chris' research interests revolve around empirical measures of overall human well-being, in particular the use of subjective, cognitive evaluations of life -- that is, self-reported life satisfaction.

His research is grounded by an empirical focus and an orientation towards policy, is interdisciplinary, and centers broadly on understanding consumption behaviour and consumption benefits. These topics are relevant to overarching issues of sustainability as well as to the design of specific environmental policy, largely because existing metrics of social progress are overly focused on the most resource-intensive part of human interactions. By pursuing policies that are well informed about human nature, we may be able to improve quality of life and decrease material impacts at the same time. In contrast to the historically dominant assumptions in economics, the themes that frame his thinking about environmental and behavioral economics are: (1) Humans are highly social beings. Social interactions matter both as a source of direct consumption benefits and as manifested by social comparisons acting in utility functions. (2) Social identity and procedural utility significantly affect behaviour and well-being. (3) Descriptions of both behaviour and welfare must be empirically accountable, thus allowing for systematic behavioral biases away from "rational" optimisation of well-being. That is, there is the possibility under this description that various forms of overconsumption could be widespread individual mistakes, not just a collective action problem.

Chris' work while at IRES has included econometric analysis of the economic and social determinants of subjective well-being in Canadian and international data, the influence of weather and climate on well-being, both theoretical and empirical analyses of the role of relative income (or consumption) reference levels, collaboration with psychologists on prosocial spending and consumption, and co-supervision of Master's student Julia Reckermann in the design of well-being assessments for inhabitants of the CIRS building.

In the autumn of 2011 Chris will be taking up a tenure track faculty position at McGill, jointly appointed in the School of Environment and the Institute for Health and Social Policy.

SWAL - UBC's Soil, Water and Air Laboratory

The Soil, Water and Air Laboratory (SWAL) was established in 2010 as focal node for interdisciplinary research in environmental sciences, with substantial participation from IRES faculty members, postdoctoral fellows, and graduate students. SWAL is hosted at UBC by the Faculty of Land and Food Systems (LFS). On the one hand, it is a true bricks-and-mortar style laboratory, with a core analytical facility located in the MacMillan Building and equipped with state-of-the-art instrumentation for analyses of soil, water and air. On the other hand, SWAL provides a focal point for collaborative research among scientists and students from a diverse array of academic units at UBC. Faculties with direct participation in SWAL include the College for Interdisciplinary Studies and the Faculties of LFS, Forestry, Arts, Science, and Applied Science.

Research projects conducted under the SWAL umbrella address a wide array of topics, and provide training opportunities for students and scholars in a diversity of methodologies. By integrating research from traditionally segregated disciplines into one large research cluster has allowed for numerous synergies to develop. These conversations have already resulted in several significant research proposals that encompass the breadth of expertise and techniques needed to address complex environmental issues today.

SWAL counts among its growing number of members IRES' scholars: Professors Gunilla Öberg and Mark Johnson, post-doc Marina Molodovskaya, visiting scholar Teresia Svensson and emeriti Hans Schreier and Les Lavkulich.

More information about the centre can be found on the Soil, Water and Air Laboratory website at www.landfood.ubc.ca/swal


Photo: Doug Curran

Program on Water Governance


Photo: Don Erhart

PROGRAM ON WATER GOVERNANCE: IRES is proud to host UBC's Program on Water Governance (PoWG), which is led by Dr. Karen Bakker (Director) (see page 53).

The Program on Water Governance (PoWG) conducts cutting-edge research and fosters dialogue on water policy with communities and decision-makers. In addition to our journal publications, we engage in extensive public outreach activities, through briefing notes, policy papers, and a renewed web presence, which makes extensive water-related information resources freely available. The PoWG team also advises national and international agencies, including (recently) the National Round Table on Environment and Economy, the United Nations Office of the High Commissioner for Human Rights, Environment Canada, and the BC Ministry of the Environment. This is an essential part of fulfilling our mandate to support informed public debate over water resources in Canada and around the world.

Our team of researchers has a diverse range of backgrounds including geography, environmental science, law and political science. Our research includes a 4-year project funded by the Canadian Water Network (CWN) on water security (www.watersecurity.ca); as well as a new research initiative on water governance in Latin America, funded by the Social Sciences and Humanities Research Council.

The PoWG is delighted to announce the recent appointment of Dr. Leila Harris as Associate Director (see page 39), bringing with her new energy and expertise to the program. Leila's appointment will expand our research areas to include water politics and governance, gender and access, and will also extend our geographic focus in ways that benefit from Leila's extensive research experience on water issues in the Middle East and Africa.

For further information, please visit our website www.watergovernance.ca, or contact Gemma Dunn in IRES (gemma.dunn@ubc.ca).

Publications

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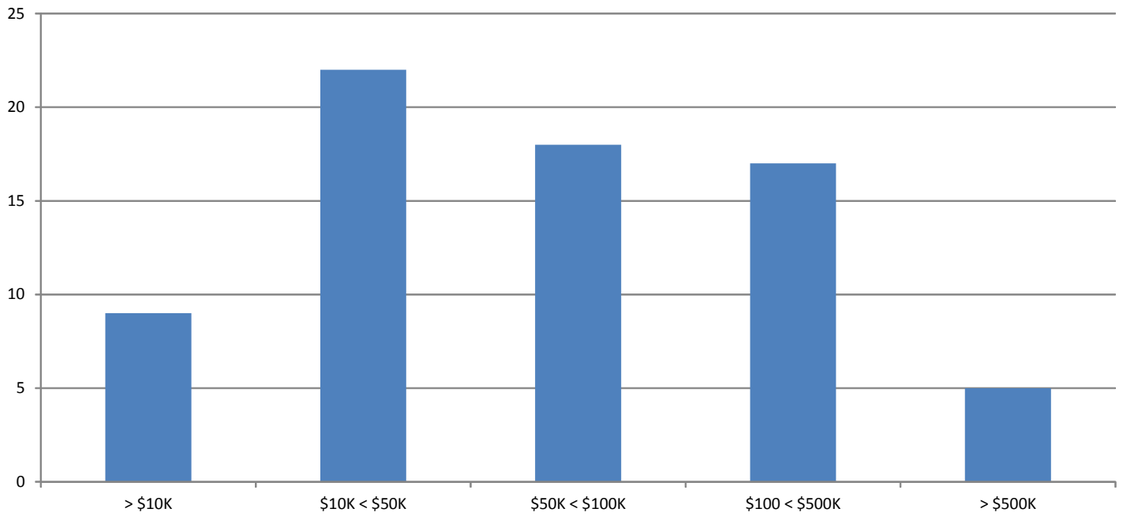
Financial Report

IRES general purpose operating fund (GPOF, i.e. money provided by the university) is approximately $1M. About 75 % of the GPOF is faculty salary funding. Three of the IRES professors are Canadian Research Chairs and only a minor fraction of their salaries are included in the GPOF. (Chan tier 2, Chang, tier 2 and Dowlatabadi, tier 1). Staff-salaries is the second largest item in the GPOF. Due to general cuts at the faculty level, the unit's operating funds have steadily decreased from $54k in 2008 to $13k in 2010, forcing us to use research and educational funds to cover operating costs. UBC's treasury is reviewing the operating costs of the CFIS units to find ways to create a sustainable financial model.

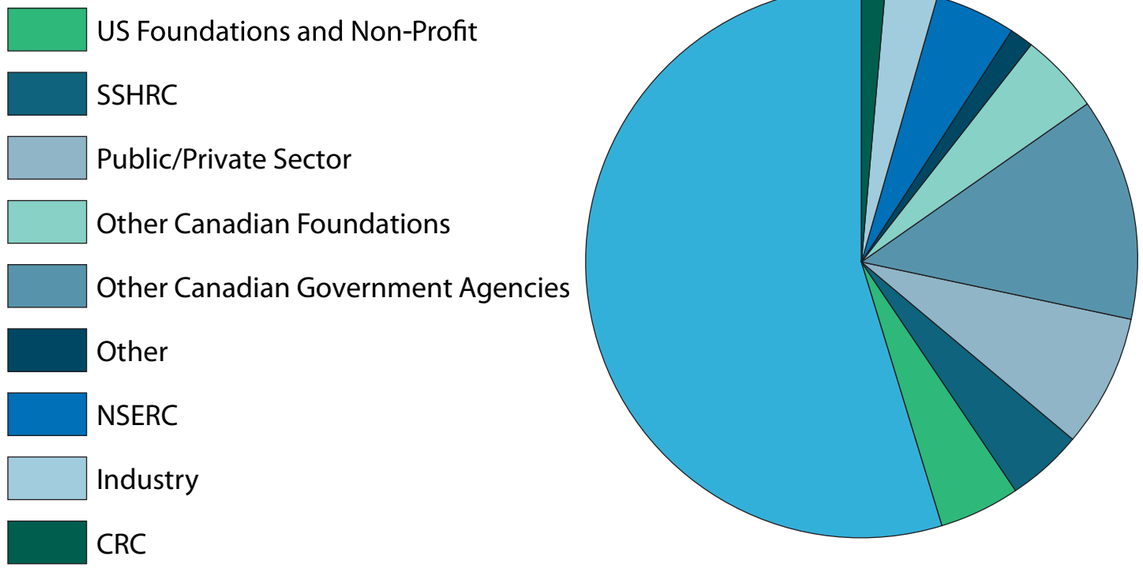
The somewhat gloomy picture on the operating side is counterbalanced by the fact that IRES's faculty members have continued to successfully bring in grants from a variety of sources. The total amount of funding brought in by IRES's faculty members as PIs or co-PIs during varies over the years, and 2010 was a successful with new grants amounting to over 30 million. Some of these grants are administrated by IRES, and some of the grants are administrated by other units. The number of grants brought in each year has varied from twelve in 2009 to twenty-nine in 2007 and the grants' sizes vary from a couple of thousand dollars to several million dollars.

Our students also continue to successfully bring in funding .

Total Number of IRES Grants Open in 2010 by Award Amount $CDN



IRES Grants open in 2010 by Agency Type - $CDN



IRES Student Awards

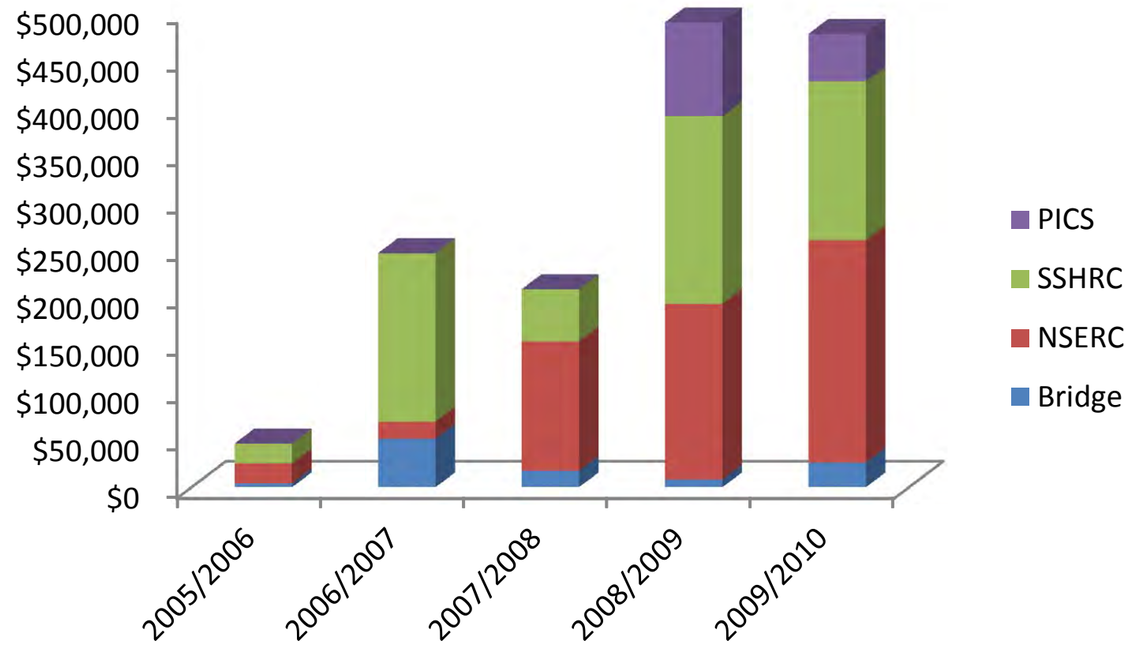


Photo: Penny White