Reaching Out: Communicating Science in the 21st Century

Dr. Andrew Jorgenson
Thursday January 19 at 10:45 am
"Development, Inequality, and Disproportionality: GHG Emissions and the Carbon Intensity of Human Well-Being"

Professor of Sociology and Environmental Studies, Boston College
Chair, Section on Environment and Technology, American Sociological Association

KEYNOTE SPEAKER

Thursday January 19 at 10:45 am
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"Development, Inequality, and Disproportionality: GHG Emissions and the Carbon Intensity of Human Well-Being"

SYMPOSIUM

Thursday, January 19
Friday, January 20
Mann Library 102
8:30 AM - 5:00 PM

HIGHLIGHTS

Contributed posters viewable in Mann Lobby
Breakfast served
Both days, 8:30 am
Lunch served
Both days, 11:50 am
Welcome Remarks
Thursday January 19 at 9:00 am
Closing Remarks and Best Presentation Award
Friday January 20 at 2:10 pm
Workshop: Social Media for Scientists
Friday January 20 at 2:30 pm

PRESENTATION SESSIONS

Conservation
Thursday January 19 at 9:15 am
Participation & Engagement
Thursday January 19 at 1:00 pm
Pop. Ecology & Genetics
Thursday January 19 at 2:30 pm
Management
Thursday January 19 at 3:40 pm
Methods
Friday January 20 at 9:00 am
Ecology
Friday January 20 at 10:30 am
Social Media
Friday January 20 at 1:00 pm

Open to the Graduate Community
Sponsored in Part By: GPSAFC

#cornell    #dnrsym2017
# Day 1 Thursday, January 19

<table>
<thead>
<tr>
<th>Time</th>
<th>Events &amp; Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 – 9:00 AM</td>
<td>Breakfast</td>
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<tr>
<td>9:00 – 9:15 AM</td>
<td><strong>Welcoming Remarks</strong></td>
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<tr>
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<td>Jen Fownes and Toby Holda</td>
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<td><em>Co-Presidents, Graduate Student Association, Natural Resources</em></td>
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<td>Dr. Pat Sullivan</td>
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<td><em>Professor and Chair, Natural Resources</em></td>
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<tr>
<td>9:15 – 10:35 AM</td>
<td><strong>Session 1 (Panel): Conservation</strong></td>
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<tr>
<td>9:15 AM</td>
<td>Vanessa Springer</td>
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<td><em>Carnivore occupancy and co-occurrence dynamics in the Ecuadorian Andes</em></td>
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<td>9:30 AM</td>
<td>Gerardo Soto</td>
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<td></td>
<td>*Conservation of the Chilean Temperate Forests: Opportunities and limitations from a</td>
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<td>scientist’s perspective*</td>
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<td>9:45 AM</td>
<td>Matt Paufve</td>
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<td><em>Cisco (Coregonus artedi) spawning habitat in the Great Lakes and restoration in Lake Ontario</em></td>
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<td>Jim Goetz</td>
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<td><em>Why use Open Standards for the Practice of Conservation?</em></td>
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<td>10:15 AM</td>
<td>Panel questions</td>
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<td>10:35 – 10:45 AM</td>
<td>Break</td>
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<td>10:45 – 11:45 AM</td>
<td><strong>Keynote Address</strong></td>
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<td>Dr. Andrew Jorgenson</td>
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<td><em>Professor of Sociology and Environmental Studies, Boston College</em></td>
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<td>Events &amp; Presenters</td>
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| 1:00 – 2:20 PM   | **Session 2 (Panel): Participation & Engagement**  
| 1:00 PM          | Anne Armstrong                                                                                                                                     |
| 1:15 PM          | Sarah Naiman  
|                  | *Climate change communication in environmental education*                                                                                         |
| 1:30 PM          | Abraham Frances  
|                  | *Environmental engagement among Latinos: An exploratory study of environmentalists in the greater Chicago region*                                |
| 1:45 PM          | James Lassoie  
|                  | *Forest stewardship conceptualized through Haudenosaunee history and values: Bridging biological and cultural information towards comprehensive resource management for Akwesasne* |
| 2:00 PM          | Panel questions                                                                                                                                     |
| 2:20 – 2:30 PM   | Break                                                                                                                                             |
| 2:30 – 3:30      | **Session 3: Population Ecology & Genetics**  
| 2:30 PM          | Yuka Kutsumi  
|                  | *Using genomics to measure population connectivity in the eastern oyster (Crassostrea virginica) within the Hudson River Estuary*               |
| 2:50 PM          | Toby Holda  
|                  | *Whole-lake seasonal growth, reproduction, abundance, and production of Mysis diluviana in Lake Ontario in 2013*                              |
| 3:10 PM          | Alec Wong  
|                  | *Sampling methods for studying spatial patterns of moose density in New York State*                                                             |
| 3:30 – 3:40 PM   | Break                                                                                                                                             |
| 3:40 - 4:40 PM   | **Session 4: Management**  
| 3:40 PM          | Carrie Simon  
|                  | *Material and symbolic implementation of ecosystem based management in New York State*                                                           |
| 4:00 PM          | Jaime Ortiz  
|                  | *The knowing-doing gap in the Galapagos Islands: Introduced species research and management*                                                      |
| 4:20 PM          | Dylan Bugden  
|                  | *Living with a lease: Landowner experiences with the shale gas industry*                                                                        |
Day 2 Friday, January 20

<table>
<thead>
<tr>
<th>Time</th>
<th>Events &amp; Presenters</th>
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<tbody>
<tr>
<td>8:30 – 9:00 AM</td>
<td>Breakfast</td>
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<td>9:00 – 10:20 AM</td>
<td><strong>Session 5: Methods</strong></td>
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<td>9:00 AM</td>
<td>Moderator: Michael Quartuch</td>
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<td>9:00 AM</td>
<td>Benjamin Marcy-Quay</td>
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<td>9:00 AM</td>
<td><em>Handling time biases time-based boat electrofishing catch per unit effort</em></td>
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<td>9:20 AM</td>
<td>Nicolas Lou</td>
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<td><em>A phylogeographic analysis of the Atlantic Silverside (Menidia menidia) using next-generation full mitochondrial genome sequencing</em></td>
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<td>9:40 AM</td>
<td>Jennifer Fownes</td>
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<td>9:40 AM</td>
<td><em>Personal experience with extreme weather and climate change</em></td>
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<td>10:00 AM</td>
<td>Manuel Berrio</td>
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<td>10:00 AM</td>
<td><em>Trajectories of the human appropriation of earth’s regenerative capacity, an interpretation of a classification of the national Ecological Footprint Accounts (1961-2012)</em></td>
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<td>10:20 – 10:30 AM</td>
<td>Break</td>
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<td>10:30 – 11:50 AM</td>
<td><strong>Session 6 (Panel): Ecology</strong></td>
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<td>10:30 AM</td>
<td>Moderator: Annise Dobson</td>
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<td>10:30 AM</td>
<td>Binbin Wang</td>
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<td>10:30 AM</td>
<td><em>Thiamine limitation to periphyton in streams of Adirondacks</em></td>
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<td>10:45 AM</td>
<td>Jeremy Dietrich</td>
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<td>10:45 AM</td>
<td><em>Assessing recovery of stream macroinvertebrate populations post-dam removal: Does landscape context matter?</em></td>
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<td>11:00 AM</td>
<td>Joe Yavitt</td>
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<td>11:00 AM</td>
<td><em>Does soil nutrient availability control plant growth in tropical forests?</em></td>
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<td>Katie McFarland</td>
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<td>11:15 AM</td>
<td><em>Testing for genetic effects on oyster stress tolerance and fitness-related performance</em></td>
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<td>11:30 AM</td>
<td>Panel questions</td>
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<td>11:50 – 1:00 PM</td>
<td>Lunch</td>
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<td>Events &amp; Presenters</td>
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| 1:00 – 2:00 PM       | **Session 7 (Panel): Social Media**  
Moderator: Sara Davis  
1:00 PM Bethany Jorgensen  
*What’s in a Page? (Potentially) exploring one group’s use of Facebook to raise awareness about plastic pollution*  
1:15 PM Cat Sun  
*Using citizen science in wildlife management*  
1:30 PM Ellen George  
*Be a #SocialScientist: Social media outreach for field biologists*  
1:45 PM Panel questions |
| 2:00 – 2:10 PM       | Break                                                                                                                                          |
| 2:10 – 2:20 PM       | **Closing Remarks and Best Presentation Award**  
Dr. Joe Yavitt  
*Professor and Director of Graduate Studies, Natural Resources* |
| 2:20 – 2:30 PM       | Break                                                                                                                                          |
| 2:30 – 3:30 PM       | **Workshop: Social Media for Scientists**  
Led by members of the Graduate Student Association, Department of Natural Resources |
“Reaching Out: Communicating Science in the 21st Century”
Department of Natural Resources Graduate Student Association
2017 Research Symposium

ABSTRACTS

Forest stewardship conceptualized through Haudenosaunee history and values: Bridging biological and cultural information towards comprehensive resource management for Akwesasne
Abraham Francis

Indigenous communities throughout Canada and the United States face unique challenges for resource management strategies on reservations, which is due to their historical and political relationship with each country and their cultural identities. Additionally, there is diversity in the indigenous communities, so a one-size-fits-all strategy is not appropriate. Saint Regis Mohawk Tribe of Akwesasne, an indigenous community that straddles the US and Canadian border, was the site chosen for the development of a biologically and culturally inclusive Forest Stewardship Strategy. Two mapping strategies used are Human Ecological Mapping and Social-Ecological Mapping to inform the strategy. Human Ecological Mapping aids in understanding the ecological context of Saint Regis Mohawk Tribe and the articulation of their cultural values and traditions as they relate to their landscape. The Social-Ecological Mapping overlays the values of the community with the biological information collected on the landscape. The combination of these two mapping approaches provides a space for a community-driven strategy that is inclusive the unique political and cultural values of the Saint Regis Mohawk Tribe and cultural reinforced. This successful implementation of this case study provides a framework for working with other Northeastern Tribes towards the successful creation of a biological and cultural inclusive resource management strategies.

Abraham Francis is a first-year MS student with Dr. Karim-Aly Kassam, working on applied research to develop a biocultural land Stewardship strategy for existing and newly settled Native American Land Claims on the St. Regis Mohawk Reservation, Akwesasne.

Sampling methods for studying spatial patterns of moose density in New York State
Alec Wong

Rare species present inherent challenges to data collection, particularly when the species is spatially clustered over large areas, such that the encounter frequency of the organism is small relative to its probability of detection. Modeling ecological state variables such as abundance becomes difficult due to the overabundance of “zeros” (lack of data) at sampling sites. These challenges can be ameliorated by the use of adaptive sampling, whereby a probabilistic sampling method (simple-random, systematic, etc.) is employed first, but additional sites are added in the vicinity of sites containing data above an a priori threshold. Moose populations in New York are small relative to other northeastern states, and an effective method for estimating their abundance is currently lacking. A sampling effort in 2016 was performed using spatial capture-recapture to estimate moose density; moose scat were undetected at 2/3 of the sites visited and appeared clustered, suggesting potential benefits in integrating adaptive sampling into our sampling framework. Our objective is to estimate moose population densities within the Adirondack Park of New York, and we augment our methods by evaluating the advantages of applying adaptive sampling to spatial capture-recapture methodology.

Alec Wong is a second-year MS student in the lab of Dr. Angela Fuller, studying the spatial ecology of moose.
Climate change communication in environmental education
Anne Armstrong

Environmental educators across the United States are delving into climate change education. Climate change as a topic poses new challenges for educators intent on not only informing audiences but informing in such a way that creates a long-lasting impacts. The purpose of this study was to investigate how environmental educators communicate about climate change and to what extent their communication techniques and strategies correspond with implications for best practices from communication research. Educators who were interviewed were moderately aware of climate change communication and education research. Educators’ strategies fell very much in line with the research in some ways; they used local frames and crafted their messages to appeal to what they perceived as their audience’s salient values or political or social identity. They diverged in other ways, employing a mostly deficit model approach to their programs. This research suggests the need for additional professional development in climate change communication strategies for environmental educators.

Anne Armstrong is a MS/PhD student working with Dr. Marianne Krasny.

Handling time biases time-based boat electrofishing catch per unit effort
Benjamin Marcy-Quay, Kurt J. Jirka, and Clifford E. Kraft

Catch per unit effort (CPUE) is the most commonly used metric for expressing and comparing boat electrofishing catch data. Although considerable research has focused on evaluating factors influencing the “catch” component of CPUE, few studies have investigated biases in effort due to handling time or even compared the utility of time-based measures of effort (e.g., seconds fished) versus space-based measures of effort (e.g., shoreline length). In this study we examined (1) a 16-year boat electrofishing dataset (2000-2015) comprised of repeatedly surveyed sites to evaluate potential biases in time-based effort, (2) used a model-comparison framework to investigate factors that could have contributed to any observed bias, and (3) reviewed the effort measurement approaches reported in published boat electrofishing studies over the last six years (2010-2015). Our results suggest that handling effort does bias time-based measures of effort and that such biases may be prevalent in recent fisheries research. Potential consequences of handling effort bias include hyperstable CPUE estimates and single species CPUE values that are unpredictably biased in either direction due to changes in effort resulting from the handling of other, more abundant species.

Benjamin Marcy-Quay is a graduate student in the Department of Natural Resources. His research focuses on the dynamics of recovering salmonid populations in the Adirondacks. He is also particularly interested in using modern technology to develop and improve fisheries research techniques.

What’s in a Page? (Potentially) exploring one group’s use of Facebook to raise awareness about plastic pollution
Bethany Jorgensen

Plastics: versatile, durable, light weight, low-cost, and practically indispensable for our daily lives. However, the “disposable” use of plastics has resulted in the presence of these long-lived materials in nearly all Earth’s biomes and ocean regions. Over time, most plastics break into fragments, leading to an increase of plastic pieces of decreasing sizes. As highlighted at the MICRO 2016 conference, the scientific community’s concerns about plastics are also mounting due to plastic’s consequences for the biosphere, from organismal to ecosystemic levels. How can we truly address this problem? One suggestion comes from the Lanzarote Declaration, written by the MICRO 2016 Organizing Board and Scientific Committee, which calls for “collaboration and cooperation, at all scales, from local to global, spanning sectors and
disciplines, to improve knowledge, education and outreach efforts” (Baztan et al., 2017, p. 173). In this presentation, I will share a brief history of one effort to educate and raise awareness about the issue of plastics in the environment, the “Agüita con el Plástico” campaign led by the Lanzarote Biosphere Reserve. Additionally, I will sketch out a potential direction for future research focused on the Agüita con el Plástico Facebook page, to be done in collaboration with colleagues from the “Zero Plastic” research initiative. Drawing from my experience conducting a media framing analysis of articles on microplastics published in mainstream newspapers globally, I anticipate the initial phase of the Agüita Facebook analysis will focus on the content that is posted and shared on the group’s social media site. It will also involve diving into the literature related to best practices for using social media to communicate expertise on environmental issues with the intention of educating and sparking behavior change. The aim of this research is to provide insight into ways to improve the integration of knowledge and action, particularly through social media.


Bethany Jorgensen is a first year Ph.D. student working with Dr. Marianne Krasny and the Civic Ecology Lab. She is interested in civic ecology practices in coastal communities, the political ecology of plastics, citizen science, and participatory observatories for microplastic pollution in coastal zones of the North Atlantic and Mediterranean systems.

Thiamine limitation to periphyton in streams of Adirondacks
Binbin Wang

Thiamine is one of the essential micronutrients for all the organisms and found widely limiting in marine ecosystems, but its ecological relationship with primary producers in freshwaters, especially in streams, has been rarely studied. We tested the thiamine limiting status in four streams in Adirondacks with nutrient enrichment experiment. Nutrient diffusing substrate method was applied with four treatments (thiamine, nitrogen, phosphorus and control). Thiamine limitation was observed in eight of the nine sets of the experiment, covering all the four study streams. The consistence of thiamine limitation was showed under varying ambient conditions, such as different concentrations of ammonium and soluble reactive phosphorous, light intensity and temperature. Once occurred, the limiting status of thiamine to the growth of periphyton went through the whole incubation period, which might suggest composition changes in the periphyton communities due to thiamine addition. However, this needs to be confirmed with further work on algal identification of the periphyton communities on the nutrient addition treatments. Nitrogen limitation was also observed in one stream and phosphorus limitation in two streams. The occurrence of nitrogen limitation and phosphorus limitation reasonably reflected the relative availability of nitrogen and phosphorus sources in the streams.

Binbin Wang is a PhD candidate in DNR.

Material and symbolic implementation of ecosystem based management in New York State
Carrie Simon

Environmental policy implementation can be anything but straightforward and can benefit from a “creative” approach to better understand the process. This research analyzes material and symbolic environmental policy implementation at the state level through a case study of ecosystem based management (EBM) legislation in New York State (NYS). I conducted 27 in-depth semi-structured interviews with individuals from NYS State agencies and partnering organizations familiar with EBM. Interview data showed that both material and symbolic strategies were used in the implementation of
EBM, though they are not mutually exclusive. With environmental and natural resource management efforts calling for more collaboration across different stakeholder groups understanding the different interpretation and means of implementation of policy terms itself can be crucial. The results indicate that a term itself has weight in the process of environmental policy implementation and should be taken into account in the policy process.

*Carrie Simon is a PhD candidate in the Department of Natural Resources and part of the Human Dimensions Research Unit. Her interests include social science, alternative research methods, science communication and how these relate to the natural world.*

**Using citizen science in wildlife management**  
Cat Sun, Angela Fuller, Matt Hare, J. Andy Royle, Jeremy Hurst, and Janis Dlckinson

Many citizen science projects have successfully monitored and detected ecological trends at large spatial and temporal scales. For example, initiatives such as iNaturalist and the Cornell Lab of Ornithology's eBird have discovered new species and revealed patterns and changes in bird migration through the collection of presence-absence data. Such efforts typically require spatially and temporally expansive field efforts. In contrast, wildlife management issues may be at smaller spatial and time scales, and data often come from individual animals, such as with capture-recapture methods. In this talk we discuss the potential for addressing large-scale management issues, possible by developing an integrated population model (IPM) that brings together traditional capture-recapture with citizen science methods. IPMs simultaneously use multiple data sets to estimate population size and dynamics such as population growth, survival and fecundity, and is therefore an efficient method for wildlife management to study populations. We examine this integrated approach from concept to field implementation and data analysis, and offer implications for wildlife management and monitoring.

*Cat Sun is a PhD student with Dr. Angela Fuller and Dr. Matt Hare, studying black bear population dynamics and phylogeography to inform large-scale management.*

**Living with a lease: Landowner experiences with the shale gas industry**  
Dylan Bugden

To date, no generalizable analysis has been conducted focusing on landowners who have leased property for shale gas development. This presentation covers survey and interview findings from the first such study, focusing on landowners in Northeastern Pennsylvania. I present a broad overview of how landowners have directly experienced industry activity in this high-activity region, focusing on perceptions of procedural fairness, economic benefits, local opposition, and more. Our findings portray the complexity with which landowners have come to understand the shale gas boom, a situation ripe with caution, optimism, and uncertainty.

*Dylan Bugden works on issues associated with energy development, including public perceptions, facility siting, and socioeconomic impacts.*

**Be a #Social Scientist: Social media outreach for field biologists**  
Ellen George

For field biologists, social media has evolved from a “shiny new tool” to a serious avenue for communication, collaboration and outreach. Many grant agencies now require an outreach plan for every application, and including social media in that plan is a great way to bring your science communication into the 21st century. However, as field biologists we aren’t always so savvy about effectively communicating
our work to the public. This talk is not about how social media is important – we already know that! Instead, we will focus on concrete ways to start creating outreach materials for Facebook, Twitter, and other platforms. We will look at case studies of fisheries biologists that are successfully using social media as an outreach tool, and we will share tips and tricks on how to shoot video, go live, engage followers, and unleash your research upon the internet!

Ellen George is a PhD student with Dr. Lars Rudstam in the Natural Resources Department. Her research focuses on the restoration of cisco, an important native prey fish, in Lake Ontario.

Conservation of the Chilean temperate forests: Opportunities and limitations from a scientist’s perspective
Gerardo Soto

To address conservation goals, participation of a big interdisciplinary network of motivated people is needed. Regulatory framework often push down people’s motivation, and interact with cultural and historic context. In particular, Chilean Temperate Forests have suffered from human exploitation in the form of big fires and intense harvest over the past 500 years. Colonial immigration and pacification of the Araucania region reduced local Mapuche Amerindian population and impacted Chilean historical development. Chilean government still ameliorates the development of the Mapuche culture, reducing the opportunities to address conservation goals. However, different efforts enlighten future conservation efforts and push forward on the fight against uncontrolled development. I explore and discuss my experience while in the field working with local people and the forest management office. I also provides some thoughts about future work and uncertainty.

Gerardo Soto is an enthusiastic conservationist. He is passionate with solving problems from the local, to landscape, to regional scales while enjoying modeling and mapping everything he can.

The knowing-doing gap in the Galapagos Islands: Introduced species research and management
Jaime Ortiz

It is important to go beyond anecdotal description to give grounded evidence for the influence of ecological research on environmental management. The concept of invasive species is both highly influential—it is a common language amongst the many players of political ecology—and radically under-theorized. Thus, the aim is to empirically assess the communication and institutional mismatch in the “research-implementation” gap in the relationship found between the language used in the scientific literature and that used in management plans for the Galapagos Islands; synthesizing and analyzing over 50 years of scientific history in the Galapagos archipelago. I use tools from digital humanities to show the changes in the usage of terms to describe invasive species and the effect of these changes on policy, and scientific research. Using specialized text analysis packages in R, I have applied topic modeling to more than three thousand documents, which include full scientific articles, grey literature and management plans (1960-2015). By comparing these datasets we quantitatively test the hypothesis that science is driving the management intention of non-native introduced species in the Galapagos protected areas.

Jaime Ortiz is from the Galapagos Islands Ecuador. His research interests relates to the political ecology of invasive species in the Galapagos Islands.
Personal experience with extreme weather and climate change  
Jennifer Fownes

Climate change is the phenomenon of human-induced alterations in the global climate system, leading to changes in weather patterns that in turn impact human societies. Despite scientific consensus on the reality and anthropogenic cause of climate change, the general US public lags in understanding. This research considers one of the ways in which individuals can learn about climate change: the role of personal experience with weather conditions. Although previous studies have shown that actual weather influences perceived personal experience, these studies have been limited in the type of weather considered. This investigation measures the influence of multiple types of extreme weather, which is more memorable than small changes in average conditions and which is being altered by climate change. This research combines robust weather data, calculated to most accurately estimate individuals’ personal experience, with survey data on perceptions of personal experience with extreme weather and climate change. In addition, this study considers the limits of personal experience as a learning method, including the effect of pre-existing beliefs.

Jen Fownes is a second-year MS student with Dr. Shorna Allred, studying public perceptions of and political communication about climate change. Her broader interest is the ways in which science (especially considerations of risk) can inform policy.

Assessing recovery of stream macroinvertebrate populations post-dam removal: Does landscape context matter? 
Jeremy Dietrich

Artificial impoundment structures impose significant and long-term impacts to streams and the biological communities that inhabit them. Barriers disrupt hydraulic continuity, alter stream channel morphology, interrupt sediment migration, change habitat types, redefine floodplains, and restrict or prevent movement of organisms. Dams and barriers have been built in the Hudson River watershed since Colonial times, dating back 300 years. Increasing national attention is being given to the removal of defunct barriers to improve water quality, reconnect stream reaches, and increase habitat connectivity. Total barrier removal is an infrequent process due to high costs. Consequently, opportunities to study physiochemical and biological recoveries are rare. Five colonial-era barriers on tributaries of the Hudson River have been identified for removal. Aquatic macroinvertebrate populations are acutely affected by barriers due to the substrate and habitat changes they create. We collected pre-removal data on water depth, stream channel morphology, and aquatic invertebrate community composition on each of five sites slated for removal. Locations upstream and downstream of the barrier were sampled. While improvement of water quality and stream habitat composition is anticipated post-removal, the maximal extent of such may be governed by broader landscape contexts independent of the local barrier impact. We share the results of our first year pre-removal aquatic macroinvertebrate population data and begin to assess how landscape context may shape recovery trends.

Jeremy Dietrich examines differences in aquatic macroinvertebrate community structure above and below historic impoundments under a pre-removal context.

Why use Open Standards for the Practice of Conservation?  
Jim Goetz

As our human ecological footprint expands, urgent, complex, high-stakes environmental problems face conservation scientists at every turn. For many imminently endangered species, ecosystems, and ecological processes, time is pressing, and resources for conservation fall far short of what is needed. Conservationist
practitioners must prioritize interventions, maximize conservation impact, learn from their own successes and failures, and share lessons learned broadly. Recognizing the urgency for coherent, effective conservation action, the Conservation Measures Partnership has worked over the past two decades to combine principles and best practices in adaptive, and results-based management from conservation and other fields to create the Open Standards for the Practice of Conservation (OS). These standards bring together in one place common concepts, approaches, and terminology in conservation project design, management, and monitoring in order to help practitioners improve their own practice of conservation. The process is not a recipe, but instead a coherent, integrated set of best practices. Fluency in OS is increasingly relevant for Cornell DNR students and graduates, first, because it operates where the rubber meets the road, in application of the learning that we produce here at Cornell, and in our future careers, and second, because it is becoming the standard results-based conservation methodology, not only for conservation planning, but also for funders seeking grant proposals for conservation research and interventions.

Jim Goetz is a PhD Candidate working with Dr. Rich Stedman, implementing and studying and forest and bird conservation in the Caribbean.

Service-learning: A powerful pedagogy for studying environmental policy, management, and governance within a public service context
James P. Lassoie

The Department of Natural Resources has long-promoted the application of interdisciplinary science to complex socio-environmental problems facing societies worldwide by fostering meaningful collaborations with external communities, including government agencies, non-governmental organizations, and the private sector. The resulting partnerships have become a defining characteristic of the department’s diverse and productive research activities and its outreach to various publics. This engagement philosophy also implies the logic of providing service-learning courses that actively involve students in ‘actionable science’, especially students interested in developing careers in policy, management, and governance within the public arena. However, I believe we have been slow to develop such courses because our orientation to public service is grounded in Cooperative Extension, where applied research defines university-community partnerships and limits the active engagement of students in educational settings. This presentation will examine the pedagogy of service-learning courses, discuss the advantages and challenges facing such courses, and situate the possible development of a community-engaged curriculum inline with the new Engaged Cornell Initiative. I will argue that properly developed service-learning courses will enhance the department’s teaching program for many undergraduate and graduate students, while also strengthening our collective commitment to applied research and outreach to stakeholders and community partners.

Jim Lassoie is an International Professor of Conservation and has held academic assignments in research, extension, teaching, and administration since joining the department in 1976. Jim has focused on developing experiential learning courses in conservation and sustainable development since the late 1990s, including the development of educational case studies (www.conservationbridge.org).

Does soil nutrient availability control plant growth in tropical forests?
Joseph B. Yavitt

The rate of plant growth, termed net primary production (NPP), is a fundamental component of ecosystems. However, the study of NPP in tropical forests is beset by a variety of problems including (1) difficulty measuring growth rates of very large, old trees, (2) the absence of annual growth rings, and (3) a diversity of species representing a broad range of growth rates. For these reasons we have poor
understanding of the ecological factors that control NPP in lowland tropical forests. Manipulating ecological factors in field experiments is the best way to provide insight. A factorial nitrogen-, phosphorus-, and potassium-addition experiment was initiated in an old-growth forest in Panama in 1998 to provide an opportunity for addressing questions about NPP and control by soil nutrient availability. Despite 19 years of nutrient additions, the change in forest NPP is minimal and due to increased growth rates of small stems. This presentation will explore hypotheses why large, old trees have not responded.

Joseph Yavitt is a Professor in Natural Resources with broad research interests in biodiversity and biogeochemistry of natural and managed ecosystems.

Testing for genetic effects on oyster stress tolerance and fitness-related performance
Katherine McFarland and Matthew Hare

New York coastal waters, once a booming oyster fishery, are now nearly void of live oyster reefs. However, recent surveys have documented substantial remnant populations of adult oysters in the upper estuarine zone of the Hudson River Estuary (HRE) near Tarrytown, NY. This portion of the estuary frequently has prolonged periods with salinities below 5 ppt, near the lower threshold typically reported for Crassostrea virginica. Evidence for the population’s robustness comes from consistent annual recruitment relative to other parts of the estuary since 2012. Motivated by intense interest in oyster restoration in the more populated lower parts of the HRE, where waters are closed to harvest, we are testing the relative growth and survival of wild Tarrytown spat to hatchery-produced spat from moderate-salinity wild broodstock. Hatchery-produced oysters with high vs. low genetic diversity were outplanted at 11 sites along the HRE gradient from Tarrytown to Jamaica Bay (high salinity) to test for a link between genetic diversity and fitness related performance measures. Highest growth was observed near Tarrytown and in Jamaica Bay with low growth at the mid-estuary New York Harbor sites. Wild spat were transplanted to 5 sites and showed faster growth compared to hatchery-produced oysters where conditions were marginal (low salinity or low water quality), suggesting that hatchery bottlenecks may be more of an impediment for spat under non-ideal conditions. Hatchery spat also were segregated into fast and slow-growing larvae for field monitoring and laboratory challenge experiments. Differential stress tolerance will be related to genetic by environment interactions.

Katie McFarland is a Postdoctoral Research Associate in Dr. Matthew Hare’s Lab studying oyster populations in the Hudson River Estuary to test links between genetic diversity and fitness related performance measures in hatchery produced cohorts from wild oysters compared to aquaculture and wild oysters.

Trajectories of the human appropriation of earth’s regenerative capacity: an interpretation of a classification of the national Ecological Footprint Accounts (1961-2012)
Manuel Berrio

To contribute to the development of sustainability indicators alternative to GDP, we use the available 1961-2012 national trajectories of the Biocapacity and Ecological Footprint components of Ecological Footprint Accounting to produce a classification of countries for the period. We present the resulting taxonomy including classifying characteristics, grouping and discriminant criteria, groups, and special cases. We develop a framework to interpret the result of this classification and compare our classification with other grouping systems relevant to sustainability (GDP and World-System). Our analysis suggests that the recent (1961-2012) accounting of human appropriation of earth’s regenerative capacity reflects historical conflictive interactions among nation/states for the appropriation of natural resources, mediated by the implementation of ‘modern’ institutions, in the context of biophysical constraints.
Environmental engagement among Latinos: An exploratory study of environmentalists in the greater Chicago region
Sarah Naiman

The Latino population is rapidly increasing in the United States, exhibits high levels of environmental concern that surpass any other ethnic group, and expresses strong support for pro-environmental policies. However, Latinos are underrepresented in mainstream environmental projects and organizations. This “value-action” gap—the divide between concern and behaviors—has been found in not only Latinos but
other minority groups. Limited research has investigated the nature of Latino environmental participation, especially the barriers to their engagement in environmental projects and organizations. Through semi-structured qualitative interviews, we investigated the nature of Latino participation in environmental organizations and projects in the greater Chicago region. Additionally, we examined three propositions that explain the gap between Latino attitudinal support and participation in environmental work: 1) needs-based theory, 2) social psychological barriers to engagement, 3) structural barriers to engagement. Results show that the Latinos interviewed participated in a wide variety of environmental projects and participants also reflected upon both social psychological and structural barriers to their participation in environmental projects and the mainstream environmental movement. These barriers included a lack of sense of belonging, narrowly defined language used to describe “environmentalism”, and lack of support for diversity initiatives. We conclude that these barriers should be addressed by both individuals and organizations invested in the environmental movement in order to increase minority participation in environmental work. Results of this study have implications for understanding environmental engagement among other minority groups as well as the Latino population.

Sarah Naiman is a second-year MS-PhD student working with Dr. Shorna Allred.

Whole-lake seasonal growth, reproduction, abundance, and production of *Mysis diluviana* in Lake Ontario in 2013
Toby Holda, Kelly Bowen, Lars Rudstam, Brian Weidel, Jeremy Holden, Michael Connerton, and Jim Watkins

*Mysis diluviana* are important members of the offshore community in the Great Lakes, perhaps especially Lake Ontario. They are an abundant food resource for a variety of fishes, significant competitors with fish and zooplankton for food resources, and a biological vehicle for linking pelagic and benthic systems. During 2013, whole-lake coverage of Lake Ontario was achieved for four sampling periods from April – November: spring, summer, late summer, and fall. Our estimates of seasonal lake wide mysid density ranged from 67.6 /m² to 125.8 /m², being lowest in fall. We observed two cohorts (spring 2012 and spring 2013) most of the year, and an absence of the late summer cohort. Summer growth rates were 0.051 mm/d and 0.026 mm/d for Y0 and Y1. Reproduction occurred in the fall. Production of mysids was 1.07 g dw/m²/yr.

Toby Holda is a PhD student in Natural Resources and Co-President of 2016-17 DNR GSA.

Tayra occupancy and carnivore co-occurrence dynamics in the Ecuadorian Andes
Vanessa Springer

The Chocó-Andean region of Ecuador lies at the convergence of two of the world’s top 25 biodiversity hotspots and is home to more endemic species than any other hotspot on Earth. Unfortunately, half of this region has been deforested and the remaining cloud forest is threatened by expanding agriculture, development, and recently granted mining concessions. As part of an overarching project to design a socio-ecological corridor between two ecological reserves using the Andean bear (*Tremarctos ornatus*) as an umbrella species, a large-scale camera trapping survey was implemented across 850 km² of forest in the region northwest of Quito, Ecuador. The first survey season, August-November 2016, resulted in over 100,000 photos of at least 18 mammal species. As a subset of the corridor design project, this specific study has three aims: 1) to evaluate how land use and land cover influence occupancy of tayra (*Eira barbara*); 2) to examine the co-occurrence of carnivores and species of conservation interest including tayra, puma (*Puma concolor*), ocelot (*Leopardus pardalis*) and others using multi-species occupancy models; and 3) to identify spatial regions that have high values of carnivore occupancy and Andean bear density. This study will increase the understanding of how wildlife species are using the landscape and will contribute to conservation planning efforts in this region.
Vanessa Springer is a member of the New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University. She is advised by Dr. Angela Fuller and Dr. Evan Cooch.

Using genomics to measure population connectivity in the eastern oyster (*Crassostrea virginica*) within the Hudson River Estuary

Yuka Kutsumi and Matthew P. Hare

Many marine organisms are capable of dispersing long distances from immediate site of the parental stock during their larval stage through ocean currents. Because of this, they are believed to disperse hundreds of kilometers, allowing the maintenance of genetically homogeneous populations across large seascapes. However, over the past decade, an alternative view has been raised by several studies; that is the successful dispersers may travel far less than their apparent potential, which can eventually create distinctive population structures in a seemingly connected geography. In our study, we focused on analyzing the genomic data of eastern oyster (*C. virginica*), a keystone species native to eastern North America, to examine if genetic population structure patterns exists within the large Hudson Estuary. We collected different life stage (juveniles and adults) of eastern oysters from 11 different sites (N=24 per site) in the estuary, and the population differentiation was tested in three ways using the model based method. Our primary finding suggested that there were two distinctive genetic population structures in the 17 wild populations in the Hudson Estuary. Our result also showed a significant genetic difference between the wild populations and the aquacultured populations. Understanding connectivity and its geographical structure is critical for effective management and conservation of marine communities.

Yuka Kutsumi is an adventurous 3rd year graduate student, working with Dr. Matt Hare and Dr. Pat Sullivan.