Great Expeditions (HONR 204CS)

Spring 2017: Frontlines of climate change: Active ice, glacial politics

Douglas Fischer¹, Tony Hartshorn², Scott Powell²

¹Environmental Health Sciences
²Department of Land Resources and Environmental Sciences, Montana State University

OVERVIEW:

On no other topic do science and public policy intersect with greater urgency than climate change. And few other topics offer such vivid opportunities in the field to see first-hand that explosive collision. Our overarching goal: To examine the broader role science can play in informing public dialogue of important environmental issues facing society - and to understand why it often falls short.

The backdrop and culminating aspect of this course is a once-in-a-lifetime trip to the frontlines of climate change: Greenland's retreating ice sheets; Iceland's eroding culture; the United Nation climate negotiations in Bonn, Germany. This unique adventure will force students to witness local impacts of past and present warming and global efforts to minimize future warming. Greenland provides students with an unparalleled perspective of the austere frailty of life – "poverty porn" – on the edge of one of the world’s largest ice sheets, the fate of which could change the world as we know it. In Iceland students would feel the keen cultural loss of those glaciers. And in Bonn, students will have a chance to sit through diplomatic wrangling – the "power plays" – and meet with delegates and activists to reinforce the difficult reality of international climate policy.
Our team-teaching approach leverages three specialties – Professor Hartshorn's expertise in carbon forcing and greenhouse gas emissions, Professor Powell's work on the global carbon cycle and Mr. Fischer's internationally recognized reporting on national and global climate politics.

GOALS:
This Great Expeditions course will:

- Transform MSU students into global citizens.
- Bring international perspective to a local, regional, and global challenge.
- Offer a multi-disciplinary exploration – science, policy and culture.
- Impart the knowledge and perspectives necessary to allow students to assess a wide scope of challenges to climate science and policy, from campus- or city-level impacts to regional, federal, and international responses.

OBJECTIVES:
1. Improve students' understanding of the role and limits of science in guiding public policy and debate on crucial issues facing society, focusing specifically on climate change.
2. Improve students' understanding of the scale of climate-change drivers, impacts, solutions and necessary policy changes.
3. Improve students' abilities to assess the scope of political responses to climate change, from local to international stages.
4. Explore local intersections with the issue – e.g., from southwest Montana, Greenland, Iceland, and German perspectives – and place these in a global context.

DESIGN:
The course builds toward the culminating expedition to Iceland, Greenland, and Germany (see above figure; minimum cost air travel to/from Greenland is via Icelandair). In advance of the trip during the semester, class meetings will consist of seminar-format discussions facilitated by guest lecturers and Great Expeditions faculty, drawn from a range of disciplines. All class sessions will be built with the aim of enabling students to place local and individual choices and issues in a broader international context.

The timing for this Great Expeditions proposal (May 2017) is ideal. In mid-May, delegates, activists and experts worldwide gather in Bonn for the United Nations Framework Convention on Climate Change (UNFCCC) to set the agenda and lay the groundwork for the fall "Conference of Parties" (or COP) climate talks that generate abundant press and social media coverage. These Bonn gatherings are quieter meetings, smaller in scale and far more approachable than the giant fall gatherings. Even better, the 2017 Bonn meetings likely will focus on how to enact the lofty goals articulated in the historic December 2015 Paris agreement.
Pre-expedition:

The first four weeks of the course will establish a foundational, baseline understanding of climate change science, focusing broadly on climate and atmospheric science, sources/sinks, and impacts of greenhouse gas (GHG) emissions, and the scientific process.

As this baseline is established, class discussion will shift to the political debate. Students will investigate and explore the range of policy responses, starting with local campus and city initiatives and working progressively through state, regional, federal and international efforts. At each of these scales, students will acquire practice in quantifying the effectiveness of political prescriptions as well as identifying potential political opportunities.

Montana State University, the City of Bozeman, and the broader regional community offer a wide range of experts that we will invite to talk on this subject. In addition, the Great Expeditions faculty have a deep network of professional contacts active in the climate arena. Guest lectures might include representatives from:

- The City of Bozeman and MSU, which have committed to reducing GHG emissions to 15% below 2000 levels by 2020 and to 20% below 2009 levels by 2025, respectively;
- MSU climate, political, and environmental economics scientists;
- Current or former Montana Senators or Representatives to talk on federal climate policy and initiatives (prior HONR494CS offerings [an on-campus seminar originally motivated by an unsuccessful Great Expeditions proposal in 2013] have included a physical visit by Senator Tester and a Skype session with Senator Daines); and
- World-renowned experts here in Bozeman such as Ray Rasker of Headwaters Economics and Molly Cross of the Wildlife Conservation Society.

Expedition:

The expedition will have three phases – Iceland, Greenland and Bonn. We will spend the first third of the trip in Iceland exploring both physical and cultural aspects of climate change. We will initially ground ourselves in the science of climate change by linking up with MSU colleague Wyatt Cross in the Department of Ecology, and his National Science Foundation-funded team, who are investigating the effects of climate warming on stream ecosystems. That team has capitalized on Iceland’s unique combination of glaciers and geothermal activity that results in a natural experimental design of differing stream temperatures.

Branching out from there, we will explore how Iceland has exploited its geothermal resources for energy production. We will visit the largest of the country’s five geothermal power stations, the Hellisheioi Power Station, which is the 3rd largest geothermal power station in the world (~300 MW of electricity and 400 MW of hot water). Of course, a visit to a geothermal power station in Iceland would not be complete without also visiting one or more of the famed geothermal hot springs, often adjacent to the power stations.
From there we'll travel to Olafsvik, gateway to Snæfellsjökull National Park and its namesake glacier, which scientists predict will be gone in 20 years. We'll meet with artist Vigdis Bjarnadottir and other Icelanders to talk about what that loss means for a culture fiercely proud of its identity as a land of fire and ice.

The middle third of the expedition will require a short flight to Ilulissat, Greenland, at the foot of the Jakobshavn (aka Ilulissat) Glacier, one of the fastest-moving glaciers on the globe, source – most likely – of the ice that sank the Titanic. We'll kayak around icebergs, hike freshly "de-iced" countryside, and talk with Inuit representatives about their changing world. Though travel to Greenland is expensive, we will commit—if this proposal is approved—to working with contacts in Montana, Washington DC, and at Tech College Greenland on ways to lower travel expenses for participants.

Following Iceland and Greenland, we'll fly to Bonn, Germany for the mission-critical reality check: If the ice is melting and the glaciers are receding, what can be done at the policy level? Every May delegates gather at this seat of culture and capitalism on the banks of the Rhine to hammer out texts that will be discussed at the fall climate talks.

These "intersessional" talks present a quieter, far-more-accessible glimpse at the global climate talks, with easy access to the United States' negotiating team, as well as global experts like Jennifer Morgan of the World Resources Institute and members of African and island nations, who are confronting climate-change consequences somewhat removed (sea-level rise, shifts in growing season precipitation) from those challenging the Inuit.

And of course, being in Bonn, the home of Ludwig van Beethoven, we'd leave some time for a concert by the city's renowned Beethoven Orchestra and a tour through the city's Museum Mile.

We have previously spent three semesters on campus and in the field locally in HONR494CS, showing students as best we could what happens when science and policy disconnect. A Great Expeditions course takes this important work to the next level, putting local and domestic politics into an international framework. International climate policy can seem arcane, even trivial. We have faith that our students will emerge from this trip with the sense that the stakes are anything but.
We also wager this type of expedition—chasing ice in the north Atlantic and then exploring frozen diplomatic ground in Bonn—is precisely the type of hands-on learning, discovery, and engagement at the core of MSU’s strategic mission that can cultivate future Goldwater, Truman, Udall, Fulbright, and Rhodes scholars.

TEAM:

*Douglas Fischer* is an award-winning journalist and director of Environmental Health Sciences, an independent, nonprofit news outlet publishing on climate change, energy policy and environmental justice, among other topics. He has been a journalist for 20 years, and received international prizes in 2009 and 2015 for coverage of global climate politics. Fischer has worked in the newsrooms of the Oakland Tribune, the Fairbanks (Alaska) Daily News-Miner, and Newsweek Magazine. He will guide students in the basics of science communication from a journalistic perspective. Fischer attended the UN climate talks in Copenhagen in 2009 (COP15) and in Warsaw in 2013 (COP19; from where he was able to Skype into our MSU HONR494CS course!).

*Tony Hartshorn* is a faculty member in the Department of Land Resources & Environmental Sciences (LRES) at MSU and has developed climate literacy initiatives since 2009, when he started teaching at James Madison University. One course he designed built student awareness of how choices relating to “Gas, food, lodging” can translate into globally significant “forcings” relating to greenhouse gas emissions. In 2009, Hartshorn led two training workshops for two indigenous tribes in the measurement of soil carbon in Guyana to support UN Reducing Emissions from Deforestation and Land Degradation initiatives funded through Norway. He is currently funded by the National Science Foundation's Advancing Informal STEM Learning program to develop approaches to both improving carbon literacy as well as quantifying those improvements.

*Scott Powell* is an award-winning faculty member in LRES and has been conducting extramurally funded climate science since 2000; in 2015, Scott won the MSU Excellence in Online Teaching Award. His research focuses on the quantification of carbon sources and sinks and the critical role that forests play in the global carbon cycle. Powell’s teaching emphasizes climate science and literacy and he has played a leadership role in the development of the LRES online MS program. This proposal will tap his research expertise, rich network of contacts across the U.S., and expertise in curriculum and program development.
**PROPOSED BUDGET**: excluding tuition & fees, insurance

*Per person estimates:*

1. Multi-city airfare between Bozeman (BZN)-Reykjavik (KEF)-Ilulissat (UAK)-Cologne/Bonn (CGN)-BZN: estimated @ ~$1000 (BZN-KEF) + ~$1000 (KEF-UAK=Narsarsuaq) + ~$400 (KEF-CGN) = $2400

2. Ground transportation in Iceland/Ilulissat/Bonn @ $25/day * 20 d = $500

3. Hotel: 20 nights @ $50/night double-occupancy = $1000

4. Meals & Inc. Expenses (based on U.S. State Department rates): $25/day * 20 days = $500

**Total: $4400**