RC 360 / CLIMATE 405—Knowing Climate Change

Course Description:
How do we know what we know about past, present, and future climate? Who has access to information, and how and why does that access change over time? What factors influence what knowledge we consider "legitimate"?

In this community-based learning course, we will consider climate expertise from a wide variety of sources. Throughout the term, we will work in concert with a community partner to monitor and preserve environmental information, deepening our own expertise through lived experience. We will progressively distill our experiences and finally communicate them on a live radio show.

Our unique learning environment will be shaped by contributions from community partners, instructors, and especially students.

Objectives:
Through this course, you will be able to
- Recognize diverse sources of climate information; and
- Examine the role of governments, nonprofits, researchers, and private citizens in creating and legitimizing knowledge about our climate.

Our work together will help you develop skills including
- Academic reading across disciplines,
- Digital literacy,
- Broadcast planning for radio/podcasts, and
- Science communication.

Community engagement:
An integral part of the learning we'll do in this course comes from interacting with community partners both inside and outside the classroom. This engagement will include:
- Monitoring environmental websites and data repositories with the Environmental Data and Governance Initiative (EDGI)
- Summarizing our experiences with EDGI for *It's Hot in Here* (hotinhere.us), the environmental news radio show managed by the School for Environment and Sustainability

Learning resources:
Required reading consists of articles from mainstream media, scholarly journals, and books, which will be freely available on the course website as much as possible. There will be occasional short videos or podcasts assigned as well. We will draw additional perspectives from interacting with our community partners and several guest speakers.

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Assessment:
The community-based learning experience will be most fruitful if we all participate fully in the community—both inside and outside the classroom. As such, a considerable portion of your course grade will be based on participation (assessed by me and by EDGI, using Engagement Rubric). You are required to submit 10 journal entries over the course of the 15-week term. If you submit more, the grade will come from the best 10 of those entries (as assessed by Journal Rubric). You will also be responsible for gathering resources for and leading one class discussion (see below). There will be no midterm or final exam.

Grade breakdown:

- EDGI project participation: 30%
- Class participation (inc. Hot in Here broadcast): 20%
- Discussion leading: 10%
- Journal responses: 40%

Discussion leading:
Over the course of the semester, we will practice gathering knowledge in various formats from diverse sources. Several class sessions will be devoted to student-led discussion. For one of the topics below (or a new one you propose), you and a partner will collect 2-4 resources, share them with the class, and facilitate a discussion.

- Climate governance
- Non-human impacts
- Climate of the geologic past
- Environmental history
- Adapting to climate change
- Decision science of climate change

EDGI partnership:
Our class will partner with the Environmental Data and Governance Initiative (EDGI) to work on analyzing and preserving public data about the environment. You will serve as website monitoring analysts, devoting approximately 2 hr/week outside of class to monitoring an assigned set of government webpages and noting changes. This essential public service for government accountability has been recognized in major media outlets including Michigan Radio (NPR), *Washington Post*, and *Scientific American*. Dr. Justin Schell, who manages the U-M Shapiro Design Lab and partners with EDGI, will be a frequent guest in the classroom to help us debrief the importance of this work and the changes we have found. Over the course of the semester, we will assemble our learnings into a broadcast plan for *It's Hot in Here*.

Course co-design:
This is a shared learning experience. I've developed an overview, but we will live it together. You have a great deal of freedom in the topics you choose to introduce during the class session you lead. During the first few sessions of class, we will discuss our expectations as a group. Based on those expectations, we will finalize the order of discussion topics and agree on deadlines. The co-design process will help you practice skills including:

- Adaptability
- Negotiation and compromise
- Self-directed learning

Course schedule:
Below is a course schedule, subject to adjustments according to our class needs and wants. Journal entries are due nearly every week; due dates are indicated in the rightmost column, and a prompt will be posted at least three days in advance of each. It is essential to do the assigned readings, as we will spend class time discussing them in groups.

Date	Topic	Class time	Reading/prep required
Thurs 4 Jan	Welcome & overview	Welcome! Course intro & expectations. What is CBL?	**Pre-survey due (Fri)**
Tues 9 Jan		Project introduction: EDGI and IHIH Learning agreements.	1. *It's Hot in Here*: Small Islands, Rising Seas 2. Rinberg & Bergman (2017) - NYT op-ed
Thurs 11 Jan	What do we know about climate?	Lay of the land: climate science, ways of knowing. How to read a scientific paper.	3. Johnson (2015) 4. Cooper & Lewenstein (2016) **Discussion topic proposal due**
Tues 16 Jan	Foundations of climate knowledge	Scientific observation and data management **Guests:** **Shad O'Neel, US Geological Survey** **Justin Schell, U-M / A2 Data Rescue** Discussion of EDGI web monitoring task	5. EDGI training videos 6. USGS (2016)
Thurs 18 Jan		Local knowledge ("traditional"/"indigenous"). Reading from development studies. In-class viewing: short video documenting climate knowledge of Himalayan elders.	7. *It's Hot in Here*: Reciprocity with the Living Land 8. FAO (2004) **Journal 1 due**
Tues 23 Jan		Proxies and reconstruction. Readings from interdisciplinary Alpine studies, popular (polar) science.	9. Zumbühl, Steiner, and Nussbaumer (2008) 10. Kolbert (2002)
Thurs 25 Jan		Climate in art. "Cli-fi" and visual representations of climate. Debrief progress on website monitoring.	11. McKibben (2006) 12. Instagram feed: Everyday Climate Change **Journal 2 due**
Tues 30 Jan		Environmental social science. Readings from anthropology, psychology, and political science.	13. Barnes et al (2013) 14. Stoknes (2014) 15. Eakin & Lemos (2006)

Date	Topic	Class time	Reading/prep required
Thurs 1 Feb	Issue I: Water	Drought & desertification. Atmospheric science: wet-get-wetter, dry-get-drier. Water stress in literary futures	16. Bacigalupi (2006) 17. Walsh/Salemi (2017) 18. Casey & Haner (2017) **Journal 3 due**
Tues 6 Feb		Snowpack & glaciers (Andes). Cryosphere science. Cyclical and linear time systems.	19. Soruco et al. (2015) 20. Chuquimia (2016) 21. Ticona Alejo (2016)
Thurs 8 Feb		Synthesis of Issue I - knowledge systems, cultural dimensions, legitimacy	**Journal 4 due**
Tues 13 Feb	Student-led discussion	Discussion pair A [Students' choice topic—see "Discussion leading" above]	Readings assigned by leading pair **Peer assessment of discussion A (Wed)**
Thurs 15 Feb	*NO CLASS - PAIR MEETINGS*	*Class cancelled due to MUSE Conference. Discussion pairs to meet instructor outside class for check-in.*	**Journal 5 due**
Tues 20 Feb	Issue II: Food Security	Food insecurity and its interactions with climate. Debrief progress with website monitoring; summarize for IHIH broadcast.	22. Krishnamurthy, Lewis & Choularton (2012)
Thurs 22 Feb		Arctic food supply: road/airstrip degradation, changing hunting patterns. Science of polar amplification. Mismatch of traditional knowledge and modern environment. Issue II synthesis—creation, presentation, circulation of knowledge	23. Unikkaaqatigiit p 65, 73-74, 78-79 24. Fabian (2017) **Journal 6 due**
Tues 27 Feb	*NO CLASS - SPRING BREAK*	*No class - spring break*	
Thurs 1 Mar		*No class - spring break*	**Optional journal 7 due**
Tues 6 Mar	Partnership check-in	Debrief progress on website monitoring. How has our experience of the work changed since January? What changes, if any, have we identified? How would we explain EDGI to others? Summarize these points for broadcast plan.	

Date	Topic	Class time	Reading/prep required
Thurs 8 Mar	Student-led discussion	Discussion pair B [Students' choice topic—see "Discussion leading" above]	Readings assigned by leading pair **Journal 8 due** **Peer assessment of discussion B (Fri)**
Tues 13 Mar	Student-led discussion	Discussion pair C [Students' choice topic—see "Discussion leading" above]	Readings assigned by leading pair **Peer assessment of discussion C (Wed)**
Thurs 15 Mar	Issue III: Homes & heritage	Rising seas. Physical science of global and regional sea level change. Notions of vulnerability.	25. Mengel et al. (2015) 26. Flynn & Hudson (2016) **Journal 9 due**
Tues 20 Mar		Forests and humans. Forests as carbon sinks. Traditional ecological knowledge and livelihoods of forest inhabitants. **Guest speaker: Katie Browne, U-M SEAS**	27. MacFarquhar (2012) 28. Lang (2011)
Thurs 22 Mar		Extreme events. Return frequency.	29. McEvers, Shapiro, & Cress (2017) 30. Climate Signals: Hurricane Harvey Overview **Journal 10 due**
Tues 27 Mar		Mitigation, adaptation, and displacement.	31. Ayers & Huq (2009) 32. Farbotko (2010)
Thurs 29 Mar		Issue III synthesis—authority of viewpoint, knowledge systems, decision-making	**Journal 11 due**
Tues 3 Apr	Student-led discussion	Discussion pair D [Students' choice topic—see "Discussion leading" above]	Readings assigned by leading pair **Peer assessment of discussion D (Wed)**

Date	Topic	Class time	Reading/prep required
Thurs 5 Apr	Partnership debrief	Debrief progress on website monitoring. **Guest:** **Toly Rinberg, EDGI Steering Committee** What were the major trends we noticed in our monitoring work? How will EDGI use this information? What has been the effect of including students in the website monitoring effort? Summarize these points for broadcast plan.	**Journal 12 due**
Tues 10 Apr	Finalize broadcast plan	Class working day to assemble a logical flow for broadcast on It's Hot in Here. **Guest:** **Rebecca Hardin, U-M SEAS, It's Hot in Here faculty advisor**	**Broadcast music suggestions due (Mon)**
Thurs 12 Apr	Broadcasting!	[Class meeting FRIDAY] Live radio show Friday at noon on WCBN FM. Sharing all our hard work with the public.	**Journal 13 due**
Tues 17 Apr	Where do we go from here?	Potluck/picnic. Reflection on key learning points of the course and discussion of how to take them forward.	

Reading List

1. Hardin, R. D. et al. (2015). Small islands, rising seas. Podcast archive of *It's Hot in Here.* Available from http://www.hotinhere.us/podcast/small-islands-rising-seas/
2. Rinberg, T. & Bergman, A. (2017, November 22). Censoring climate change. *The New York Times.* Available from https://www.nytimes.com/2017/11/22/opinion/censoring-climate-change.html
3. Johnson, G. C. (2015). *Climate Change Science 2013: Haiku.* Booklet available from http://sightline.wpengine.netdna-cdn.com/wp-content/uploads/2015/10/FULL_IPCC_HAIKU_SLIDES_OPT.pdf
4. Cooper, C. B. & Lewenstein, B. V. (2016). Two meanings of citizen science. In: *The Rightful Place of Science: Citizen Science* [p 51-61]. Tempe, AZ: University of Arizona Press.
5. Training videos: proprietary to Environmental Data and Governance Initiative. Will be distributed directly to students.
6. United States Geological Survey [USGS] (2016). Hubbard Glacier, Alaska [website]. https://www2.usgs.gov/climate_landuse/clu_rd/glacierstudies/hubbard.asp
7. Hardin, R. D. et al. (2016, February 22). Reciprocity with the living land: Braiding Sweetgrass with Dr. Robin Kimmerer. Podcast archive of *It's Hot in Here.* Available from http://www.hotinhere.us/podcast/reciprocity-with-the-living-land-braiding-sweetgrass-with-dr-robin-kimmerer/
8. United Nations Food and Agriculture Organization [FAO] (2004). What is local knowledge? [Factsheet]
9. Zumbühl, H. J., Steiner, D., & Nussbaumer, S. U. (2008). 19th century glacier representations and fluctuations in the central and western European Alps: An interdisciplinary approach. *Global and Planetary Change*, *60*(1), 42-57. https://doi.org/10.1016/j.gloplacha.2006.08.005
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11. McKibben, B. (2006). Introduction. In: *I'm With the Bears: Short Stories from a Damaged Planet* [Martin, M., ed.]. London, UK: Verso Books.
12. Instagram account: @everydayclimatechange. https://www.instagram.com/everydayclimatechange/?hl=en
13. Barnes et al (2013). Contribution of anthropology to the study of climate change. *Nature Climate Change* 3, 541-544. http://dx/doi.org/10.1038/nclimate1775
14. Stoknes, P. (2013). It's hopeless and I'll give it my all. In *What We Think About When We Try Not to Think About Global Warming*.
15. Eakin, H. and Lemos, M. C. (2006). Adaptation and the state: Latin America and the challenge of capacity-building under globalization. *Global Environmental Change* 16, 7-18. http://dx.doi.org/10.1016/j.gloenvcha.2005.10.004
16. Bacigalupi, P. (2006). The tamarisk hunter. In: *I'm With the Bears: Short Stories from a Damaged Planet* [Martin, M., ed.]. London, UK: Verso Books. Available from http://windupstories.com/books/pump-six-and-other-stories/the-tamarisk-hunter/
17. Walsh, B. (2017, April 5). The visible effects of climate change in Iran. *Time.* Available from http://time.com/4713291/iran-climate-change/

    ▸ Also see photos at: http://www.akosalemi.com/climate-change-in-iran.html
18. Casey, N. and Haner, J. (2016, July 7). Climate change claims a lake, and an identity. *The New York Times.* Available from https://www.nytimes.com/interactive/2016/07/07/world/americas/bolivia-climate-change-lake-poopo.html?mcubz=3&_r=0

19. Soruco, A. et al. (2015). Contribution of glacier runoff to water resources of La Paz city, Bolivia (16° S). *Annals of Glaciology,* 56(70), 147–154. http://dx.doi.org/10.3189/2015AoG70A001
20. Chuquimia, L. (2016, December 19). Crisis del agua: La Paz sufre la peor sequía en cuarto siglo. *Página Siete* [Bolivia]. Available from http://paginasiete.bo/especial01/2016/12/19/crisis-agua-sufre-peor-sequia-cuarto-siglo-120657.html
21. Ticona Alejo, E. (2016, November 19). Escasez de agua en la ciudad de La Paz. *La Razón* [Bolivia]. Available from http://www.la-razon.com/index.php?_url=/opinion/columnistas/Escasez-agua-ciudad-Paz_0_2603139736.html
22. Krishnamurthy, P. K., Lewis, K. & Choularton, R. J. (2012). *Climate impacts on food security and nutrition: A review of existing knowledge.* Report of the United Nations World Food Programme and the UK Met Office.
23. Nickels, S., Furgal, C., Buell, M. & Moquin, H. (2005). *Unikkaaqatigiit - Putting the Human Face on Climate Change: Perspectives from Inuit in Canada.* Ottawa, Canada: Joint publication of Inuit Tapiriit Kanatami, Nasivvik Centre for Inuit Health and Changing Environments at Université Laval and the Ajunnginiq Centre at the National Aboriginal Health Organization. Available from https://www.itk.ca/wp-content/uploads/2016/07/unikkaaqatigiit01-1.pdf
24. Fabian, S. (2017). Climate change affecting mental health in northern Labrador. News broadcast, available from http://www.cbc.ca/news/thenational/climate-change-affecting-mental-health-in-northern-labrador-1.4134247
25. Mengel, M. et al. (2015). Future sea level rise constrained by observations and long-term commitment. *Proceedings of the National Academy of Sciences,* 113(10), 2597-2602. Available from www.pnas.org/cgi/doi/10.1073/pnas.1500515113
26. Flynn, A. and Hudson, A. D. (2016). Sunshine state. In: *Everything Change: An Anthology of Climate Fiction.* Arizona State University online publication. Available from https://climateimagination.asu.edu/everything-change/
27. MacFarquhar, C. (2012). Introduction to REDD+ [YouTube video]. Available from https://www.youtube.com/watch?v=D0WeGw3h2yU
28. Lang, C. (2011, February 5). Why REDD+ is dangerous (in its current form). *REDD Monitor* [blog]. Available from http://www.redd-monitor.org/2011/02/05/why-redd-is-dangerous-in-its-current-form/
29. McEvers, K., Shapiro, A. & Cress, S. (2017, August 29). 'It's so surprising when it happens': Houston resident on leaving flooded home. *All Things Considered* [radio broadcast]. Available from http://www.npr.org/2017/08/29/547099583/its-so-surprising-when-it-happens-houston-resident-on-leaving-flooded-home
30. Climate Signals (2017). Hurricane Harvey: Overview. Interactive web page, available at: http://www.climatesignals.org/headlines/events/tropical-storm-harvey-2017
31. Ayers, J. M. and Huq, S. (2009). The value of linking mitigation and adaptation: A case study of Bangladesh. *Environmental Management* 43, 753-764. http://dx.doi.org/10.1007/s00267-008-9223-2
32. Farbotko, C. (2010). Wishful sinking: Disappearing islands, climate refugees and cosmopolitan experimentation. *Asia Pacific Viewpoint* 51(1), 47-60. http://dx.doi.org/10.1111/j.1467-8373.2010.001413.x