

YARROW AXFORD

Associate Professor
Department of Earth and Planetary Sciences
Northwestern University
2145 Sheridan Road, Evanston IL USA 60208-3130

EDUCATION

- Ph.D.*, 2007 University of Colorado, Dept. of Geological Sciences
Adviser: Gifford Miller
Dissertation: *Interglacial temperature variability in the high-latitude North Atlantic region inferred from subfossil midges, Baffin Island (Arctic Canada) and Iceland*
- M.S.*, 2000 Utah State University, Dept. of Geology
Adviser: Darrell Kaufman
M.S. thesis: *Late Quaternary glacier fluctuations and vegetation change in the northwestern Ahklun Mountains, southwestern Alaska*
- A.B.*, 1997
summa cum laude Mount Holyoke College, Dept. of Geology
Adviser: Al Werner
Honors thesis: *A Late-glacial/Holocene record of environmental change, Denali National Park, Alaska*

MAJOR PROFESSIONAL INTERESTS

Paleoclimate; paleolimnology; Arctic & global environmental change; science communication

ACADEMIC APPOINTMENTS

- Sept 2017 – present* Associate Professor (& Director of Graduate Admissions & Recruitment 2020-)
Northwestern University, Dept. of Earth and Planetary Sciences, Evanston IL
- Jan 2012– Aug 2017* Assistant Professor (& Director of Undergraduate Studies 2014-2017)
Northwestern University, Dept. of Earth and Planetary Sciences, Evanston IL
- Sept 2010 – Dec 2011* Visiting Assistant Professor
Northwestern University, Dept. of Earth and Planetary Sciences, Evanston IL
- Mar 2010 – June 2010* Adjunct Lecturer
Northwestern University, Dept. of Earth and Planetary Sciences, Evanston IL
- Oct 2008 – Mar 2010* Research Associate
University of Colorado, Institute of Arctic and Alpine Research, Boulder CO
- May 2007- Oct 2008* Comer Science & Education Foundation Postdoctoral Fellow
University of Iceland, Earth Science Institute, Reykjavík, Iceland
Supervisor: Áslaug Geirsdóttir
- May 2007- Jan 2008* Research Assistant Professor
Dept. of Geology, University at Buffalo, Buffalo NY

SELECTED AWARDS, FELLOWSHIPS & RECOGNITIONS

Linzer Grant for Faculty Innovation in Diversity and Equity, Northwestern University	2019
NSF Faculty Early Career Development (CAREER) Award, Office of Polar Programs	2015
Early Career Investigator Award, Institute for Sustainability and Energy at Northwestern	2014
Finalist & Nominee, AAAS Early Career Award for Public Engagement with Science	2010
Postdoctoral Fellowship, Gary S. Comer Science & Education Foundation	2007-2008
NSF IGERT Graduate Fellowship, Carbon Climate and Society Initiative, Univ. of Colorado	2002-2005
Outstanding Student Research citations, Geological Society of America (GSA)	2004, 2003
J. Hoover Mackin Research Award, GSA Quaternary Geology & Geomorphology Division, awarded to the top Ph.D. proposal submitted to the Division	2003
Arthur D. Howard Research Award, GSA Quaternary Geology & Geomorphology Division, awarded to the top M.S. proposal submitted to the Division	1998

OVERVIEW OF CURRENT RESEARCH

Current and funded work focuses on these primary objectives:

- testing and improving paleolimnological methods for reconstructing Arctic climate, including analyses of oxygen isotopes in organic materials, hydrogen isotopes in sedimentary lipids, chironomid species assemblages, and proxies for glacier fluctuations;
- quantifying Holocene temperature trends around the margins of the Greenland Ice Sheet, where paleoclimate data can elucidate how the ice sheet responds to climate change;
- developing rare records of Last Interglacial conditions on and near Greenland;
- evaluating the magnitude and seasonality of past abrupt climate changes in the Arctic;
- assessing the impacts of past climate change on glaciers and aquatic/tundra ecosystems of Greenland;
- synthesizing Holocene paleoclimate data across the Arctic as a whole, along with paleoenvironmental data revealing the impacts of past climate change.

My lab group performs all stages of paleolimnological research, from site selection and field work to interpreting sediment stratigraphy and chronology to analyzing paleoclimate proxies.

RESEARCH PUBLICATIONS

* Starred names are supervised graduate student or postdoc authors.

** Double stars indicate undergraduates.

Axford indicates senior author/principal investigator role.

In Review / In Revision

46. Medeiros, A.M., Milošević, Đ., Francis, D.R., Maddison, E., Woodroffe, S., Long, A., Walker, I.R., Hamerlík, L., Quinlan, R., Langdon, P., Brodersen, K.P., and **Axford, Y.** Implications of biogeography for the distribution of arctic Chironomidae (Insecta: Diptera).

45. *Larocca, L.J., **Axford, Y.**, Woodroffe, S.A., *Lasher, G.E., and **Gawin, B. Holocene glacier and ice cap fluctuations in southwest Greenland inferred from two lake records.
44. Otto-Bliesner, B.L., Brady, E.C., Zhao, A., Brierley, C., **Axford, Y.**, Capron, E., Govin, A., Hoffman, J., Isaacs, E., Kageyama, M., Scussolini, P., Tzedakis, P.C., Williams, C., Wolff, E., Abe-Ouchi, A., and 22 others. Large-scale features of Last Interglacial climate: Results from evaluating the lig127k simulations for CMIP6-PMIP4.

Peer-Reviewed Journal Articles

43. **Dion-Kirschner, H., *McFarlin, J.M., Masterson, A., **Axford, Y.**, and Osburn, M.R. 2020. Modern constraints on the sources and climate signals recorded by plant waxes in west Greenland. Accepted, *Geochimica et Cosmochimica Acta*.
42. *Larocca, L., **Axford, Y.**, *Lasher, G.E., **Brooks, J., and Bjørk, A.A. 2020. Local glaciers record delayed peak Holocene warmth in South Greenland. *Quaternary Science Reviews* 241, 106421.
41. **Puleo, P.J.K., **Axford, Y.**, *McFarlin, J.M., Curry, B.B., Barklage, M., and Osburn, M.R. 2020. Late glacial and Holocene paleoenvironments in the midcontinent United States, inferred from Geneva Lake leaf wax, ostracode valve, and bulk sediment chemistry. *Quaternary Science Reviews* 241, 106384.
40. *Lasher, G.E., **Axford, Y.**, **Berman, K.S., and *Larocca, L.M. 2020. Holocene temperature and landscape history of southwest Greenland inferred from oxygen isotopes and geochemical lake sediment proxies. *Quaternary Science Reviews* 239, 106358.
39. Kaufman, D.S., McKay, N., Routson, C., Erb, M., Davis, B., Heiri, O., Jaccard, S., Tierney, J., Dätwyler, C., Axford, Y., Brussel, T., Cartapanis, O., Chase, B., Dawson, A., de Vernal, A., Engels, S., Jonkers, L., Marsicek, J., Moffa-Sánchez, P., Morrill, C., Orsi, A., Rehfeld, K., Saunders, K., Sommer, P., Thomas, E., Tonello, M., Tóth, M., Vachula, R., Andreev, A., and 63 others. 2020. A global database of Holocene paleo-temperature records. *Scientific Data* 7, 115.
38. Engels, S., Medeiros, A.S., **Axford, Y.**, Brooks S.J., Heiri, O., Luoto, T.P., O., Nazarova, L., Porinchi, D.F., Quinlan, R., and Self, A.E. 2019. Temperature change as a driver of spatial patterns and long-term trends in chironomid (Insecta: Diptera) diversity. *Global Change Biology* 26, 1155-1169.
37. *McFarlin, J.M., **Axford, Y.**, Masterson, A., and Osburn, M.R. 2019. Calibration of modern sedimentary $\delta^2\text{H}$ plant wax-water relationships in Greenland lakes. *Quaternary Science Reviews* 225, 105978.
36. Khider, D. and 101 others. 2019. PaCTS v1.0: A Crowdsourced reporting standard for paleoclimate data. 2019. *Paleoceanography and Paleoclimatology*, DOI 10.1029/2019PA003632.
35. Capron, E., Rovere, A., Austermann, J., **Axford, Y.**, Barlow, N.L.M., Carlson, A.E., de Vernal, A., Dutton, A., Kopp, R.E., McManus, J.F., Menviel, L., Otto-Bliesner, B.L., Robinson, A., Shakun, J.D., Tzedakis, P., and Wolff, E.W. 2019. Challenges and research priorities to understand interactions between climate, ice sheets and global mean sea level during past interglacials. *Quaternary Science Reviews*, DOI 10.1016/j.quascirev.2019.06.030.
34. **Axford, Y.**, *Lasher, G.E., Kelly, M.A., Osterberg, E.C., Landis, J., Schellinger, G., **Pfeiffer, A., Thompson, E., and Francis, D.R. 2019. Holocene temperature history of northwest Greenland – with new ice cap constraints and chironomid assemblages from lake Deltasø. *Quaternary Science Reviews* 215, 160-172.
33. *Lasher, G.E., and **Axford, Y.** 2019. Medieval warmth confirmed at the Norse Eastern Settlement in Greenland. *Geology* 47, 267-270.

32. *McFarlin, J.M., **Axford, Y.**, Osburn, M.R., Kelly, M.A., Osterberg, E.O., and Farnsworth, L.B. 2018. Pronounced summer warming in northwest Greenland during the Holocene and Last Interglacial. *Proceedings of the National Academy of Sciences* 115, 6357-6362.
31. Farnsworth, L.B., Kelley, M.A., Bromley, G.R.M., **Axford, Y.**, Osterberg, E.C., Howley, J.A., Jackson, M.S., and Zimmerman, S.R. 2018. Holocene history of the Greenland Ice Sheet margin in northern Nunatarssuaq, northwest Greenland. *Arktos: The Journal of Arctic Geosciences* 4, DOI:10.1007/s41063-018-0044-0.
30. **Axford, Y.**, Levy, L.B., Kelly, M., Francis, D.R., Hall, B., Langdon, P.R., and Lowell, T. 2017. Timing and magnitude of early Holocene warmth in East Greenland inferred from chironomids. *Boreas* 46, 678-687.
29. *Lasher, G.E., **Axford, Y.**, *McFarlin, J.M., Osterberg, E.C., Kelly, M.A., and Berkelhammer, M. 2017. Holocene temperatures and isotopes of precipitation in northwest Greenland recorded in lacustrine organic materials. *Quaternary Science Reviews* 170, 45-55.
28. Perren, B.B., **Axford, Y.**, and Kaufman, D.S. 2017. Alder, nitrogen, and lake ecology: terrestrial-aquatic linkages in the postglacial history of Lone Spruce Pond, southwestern Alaska. *PLOS One*, DOI:10.1371/journal.pone.0169106.
27. Briner, J.P., McKay, N., **Axford, Y.**, Bennike, O., Bradley, R.S., de Vernal, A., Fisher, D., Francus, P., Frechette, B., Gajewski, K., Jennings, A., Kaufman, D.S., Miller, G., Rouston, C., and Wagner, B. 2016. Holocene climate change in Arctic Canada and Greenland. *Quaternary Science Reviews* 147, 340-364.
26. Matthews-Bird, F., Gosling, W., Coe, A., Bush, M., Mayle, F., **Axford, Y.**, and Brooks, S. 2016. Environmental controls on the distribution and diversity of lentic Chironomidae (Insecta: Diptera) across an altitudinal gradient in tropical South America. *Ecology and Evolution* 6, 91-112.
25. Kaufman, D.S., **Axford, Y.**, Henderson, A.C.G., McKay, N.P., Oswald, W.W., Saenger, C., Anderson, R.S., Bailey, H.L., Clegg, B., Gajewski, K., Hu, F.S., Jones, M.C., Massa, C., Rouston, C.C., Werner, A., Wooller, M.J., and Yu, Z. 2016. Holocene climate changes in eastern Beringia (NW North America) – a systematic review of multi-proxy evidence. *Quaternary Science Reviews* 147, 312-339.
24. Carlson, A.E., Winsor, K., Ullman, D.J., Brook, E.J., Rood, D.H., **Axford, Y.**, LeGrande, A.N., Anslow, F.S., and Sinclair, G. 2014. Earliest Holocene south Greenland ice-sheet retreat within its late-Holocene extent. *Geophysical Research Letters* 41, 5514-5521.
23. Sundqvist, H.S., Kaufman, D.S., McKay, N.P., Balascio, N.L., Briner, J.P., Cwynar, L.C., Sejrup, H.P., Seppä, H., Subetto, D.a., Andrews, J.T., **Axford, Y.**, Bakke, J., Birks, H.J.B., Brooks, S.J., de Vernal, A., Jennings, A., Ljungqvist, F.C., Ruhland, K., Saenger, C., Smol, J.P., and Viau, A. 2014. Arctic Holocene proxy climate database – New approaches to assessing geochronological accuracy and encoding climate variables. *Climate of the Past*, DOI 10.5194/cpd-10-1-2014.
22. Levy, L.B., Kelly, M.A., Lowell, T.V., Hall, B.L., Hempl, L.A., Honsaker, W.M., Lusas, A.R., Howley, J.A., and **Axford, Y.** 2014. Holocene fluctuations of Bregne ice cap, Scoresby Sund, east Greenland: a proxy for climate along the Greenland Ice Sheet margin. *Quaternary Science Reviews* 92, 357-368.
21. **Axford, Y.**, Losee, S., Briner, J.P., Francis, D.R., Langdon, P.G., and Walker, I.R. 2013. Holocene temperature history at the western Greenland Ice Sheet margin reconstructed from lake sediments. *Quaternary Science Reviews* 59, 87-100.
20. Ballantyne, A., **Axford, Y.**, Miller, G., Otto-Bliesner, B., Rosenbloom, N., and White, J. 2013. The amplification of Arctic terrestrial surface temperatures by reduced sea-ice extent during the Pliocene. *Palaeogeography, Palaeoclimatology, Palaeoecology* 386, 59-67.

19. Brooks, S.J., **Axford, Y.**, Heiri, O., Langdon, P.G., and Larocque-Tobler, I. 2012. Chironomids can be reliable proxies for Holocene temperatures: A comment on Velle et al. (2010). *The Holocene*. DOI 10.1177/0959683612449757.
18. Kaufman, D.S., Anderson, R.S., **Axford, Y.**, Lamoureux, S., Schindler, D., Walker, I.R., and Werner, A. 2012. A multi-proxy record of the Last Glacial Maximum and last 14,500 years of paleo-environmental change at Lone Spruce Pond, southwestern Alaska. *Journal of Paleolimnology* 48, 9-26.
17. Young, N.E., Briner J.P., **Axford, Y.**, Csatho, B., Babonis, G.S., Rood, D.H., and Finkel, R.C. 2011. Response of a marine-terminating Greenland outlet glacier to abrupt cooling 8200 and 9300 years ago. *Geophysical Research Letters* 38, L24701.
16. **Axford, Y.**, Andresen, C.S., Andrews, J.T., Belt, S.T., Geirsdóttir, Á., Massé, G., Miller, G.H., Ólafsdóttir, S., and Vare, L.L. 2011. Do paleoclimate proxies agree? A test comparing 19 late Holocene climate and sea-ice reconstructions from Icelandic marine and lake sediments. *Journal of Quaternary Science* 26, 645-656.
15. **Axford, Y.**, Briner, J.P., Francis, D.R., Miller, G.H., Walker, I.R., and Wolfe, A.P. 2011. Chironomids record terrestrial temperature changes throughout arctic interglacials of the past 200,000 years. *Geological Society of America Bulletin* 123, 1275-1287.
14. *Thomas, E.K., Briner, J.P., **Axford, Y.**, and Miller, G.H. 2011. A 2000-year-long multi-proxy lacustrine record from eastern Baffin Island, Arctic Canada reveals first millennium AD cold period. *Quaternary Research* 75, 491-500.
13. Young, N.E., Briner, J.P., Stewart, H.A., **Axford, Y.**, Csatho, B., Rood, D.H., and Finkel, R.C. 2011. The response of Jakobshavn Isbræ to Holocene climate change. *Geology* 39, 131-134.
12. **Axford, Y.**, Briner, J., Cooke, C.A., Francis, D.R., Michelutti, N., Miller, G.H., Smol, J.P., *Thomas, E.K., *Wilson, C.R., and Wolfe, A.P. 2009. Recent changes in a remote Arctic lake are unique within the past 200,000 years. *Proceedings of the National Academy of Sciences* 106, 18443-18446.
11. Kaufman, D.S., Schneider, D.P., McKay, N.P., Ammann, C.M., Bradley, R.S., Briffa K.R., Miller, G.H., Otto-Bliesner, B.L., Overpeck, J.T., Vinther, B.M., Arctic Lakes 2k Project Members (Abbott, M., **Axford, Y.**, Bird, B., Birks, H.J.B., Bjune, A.E., Briner, J., Cook, T., Chipman, M., Francus, P., Gajewski, K., Geirsdóttir, Á., Hu, F.S., Kutchko, B., Lamoureux, S., Loso, M., MacDonald, G., Peros, M., Porinchu, D., Schiff, C., Seppä, H., *Thomas, E.). 2009. Recent warming reverses long-term Arctic cooling. *Science* 325, 1236-1239.
10. Geirsdóttir, Á., Miller, G.H., **Axford, Y.**, and *Ólafsdóttir, S. 2009. Holocene and late Pleistocene climate and glacier fluctuations in Iceland. *Quaternary Science Reviews* 28, 2107-2118.
9. **Axford, Y.**, Briner, J.P., Miller, G.H., and Francis, D.R. 2009. Paleoecological evidence for abrupt cold reversals during peak Holocene warmth on Baffin Island, Arctic Canada. *Quaternary Research* 71, 142-149.
8. **Axford, Y.**, Geirsdóttir, Á., Miller, G.H., and Langdon, P.G. 2009. Climate of the Little Ice Age and the last 2000 years in northeast Iceland inferred from chironomids and other lake sediment proxies. *Journal of Paleolimnology* 41, 7-24.
7. *Thomas, E.K., **Axford, Y.**, and Briner, J.P. 2008. Rapid 20th-century environmental change on northeastern Baffin Island, Arctic Canada inferred from a multi-proxy lacustrine record. *Journal of Paleolimnology* 40, 507-517.

6. Wooller, M.W., Wang, Y., and **Axford, Y.** 2008. A multiple stable isotope record of Late Quaternary limnological changes and chironomid paleoecology from northeastern Iceland. *Journal of Paleolimnology* 40, 63-77.
5. **Axford, Y.**, Miller, G.H., Geirsdóttir, Á., and Langdon, P.G. 2007. Holocene temperature history of northern Iceland inferred from subfossil midges. *Quaternary Science Reviews* 26, 3344-3358.
4. Briner, J.P., **Axford, Y.**, Forman, S.L., Miller, G.H., and Wolfe, A.P. 2007. Multiple generations of interglacial lake sediment preserved beneath the Laurentide Ice Sheet. *Geology* 35, 887-890.
3. Briner, J.P., Michelutti, N., Francis, D.R., Miller, G.H., **Axford, Y.**, Wooller, M.J., and Wolfe, A.P. 2006. A multi-proxy lacustrine record of Holocene climate change on northeastern Baffin Island, Arctic Canada. *Quaternary Research* 65, 431-442.
2. Reheis, M., Reynolds, R., Goldstein, H., Roberts, H., Yount, J., **Axford, Y.**, Cummings, L.S., and Shearin, N. 2005. Late Quaternary eolian and alluvial response to paleoclimate, Canyonlands, southeast Utah. *Geological Society of America Bulletin* 7, 1051-1069.
1. **Axford, Y.**, and Kaufman, D.S. 2004. Late glacial and Holocene glacier and vegetation fluctuations at Little Swift Lake, southwestern Alaska, USA. *Arctic, Antarctic and Alpine Research* 36, 139-146.

White Papers

- Briner, J.P., and 18 others. 2017. *How Stable is the Greenland Ice Sheet?* White paper. Outcome of a workshop supported by the NSF Office of Polar Programs.
- Mix, A.C., and 36 others. 2012. *Interdisciplinary Approaches to Understanding Atmosphere/Ocean/Ice-Shelf/Ice-Sheet Interactions.* White paper. Outcome of a workshop supported by the NSF Arctic System Sciences program.
- Reynolds, R.L., Sweetkind, D.S., and **Axford, Y.** 2001. An inexpensive magnetic mineral separator for fine-grained sediment. *USGS Open-File Report 01-281*. Denver: U.S. Geological Survey. 7 pp.

CONFERENCE ABSTRACTS, PAST FIVE YEARS

* Starred names are student or postdoc authors (Axford's trainees).

** Double stars indicate undergraduates.

Axford indicates senior author role.

2020

- **Brooks, J., *Larocca, L., and **Axford, Y.** 2020. Little Ice Age climate in South Greenland inferred from alpine glacier reconstructions. Submitted to AGU Fall Meeting (virtual).
- *Larocca, L., and **Axford, Y.** 2020. A pan-Arctic review of lake-based Holocene glacier and ice cap records. Submitted to AGU Fall Meeting (virtual).
- *Puleo, P., **Axford, Y.**, Schellinger, G., Masterson, A., and Coston, T. 2020. Younger Dryas Climate in South Greenland Inferred from Chironomid and Moss Chemistry at Lake N14. Submitted to AGU Fall Meeting (virtual).

2019

- Axford, Y.**, *Chipman, M.L., *Larocca, L., *Lasher, G.E., *McFarlin, J.M., and Osburn, M.R. 2019. Diverse terrestrial evidence for Holocene temperature trends over Greenland: a view from beyond the ice sheet. AGU Fall Meeting (San Francisco, CA).
- *Chipman, M.L., Schellinger, G.C., *McFarlin, J.M., Medeiros, A., and **Axford, Y.** 2019. Magnitude and seasonality of climate change in South Greenland over the past 12,000 years from midge assemblages and oxygen isotopes of chitin. AGU Fall Meeting (San Francisco, CA).
- *Larocca, L., **Axford, Y.**, *Lasher, G.E., Bjørk, A.A., and **Brooks, J. 2019. Holocene climate and local glacier fluctuations in South Greenland inferred from three glacial lake sediment records. AGU Fall Meeting (San Francisco, CA).
- *McFarlin, J.M., **Axford, Y.**, Osburn, M.R., Masterson, M.L., and *Lasher, G.E. 2019. Greenland Ice Sheet mass loss during the Last Interglacial and middle Holocene despite paleolimnological evidence for increased atmospheric moisture. AGU Fall Meeting (San Francisco, CA).
- McKay, N. and the Temperature 12k Group. 2019. A new global multiproxy Holocene temperature database: a resource for model comparison and evaluation. AGU Fall Meeting (San Francisco, CA).
- Medeiros, A.S., Francis, D.R., *Chipman, M.L., and **Axford, Y.** 2019. Inferring Holocene climate change in northern North America using an improved paleo-climate model based on chironomid (Diptera: Chironomidae) assemblages identified with increased taxonomic resolution. AGU Fall Meeting (San Francisco, CA).
- **Puleo, P., **Axford, Y.**, Curry, B., and Barklage, M. 2019. Hydrologic and climatic change of the past 14,500 yrs at Geneva Lake, Wisconsin, inferred from ostracode and bulk sediment geochemistry. AGU Fall Meeting (San Francisco, CA).
- Axford, Y.** 2019. Greenland in the Last Interglacial: how warm and how much ice? Workshop on *Warm extremes – Marine isotope stage 5e and its relevance to the future*, IGBP-PAGES working group on Quaternary interglacials (QUIGS). British Antarctic Survey, Cambridge, UK.
- *Larocca, L., **Axford, Y.**, Bjørk, A.A. 2019. An aerial view of ~100 years of glacier and ice cap change in South Greenland. American Association of Geographers (Washington, DC).
- Engels, S., Medeiros, A.S., **Axford, Y.**, Brooks, S.J., Heiri, O., Nazarova, L., Luoto, T.P., Porinchu, D.F., Quinlan, R., and Self, A.E. 2019. Spatiotemporal trends in subfossil chironomid diversity: potential and problems. International Quaternary Association (INQUA) Congress (Dublin, Ireland).
- Barklage, M., **Puleo, P., Curry, B., and **Axford, Y.** 2019. Application of sub-bottom profiling to image the structure and stratigraphy of glacial sediments in Geneva Lake, WI. Symposium on the Application of Geophysics to Engineering and Environmental Problems (Portland, OR).

2018

- *Chipman, M.L., Schellinger, G., *McFarlin, J., and **Axford, Y.** 2018. Timing of the Holocene Thermal Maximum in South Greenland inferred from insect (Diptera: Chironomidae) assemblages and oxygen isotopes. AGU Fall Meeting (Washington, DC).
- *Lasher, G.E., and **Axford, Y.** 2018. Medieval climate in the context of the past 3000 years at the Norse Eastern Settlement in South Greenland. AGU Fall Meeting (Washington, DC).
- *McFarlin, J.M., Osburn, M.R., **Axford, Y.**, and Masterson, A. 2018. A calibration of hydrogen isotope ratios of sedimentary plant waxes as a proxy for meteoric water in the Arctic. AGU Fall Meeting (Washington, DC).
- *Chipman, M.L., *Lasher, G.E., Medeiros, A., and **Axford, Y.** 2018. 6500 years of climate change in South Greenland inferred from insect (Diptera: Chironomidae) assemblages. GSA Annual Meeting (Indianapolis, Indiana).

*McFarlin, J.M., **Axford, Y.**, Osburn, M.R., *Lasher, G.E., Kelly, M.A., Osterberg, E.C., and *Farnsworth, L.B. 2018. Reconstructions of Northwest Greenland temperature and hydrology during past interglacials. PALSEA/QUIGS Annual Meeting (Galloway, New Jersey).

Axford, Y., *McFarlin, J.M., *Lasher, G.E., Osburn, M.R. 2018. How much do we know about climate over Greenland during past warm periods? PALSEA/QUIGS Annual Meeting (Galloway, New Jersey).

*McFarlin, J.M., **Axford, Y.**, Masterson, A., Osburn, M.R. 2018. Hydrogen isotope ratios of sedimentary plant lipids as a proxy for meteoric water in the Arctic. Gordon Research Seminar on Organic Geochemistry (Holderness, New Hampshire).

Medeiros, A.S., Francis, D.R., *Chipman, M.L., Walker, I., and **Axford, Y.** 2018. Inferring Holocene climate change in Greenland: Potential for improvements using modern chironomid (Diptera: Chironomidae) assemblages identified with increased taxonomic resolution. International Paleolimnology Association Meeting (Stockholm, Sweden).

2017

Berman, K., **Axford, Y., and *Lasher, G.E. 2017. Evidence for isostatic emergence and Holocene environmental change recorded in chironomid assemblages and sediment composition of coastal lake T1 in SW Greenland. AGU Fall Meeting (New Orleans, Louisiana).

Dion-Kirschner, H., *McFarlin, J., **Axford, Y., and Osburn, M. 2017. Constraining lipid biomarker paleoclimate proxies in a small arctic watershed. AGU Fall Meeting (New Orleans, Louisiana).

*Larocca, L., **Axford, Y.**, *Lasher, E., and **Lee, C. 2017. Southwest Greenland's alpine glacier history: recent glacier change in the context of the Holocene geologic record. AGU Fall Meeting (New Orleans, Louisiana).

*Lasher, G.E., **Axford, Y.**, Blair, N. 2017. Oxygen isotopes archived in subfossil chironomids: Advancing a promising proxy for lake water isotopes. AGU Fall Meeting (New Orleans, Louisiana).

*Sinclair, G., Carlson, A.E., Rood, D.H., and **Axford, Y.** 2017. Late Holocene spatio-temporal variability of the south Greenland Ice Sheet and adjacent mountain glaciers. AGU Fall Meeting (New Orleans, Louisiana).

*McFarlin, J.M., Osburn, M., **Axford, Y.**, and *Lasher, G.E. 2017. Sedimentary lipids as a paleoclimate proxy in Greenland. Midwest Geobiology Symposium (Indianapolis, Indiana).

Osburn, M., *McFarlin, J., *Lasher, G., and **Axford, Y.** 2017. Multiproxy reconstruction of hydroclimate from two interglacial periods in northwest Greenland. 28th International Meeting on Organic Geochemistry (Florence, Italy).

Axford, Y., Osburn, M.A., *McFarlin, J., *Lasher, G.E., *Larocca, L., *Chipman, M., Kelly, M.A., and Osterberg, E.O. 2017. *Invited*. Past climates along the Greenland Ice Sheet margin: Essential inputs for assessing ice sheet stability. NSF Workshop: How Stable is the Greenland Ice Sheet? (Buffalo, New York).

Kelly, M.A., Lowell, T.V., Hall, B.L., **Axford, Y.** and Levy, L.B. 2017. A case for understanding Greenland Ice Sheet stability. NSF Workshop: How Stable is the Greenland Ice Sheet? (Buffalo, New York).

Engels, S., **Axford, Y.**, Brooks, S.J., Heiri, O., Luoto, T.P., Medeiros, A.S., Porinchu, D.F., and Quinlan, R. 2017. Chironomids as proxy-indicators of spatiotemporal changes in biodiversity. PAGES Open Science Meeting (Zaragoza, Spain).

2016

- Axford, Y.**, **Isaacson, M., *Matthews-Bird, F., Schellinger, G.C., Carrio, C., Kelly, M.A., Lowell, T.V., *Beal, S.A., *Stroup, J.S., and Tapia, P.M. 2016. Holocene climate, fire and vegetation change inferred from lacustrine proxies in the tropical Andes, Laguna Yanacocha, SE Peru. AGU Fall Meeting (San Francisco, California).
- *Lasher, G.E., **Axford, Y.**, *McFarlin, J., Kelly, M.A., Osterberg, E.C., Berkelhammer, M., **Berman, K., **Kotecki, P., and **Gawin, B. 2016. Holocene climate reconstructions from lake water oxygen isotopes in NW and SW Greenland. AGU Fall Meeting (San Francisco, California).
- *McFarlin, J.M., **Axford, Y.**, Osburn, M.R., *Lasher, G.E., Kelly, M.A., Osterberg, E.C., Francis, D.R., and *Farnsworth, L.B. 2016. Eemian and Holocene interglacial climate in northwest Greenland inferred from insect assemblages, lipid $\delta^2\text{H}$, and chitin $\delta^{18}\text{O}$ preserved in lake sediments. AGU Fall Meeting (San Francisco, California).
- *Lasher, G.E., **Axford, Y.**, *McFarlin, J., Kelly, M.A., Osterberg, E.C., and Berkelhammer, M. 2016. Holocene climate in northwest Greenland recorded in oxygen isotopes of lacustrine organic materials. Workshop on Stable Isotopes in Fossils and Organic Compounds from Lake Sediment Records (Southampton, UK).
- *Lasher, G.E., **Axford, Y.**, *McFarlin, J., Kelly, M.A., Osterberg, E.C., and *Farnsworth, L. 2016. Oxygen isotopes of preserved aquatic organic material record past lakewater and climate change in NW Greenland. 26th International Arctic Workshop (Boulder, Colorado).
- *Farnsworth, L., Kelly, M., **Axford, Y.**, *Bromley, G., Osterberg, E., Howley, J., Zimmerman, S., *Jackson, M., *Lasher, G.E., and *McFarlin, J. 2016. Late glacial and Holocene history of the Greenland Ice Sheet margin, Nunatarssuaq, Northwestern Greenland. GSA Northeastern Section Annual Meeting (Albany, New York).

2015

- Axford, Y.**, *Lasher, G.E., *McFarlin, J., Francis, D.R., Kelly, M.A., Langdon, P.G., *Levy, L.B., Osburn, M., and Osterberg, E.C. 2015. *Invited*. Holocene temperature shifts around Greenland: Paleolimnological approaches to quantifying past warmth and documenting its consequences. AGU Fall Meeting (San Francisco, California).
- *Lasher, G.E., **Axford, Y.**, *McFarlin, J., Kelly, M.A., Osterberg, E.C., *Farnsworth, L., and **Kotecki, P. 2015. Holocene climate in NW Greenland inferred from oxygen isotopes of preserved aquatic organic material. AGU Fall Meeting (San Francisco, California).
- *McFarlin, J., **Axford, Y.**, Osburn, M.R., *Lasher, G.E., Francis, D.R., Kelly, M.A., and Osterberg, E.C. 2015. Lacustrine records of continental climate in northwest Greenland through the Holocene and Last Interglacial. AGU Fall Meeting (San Francisco, California).
- Geirsdottir, A., **Axford, Y.**, *Florian, C., *Crump, S., Miller, G., *Olafsdottir, S., *Larsen, D., Thordarson, T. 2015. Holocene climate and catchment-specific responses to climate change, recorded in a transect of Icelandic lakes. AGU Fall Meeting (San Francisco, California).
- *Farnsworth, L., Kelly, M., **Axford, Y.**, *Bromley, G., Osterberg, E., Howley, J., Zimmerman, S., *Jackson, M., *Lasher, G.E., and *McFarlin, J. 2015. Late glacial and Holocene history of the Greenland Ice Sheet margin, Nunatarssuaq, Northwestern Greenland. AGU Fall Meeting (San Francisco, California).
- Briner, J.P., McKay, N., **Axford, Y.**, Bennike, O., Bradley, R.S., de Vernal, A., Fisher, D.A., Francus, P., Frechette, B., Gajewski, K.J., Jennings, A.E., Kaufman, D.S., Miller, G.H., Rouston, C., and Wagner, B. 2015. Holocene climate change in arctic Canada and Greenland. AGU Fall Meeting (San Francisco, California).

- Kelly, M.A., Osterberg, E.C., **Axford, Y.**, *Farnsworth, L., Howley, J.A., *Lasher, E.G., and Zimmerman, S. 2015. Holocene fluctuations of North Ice Cap, a proxy for climate conditions along the northwestern margin of the Greenland Ice Sheet. AGU Fall Meeting (San Francisco, California).
- *Farnsworth, L., Kelly, M., **Axford, Y.**, *Bromley, G., Osterberg, E., Howley, J., Zimmerman, S., *Jackson, M., *Lasher, G.E., and *McFarlin, J. 2015. Late glacial and Holocene history of the Greenland Ice Sheet margin, Nunatarssuaq, Northwestern Greenland. GSA Annual Meeting (Baltimore, Maryland).
- *Lasher, G.E., **Axford, Y.**, *McFarlin, J., Blair, N.E., Kelly, M.A., Osterberg, E.C., **Kotecki, P., and *Farnsworth, L. 2015. Northwest Greenland Holocene temperatures inferred from organic archives of lakewater oxygen isotopes. GSA North-Central Section Annual Meeting (Madison, Wisconsin).
- *McFarlin, J., **Axford, Y.**, Osburn, M.R., Kelly, M.A., Osterberg, E.C., *Lasher, G.E., *Farnsworth, L., and Francis, D.R. 2015. Holocene and Last Interglacial continental climate inferred from insects and n-alkanes in lake sediments from northwest Greenland. GSA North-Central Section Annual Meeting (Madison, Wisconsin).
- *Florian, C., Geirsdottir, A., Miller, G., and **Axford, Y.** 2015. A high-resolution multi-proxy lake sediment record from Torfdalsvatn suggests an enhanced temperature gradient between north and south Iceland during the early Holocene. EGU General Assembly (Vienna, Austria).
- Osterberg, E., Hawley, R., Kelly, M., **Axford, Y.**, Ferris, D., *Wong, G., and Howley, J. 2015. Recent climate and cryospheric change in northwest Greenland. GSA Northeastern Section Annual Meeting (Bretton Woods, New Hampshire).
- *Farnsworth, L., Kelly, M., **Axford, Y.**, *Bromley, G., *Jackson, M., Doughty, A., *Lasher, G. E., *McFarlin, J., and Osterberg, E. 2015. Holocene history of the Greenland Ice Sheet margin in Nunatarssuaq, northwest Greenland. GSA Northeastern Section Annual Meeting (Bretton Woods, New Hampshire).

SELECTED SEMINAR TALKS & PUBLIC LECTURES, PAST FIVE YEARS

- 07/2019 Invited talk, *Greenland during the Last Interglacial*. IGBP-PAGES-supported workshop on Warm Extremes – Marine Isotope Stage 5e and its Relevance to the Future, British Antarctic Survey, Cambridge UK
- 05/2019 *Arctic climate change*. Lecture for Alumnae “New Frontiers in Science” course, Northwestern University
- 04/2019 *Two must-do’s for effective science communication, from proposals to the local pub*. Northwestern Graduate Student Association and Science Policy Outreach Task Force
- 02/2019 *The bears are not the scary part: Reflecting on two decades of Arctic climate research*. Women in Science and Engineering Research, Northwestern University
- 02/2019 Research seminar, Dept. of Earth and Environmental Sciences, University of Illinois - Chicago
- 01/2019 *Keynote talk on mentorship and finding mentors*. Chicago Women in STEM Initiative
- 11/2018 Geology & Geophysics Seminar, Oregon State University
- 06/2018 Lead organizer and keynote presenter: *Integrating Climate Science into Your STEM Courses*. Two-day professional development workshop on teaching climate science for Chicago-area high school teachers, supported by NSF Division of Polar Programs and Northwestern Office of Community Education Partnerships. <http://bit.ly/NWUclimate>

- 02/2018 Collaborator on developing college curriculum: *Climate Change Curriculum for the Environmental Technology Program of Nunavut Arctic College*. Supported by Indigenous and Northern Affairs Canada. Iqaluit, Nunavut, Canada
- 10/2017 Interview and discussion, *Coffee & conversations with Dr. Yarrow Axford: Women in STEM*. Women's Health Research Institute, Northwestern University
- 04/2017 Public lecture, *Arctic meltdown? Perspectives from a polar geologist*. Chicago Taste of Science, Chicago
- 02/2017 Panel member, *Does truth stand a chance?* Science and Human Culture Program, Northwestern University
- 02/2017 Public lecture and community discussion, *Weather and climate change*. Northwestern Libraries and One Book One Northwestern.
- 03/2016 Panel member, *Impactful communication with the public*. 2016 Career Development and Leadership Retreat, Chicago Collaboration for Women in STEM
- 11/2015 Five-College Geology Speaker, Mount Holyoke College
- 10/2015 Smith Lecture, Dept. of Earth & Environmental Sciences, University of Michigan
- 10/2015 Panel member, *Understanding and recognizing broader impacts work at multiple levels*. Workshop on Building an Institutional Framework for Faculty Success, hosted by Iowa State University and National Alliance for Broader Impacts
- 09/2015 Research seminar, Dept. of Earth & Planetary Sciences, Harvard University
- 04/2015 Polar Studies Lecture, Center for Polar Studies, Augustana College

SELECTED MEDIA APPEARANCES & OP EDS

- 06/2019 Featured scientist, NPR's *Wow in the World*
- 04/2019 Scientist of the Month, Association for Women in Science – Chicago, <http://www.awis-chicago.org/community/scientist-of-the-month/april-sotm-dr-yarrow-axford>
- 02/2019 *Vikings may have settled in a surprisingly warmer Greenland*. Earth.com coverage of research paper, K. Vandette, Feb 8 2019. <https://www.earth.com/news/vikings-settled-warmer-greenland/>
- 02/2019 *Solving the climate mystery of the Vikings*. CNN coverage of research paper, A. Strickland, CNN, Feb 6 2019. <https://www.cnn.com/2019/02/06/world/viking-greenland-climate-study/index.html>
- 01/2019 Live television interview, *These scientists study the Arctic. What's their take on 'Chiberia'?* WTTW, Chicago Tonight, <https://news.wttw.com/2019/01/31/these-scientists-study-arctic-what-s-their-take-chiberia>
- 01/2019 *Arctic, Antarctic vets offer warm advice for surviving the polar vortex*. R. McCoppin, Chicago Tribune, Jan 30 2019.
- 07/2017 Live television interview, *Giant iceberg the size of Delaware breaks off Antarctica*. WTTW, Chicago Tonight, <https://news.wttw.com/2017/07/13/giant-iceberg-size-delaware-breaks-antarctica>
- 07/2017 Live radio interview, *Ice breaks off Antarctic shelf*. WGN Radio, The John Williams Show, <https://wgnradio.com/2017/07/12/northwestern-university-professor-yarrow-axford-two-mile-thick-ice-breaks-off-antarctica-shelf/>

- 04/2017 Podcast, *Life in the Headlines: Interviews with climate scientists*. Urban Plains podcast, Drake University, <https://urban-plains.com/art/life-headlines-yarrow-axford-melissa-berke/>
- 10/2016 Op Ed: Thanks to the glass ceiling breakers. *Science*, print issue, September 2, 2016, <http://science.sciencemag.org/content/353/6303/1062>
- 01/2014 Op Ed: No, global warming isn't suddenly a myth because it's really cold out. *U.S. News and World Report*, online, January 25, 2014, <https://www.usnews.com/opinion/articles/2014/01/25/no-global-warming-isnt-suddenly-a-myth-because-its-really-cold-out>

SELECTED FIELD EXPEDITIONS

- 2019 South Greenland (Narsarsuaq region). The Axford research group cored low-elevation island and high-elevation nunatak lakes to reconstruct Holocene climate
- 2018 South Greenland (Narsarsuaq and Kangerlussuaq regions). The Axford research group conducted an expedition to remote glacier-fed alpine lakes in southernmost Greenland and recent wildfire sites in southwest Greenland.
- 2016 South Greenland (Narsarsuaq region). The Axford research group conducted an expedition to remote sites to core lakes and to map and date Holocene glacier deposits.
- 2015 Southwest Greenland (Nuuk region). Leader of expedition to collect sediment cores from coastal lakes. Accompanied by two graduate students and one postdoc.
- 2014 Northwest Greenland (Thule region). Leader of expedition to collect sediment cores from remote lakes near the Greenland Ice Sheet margin. Accompanied by four graduate students, one postdoc, and a bear guard.
- 2011 East Greenland (Scoresby Sund region). Lake sediment coring and glacial geologic mapping near Renland Ice Cap.
- 2010 Aleutian Islands (North Pacific). Summer lake sediment coring on Adak Island, central Aleutians, North Pacific.
- 2009 West Greenland (Ilulissat region). Lake coring near Jakobshavn Isbrae.
- 2007 Iceland. Co-led summer trip to obtain surface gravity cores from North Iceland lakes.
- 2005 Canadian Arctic. Ice-based lake sediment coring in winter conditions on northeast Baffin Island.
- 2005 Iceland. Leader of expedition to collect surface sediment cores characterizing environmental changes of the past 2000 years.
- 2004 Iceland. Leader of spring expedition to collect lake sediment cores from lake ice.
- 2003 Iceland. Leader of summer expedition to collect a broad transect of water and surface sediment samples from the central highlands to the north and south coasts.
- 2001 Mojave Desert. Assisted with collecting soil and eolian sediments to study the role of regional dust transport in desert soil formation.
- 2000 Colorado Plateau. Assisted with mapping alluvial deposits near Canyonlands National Park for Holocene hydroclimate reconstruction.
- 1999 Alaska. Assisted with coring glacier-fed lakes in the central Ahklun Mountains.
- 1998 Alaska. Cored lakes and co-led glacial geologic mapping in the northern Ahklun Mountains.

RESEARCH SUPPORT

Current

Funded by: National Science Foundation, Division of Polar Programs

Title: *CAREER: South Greenland's Holocene climate history reconstructed using three paleolimnological approaches*

Dates: 8/15-7/21

Funded by: National Science Foundation, Geography and Regional Sciences

Title: *Doctoral Dissertation Research: A geospatial analysis of alpine glacial variability.* With Ph.D. student Laura Larocca

Dates: 3/18-9/21

Past

Funded by: National Geographic Society, Changing Polar Systems RFP

Title: *Fire history of SW Greenland: Characterizing long term climate-fire relationships using lake sediments.* Co-PI with PI Dr. Melissa Chipman (formerly NU postdoctoral scholar)

Dates: 2018-2020

Funded by: National Science Foundation, Geography and Regional Sciences

Title: *Doctoral Dissertation Research: An evaluation of sedimentary lipid hydrogen isotopes as an Arctic precipitation proxy in west Greenland.* With Ph.D. student Jamie McFarlin and co-PI Magdalena Osburn, Northwestern University

Dates: 2016-2017

Funded by: National Geographic Society, Explorers Grants Program

Title: *Glacier loss and climate change in southwest Greenland: Long-term perspectives from lake sediments*

Dates: 2015-2016

Funded by: Institute for Sustainability and Energy at Northwestern

Title: Early Career Investigator Award: *Rare records of Last Interglacial arctic warmth from NW Greenland lakes*

Dates: 2014-2015

Funded by: National Science Foundation, Arctic Natural Sciences

Title: *Collaborative Research: Response of the NW Greenland cryosphere to Holocene climate change.* Co-PI, with Erich Osterberg (lead PI) and Meredith Kelly, Dartmouth College; Sean Birkel, University of Maine

Dates: 2012-2014

Funded by: National Science Foundation, Paleoclimate Perspectives on Climate Change

Title: *Collaborative Research: Testing mechanisms for Holocene climate change in the southern tropical and mid-latitude Andes.* Co-PI, with Meredith Kelly (lead PI), Dartmouth College; Ray Pierrehumbert, University of Chicago; Thomas Lowell, University of Cincinnati

Dates: 2010-2014

Funded by: National Science Foundation, Paleoclimate Perspectives on Climate Change

Title: *Collaborative Research: Coupled glacial and lacustrine evidence for decadal- to millennial-scale variability in the climatologic Aleutian low, southern Alaska.* Co-PI, with Darrell Kaufman (lead PI), Northern Arizona University

Dates: 2008-2013

Funded by: Institute for Sustainability and Energy at Northwestern (ISEN)

Title: Faculty Booster Award: *Assessing the Greenland Ice Sheet's response to warming: A geologic approach*

Dates: 2010-2013

Funded by: National Science Foundation, Arctic System Science (ARCSS)

Title: *Collaborative Research: Nonlinearities in the Arctic climate system during the Holocene*. Co-PI, with Gifford Miller (PI) and Scott Lehman, University of Colorado; lead PI Darrell Kaufman, Northern Arizona University, and others

Dates: 2010-2012

Funded by: National Science Foundation, Geography and Regional Science

Title: *The sensitivity of the Greenland Ice Sheet to climate change: Reconstructing the response of Jakobshavn Isbrae during the Little Ice Age and Holocene Thermal Maximum*. Co-PI, with Jason Briner (PI) and Bea Csatho, University at Buffalo

Dates: 2008-2010

SCIENCE POLICY AND COMMUNICATION TRAINING

08/2017 Participant, Polar Science Communication Workshop (hosted by the Alda Center for Science communication and US APECS), Boulder CO

09/2013-06/2014 Public Voices Fellow, OpEd Project, Northwestern University

06/2007 Fellow, Summer Policy Colloquium, American Meteorological Society, Washington DC

05/2004 Participant, Santa Fe Science-Writing Workshop, Ghost Ranch Santa Fe, Santa Fe NM

UNIVERSITY TEACHING

Courses address Earth's climate system and climate history, Earth surface processes, the physical science of human impacts on the environment, and science communication. Registrants range from freshmen to Ph.D. students, representing many disciplines within the College of Arts and Sciences, McCormick School of Engineering, Medill School of Journalism, Kellogg School of Management and the Northwestern Law School.

Courses Taught

Energy and Climate Change (EARTH 342/ISEN 410)

Fall 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2018, 2019, 2020.

Interdisciplinary lecture- and discussion-based class for graduate students and senior undergraduates in all fields. Students represent multiple schools including WCAS, McCormick, Kellogg, and Medill. Core course within the ISEN graduate curriculum and the M.S. in Mechanical Engineering with Specialization in Sustainability/Energy; optional course for the ISEN Undergraduate Certificate.

Quaternary Climate Change – Ice Ages to the Age of Oil (EARTH 341)

Spring 2014, Winter 2016, Spring 2017.

Course covers methods for reconstructing and dating past environmental change, causes of natural climate change, major climatic events of the Cenozoic up to present-day, and their relevance for

understanding current climate change. Lecture and discussion. Homework assignments focus on quantitative aspects of radiometric dating and on interpretation of surficial geologic maps.

Communicating Science Beyond Academia (EARTH 450/ISEN 495)

Spring 2017, Winter 2019.

Open to graduate students in all STEM disciplines, this course explores strategies for successful scientific communication beyond academia. How can we break through barriers to understanding and foster engagement with scientific information, while still conveying nuance and uncertainty? What happens when science becomes politicized and controversial? Among other hands-on exercises, students complete peer-reviewed writing assignments which they may choose to publish for public audiences.

Arctic Environments – Past, Present, Future (EARTH 450, Graduate Seminar)

Winter 2014.

Graduate-level seminar focused on reading and discussing primary research literature and major review papers and reports. Students lead discussions on readings pertaining to arctic paleoenvironments and paleoclimate, dynamics of present-day arctic environments, and perspectives on the Arctic's future.

Paleoclimate Perspectives on Future Climate Change (EARTH 451, Graduate Seminar)

Winter 2015, Spring 2019.

What does Earth's eventful climate history tell us about our future? Emphasis on understanding methods used to reconstruct Cenozoic climates, and on exploring the causes and consequences of climate shifts from the PETM to the late Holocene. Graduate-level discussions of primary literature.

Earth: A Habitable Planet (ENVR SCI 201/CIV ENV 201)

Spring 2012.

Introduction to Earth system science and the physical science of diverse environmental problems. Required for Environmental Science and Environmental Engineering majors. Lecture format. Enrolled 68 undergraduates.

Global Warming: The Scientific Evidence (EARTH 102, Freshman Seminar)

Spring 2010, Spring 2011.

Freshman seminar addressing the science behind debates over climate change. Student-centered, discussion-based format, emphasizing the improvement of student writing and critical thinking skills, and critique of science-based arguments. Fulfills Northwestern's first-year writing requirement.