

Jeremy D. Shakun

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Appointments

2013-Present Assistant Professor, Boston College, Earth & Environmental Sciences
Winter 2013 Visiting Instructor, Middlebury College, Geology
Fall 2012 Lecturer, Northeastern University, Earth and Environmental Sciences
2010-2013 Postdoctoral Fellow at Boston University, Woods Hole Oceanographic Institution, Harvard University, Lamont Doherty Earth Observatory
Fall 2009 Lecturer, Oregon State University, Geosciences
2006-2010 Research Assistant, Oregon State University, Geosciences
2005-2006 Teaching Assistant, Oregon State University, Geosciences
2003-2005 Research and Teaching Assistant, University of Massachusetts, Geosciences
Summer 2002 Field mapping, USGS EDMAP Program, Uinta Mountains, Utah

Education

2012 NOAA Climate and Global Change Postdoctoral Fellow
"Ice sheet sensitivity to radiative forcing: Testing multiple hypotheses for the 41-kyr world", advisor: Maureen E. Raymo
2010 **Ph.D.**, Geology, Oregon State University, Corvallis, OR
Graduate minor degrees: Oceanography, advisor: Alan C. Mix; Atmospheric Science, advisor: Jeffrey Shaman
Dissertation: "Analyzing large paleoclimate datasets: Implications for past and future climate change", advisor: Peter U. Clark
2006 **M.S.**, Geology, University of Massachusetts, Amherst, MA
Thesis: "A high-resolution speleothem record of Indian Ocean climate over the last glacial termination", advisor: Stephen J. Burns
2003 **B.A.**, Geology, Summa Cum Laude, Middlebury College, Middlebury, VT
Thesis: "Last Glacial Maximum equilibrium-line altitudes and paleoclimate, northeastern Utah", advisor: Jeffrey S. Munroe

Philosophy

I use the geologic record to understand the behavior of the climate system on decadal to million-year time scales. Given the complexity and interdisciplinary nature of global change science, my research takes a broad and highly collaborative approach. I generate new reconstructions of climate change from glacier, cave, and marine deposits using various geochemical techniques as well as mine existing data to address central questions in paleoclimatology. This work involves a balance between field, laboratory, and statistical components, and collaboration with various types of specialists. I am keenly interested in effectively communicating science to students and nonscientists. I believe this can best be accomplished by providing a holistic perspective that links the detailed techniques and problems in earth science to the big-picture issues surrounding global change.

Courses Taught

Climate Change and Society, Earth System Seminar, Climate Change Debates, Paleoclimate Dynamics, Environmental Systems: Climate Change, Dynamic Earth, Exploring the Earth, Sedimentology and Stratigraphy

Awards & Engagements

- 2017-2022 PALSEA (PALeo constraints on SEA level rise working group) co-leader
- 2018 Convener of EGU session: *Climate-carbon cycle interactions of the Pleistocene*
- 2018 Convener of EGU session: *Interglacial climate change: Patterns, processes, and impacts*
- 2017 Co-leader of NEIGC field trip: *Testing the cosmogenic nuclide dipstick model for deglaciation of Mount Washington*
- 2016 Convener of GSA Northeast meeting session: *Glacial Landscapes as Recorders of Geomorphic Process and Climate Change*
- 2015 Attended *On the cutting edge: Early Career Geoscience Faculty Workshop: Teaching, Research and Managing your Career*
- 2015 Professor of the Year, Awarded by students of the Department of Earth and Environmental Sciences at Boston College
- 2015 EGU Climate Division Outstanding Young Scientist Award
- 2015 Convener of GSA Northeast meeting session: *Climate Change in Space and Time: An Update*
- 2014 Led three-day workshop *Past as Prologue: Holocene Climate as Context for Future Climate Change* at Mt. Hood, OR
- 2014 Joined Global and Planetary Change editorial board
- 2013 Marcott et al. (2013, Science) listed on CNN's "Top science and space stories of 2013"
- 2013 Contributing Author to IPCC AR5 Paleoclimate chapter
- 2013 Attended *NSF Expert Witness Training Academy*, William Mitchell College of Law
- 2012 Award for highly cited paper in 2012 from Quaternary Science Reviews for Shakun and Carlson (2010)
- 2011 Attended *On the cutting edge: Preparing for an academic career in the geosciences* workshop
- 2010 Convener of AGU fall meeting session: *The Dynamics of Glacial Cycles*
- 2010 NOAA Climate and Global Change Postdoctoral Fellowship
- 2009 Lance Forsythe Memorial Fellowship for Renaissance thinking, Oregon State University
- 2008 Convener of AGU fall meeting session: *Perspectives on the Past and Future of Paleoceanography and Paleoclimatology*
- 2007 Attended UC-Irvine *Radiocarbon in ecology and earth system science* short course
- 2006 Convener of AGU fall meeting session: *The Driver of Quaternary Climate Change: Tropics Versus High Latitudes*
- 2005 Taubeneck Fellowship, Oregon State University
- 2003 Baldwin/Coney Scholarship, Middlebury College
- 2003 Phi Beta Kappa
- 2003 Charles Doll Award, Vermont Geological Society
- 1999 Salutatorian, Seton Catholic Central H.S., Binghamton, NY

Peer Review

Nature, Science, Nature Geoscience, Quaternary Science Reviews, Geophysical Research Letters, Journal of Climate, GSA Today, Earth and Planetary Science Letters, Physical Geography, NSF ANS, NSF P2C2, NSF P2C2 review panel

Public Outreach

- 2017- Climate Feedback reviewer – a worldwide network of scientists who collectively assess the credibility of influential climate change media coverage
- 2015- Public lectures at libraries, science museums, faith groups
- 2014- Climate Voices national speaker network
- 2012- Numerous interviews on climate change with e.g., New York Times, NPR, BBC, US News & World Report, Associated Press, Scientific American, New Scientist, Channel One Russia, Chicago Tribune, msnbc.com, Christian Science Monitor, Al Jazeera English, Nature, CBS Boston, KCBS San Francisco, Boston Globe, Washington Post, National Geographic
- 2014 Participant in 97 Hours of Consensus social media campaign on climate change
- 2014 Contributor to Climate Change National Forum blog on climate science
- 2013 Contributor to PBS Learning Media *Ancient Ice and Future Climate* web-based exercise for high school students
- 2010 Mission scientist on Science Channel's *Deadly Descent* in Puerto Rico in which a team of cavers collected stalagmites for paleoclimate reconstruction

Invited Talks

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- 2017 GSA annual meeting, Seattle, WA, *Pliocene Greenland Ice Sheet growth recorded by in situ ¹⁰Be decrease in multiple marine sediment cores*
 - 2017 Woods Hole Oceanographic Institution Marine Chemistry and Geochemistry Seminar: *Polar ice sheet variability over the last 8 Myr from cosmogenic nuclides in marine sediments*
 - 2016 Boston University Biogeosciences Seminar: *The long view on climate change, from the Ice Age to the Anthropocene*
 - 2016 AMQUA Biennial meeting, Santa Fe, NM: *From the Ice Age the Anthropocene: What the last 21,000 years tells us about 21st century climate change and beyond*
 - 2015 AGU fall meeting, San Francisco, CA: *An 800-kyr record of global surface ocean $\delta^{18}O$ and implications for ice volume-temperature coupling*
 - 2015 MIT Oceans/Climate Seminar, Cambridge, MA: *Eight million years of Greenland and Antarctic Ice Sheet dynamics from in situ cosmogenic nuclides in marine sediments*
 - 2015 University of Wisconsin-Madison, Department of Geology and Geophysics, Weeks Lecture: *An 800-kyr record of global surface ocean $\delta^{18}O$ and implications for ice volume-temperature coupling*
 - 2015 EGU annual meeting, Vienna, Austria: *An 800-kyr record of global surface ocean $\delta^{18}O$ and implications for ice volume-temperature coupling*
 - 2015 Golf Course Superintendents Association of Cape Cod: *Climate change: What we know, what we don't, and why we disagree*
 - 2014 Weston Observatory Colloquium Series, Weston, MA: *Climate change: What we know, what we don't, and why we disagree*
 - 2014 Mensa annual gathering, Boston, MA: *Past climate insights into our warmer future*
 - 2014 Dartmouth College, Earth Science Department, Hanover, NH: *What are the two pillars of paleoclimatology telling us about past (and future) climate change: Separating signal from noise in ocean and ice cores*
 - 2014 Royal Swedish Academy of Sciences, Stockholm, Sweden: *How unique is recent climate change in the context of the Holocene?*
 - 2013 MIT Chemical Oceanography and Geobiology Seminar, Cambridge, MA: *The oxygen isotopic composition of the global surface ocean during the past 800,000 years: Implications for climate and ice volume changes over glacial cycles*
 - 2013 Framingham State University Seminar, Framingham, MA: *From the Ice Age to the Anthropocene: What the last 21,000 years tells us about 21st century climate change*
 - 2013 Weston Observatory Colloquium Series, Weston, MA: *From the Ice Age to the Anthropocene: What the last 21,000 years tells us about 21st century climate change*

- 2013 International Conference on Paleoceanography, Barcelona, Spain: *Changes in global temperature over the past 21,000 years*
- 2013 ECORD Summer School, Bremen, Germany: *Deglacial climate change: from chronologies to causation*
- 2013 Northeast GSA, Bretton Woods, NH: *Near-synchronous global glacier retreat during the last deglaciation associated with increasing atmospheric CO₂*
- 2012 SynTraCE-21 workshop, Brown University, Providence, RI: *Near-synchronous global glacier retreat during the last deglaciation associated with increasing atmospheric CO₂*
- 2012 University of Minnesota, National Center for Earth-Surface Dynamics, Minneapolis, MN: *The last global warming: what the last 21,000 years tells us about 21st century climate change*
- 2012 Harvard University, Department of Earth and Planetary Sciences, ClimaTea: *CO₂ and the last global warming*
- 2011 IODP workshop on Greenland Ice Sheet history, Corvallis, OR: *Deciphering 6 Myr of Greenland Ice Sheet history using in situ ¹⁰Be from marine sediment cores*
- 2011 COST-INTIMATE workshop, Copenhagen, Denmark: *The Syntrace-21 data synthesis: Global and regional climate modes during the last deglaciation and their forcing mechanisms*
- 2011 University of Vermont, Geology Department, Burlington, VT: *A warm-up to global warming: What the last 21,000 years tells us about 21st century climate change*
- 2011 ACER-INTIMATE workshop, Bordeaux, France: *Global and regional climate modes during the last deglaciation: Separating signal from noise*
- 2011 INQUA Congress, Bern, Switzerland: *Global climate modes during the last deglaciation and implications for the mechanisms of deglacial climate change*
- 2011 Middlebury College, Geology Department, Middlebury, VT: *A warm-up to global warming: What the last 21,000 years tells us about 21st century climate change*
- 2010 AGU fall meeting, San Francisco, CA: *The proxy record of global surface temperature variations during the last deglaciation and implications for climate change mechanisms*
- 2010 Brown University, Department of Geological Sciences, Providence, RI: *The role of CO₂ during the last deglaciation*
- 2010 Woods Hole Oceanographic Institution, Paleolunch, Woods Hole, MA: *The role of CO₂ during the last deglaciation*
- 2010 SynTraCE-21 workshop, Mt. Hood, OR: *Surface climate evolution during the last deglaciation in proxy records and the SynTraCE-21 model simulation*
- 2009 Oregon State University, Global Environmental Change Organization, Corvallis, OR: *Ice age lessons for global warming*
- 2009 Hatfield Marine Science Center, Newport, OR: *Ice age lessons for global warming*

Grants

- 2016 NSF Geomorphology and Land Use Dynamics, \$70,095
Constraining the timing and rate of southeastern Laurentide Ice Sheet thinning during the last deglaciation with cosmogenic nuclide dipsticks
- 2016 NSF Past Perspectives on Climate Change, \$117,761
Speleothem records of permafrost thaw and paleoclimate in the North American Arctic
- 2015 NSF Instrumentation and Facilities, \$162,557
Early Career: Upgrade of isotope ratio mass spectrometer at Boston College
- 2014 Australian Research Council (\$0 to BC)
A 140,000 year insight into the imprint of climate and humans on Australia
- 2014 NSF Paleoclimate, \$49,993
Workshop – Past as Prologue: Holocene climate as context for future climate change
- 2014 Past Global Changes, \$10,000
Workshop – Past as Prologue: Holocene climate as context for future climate change
- 2010 NSF Arctic Sciences, \$324,613 (co-wrote proposal but was not eligible for PI status)

- 2007 *Deciphering 6 Myr of Greenland Ice Sheet history using in situ ¹⁰Be from marine sediment cores*
NSF Doctoral Dissertation Research Improvement Grant, \$12000
- 2007 *Developing a cosmogenic chronology of tropical glaciation in the Peruvian Andes*
PRIME LAB seed grant, Purdue University, \$7000
- 2007 *Developing a cosmogenic chronology of tropical glaciation in the Peruvian Andes*
National Geographic Society, \$5000
- 2007 *Developing a ¹⁴C chronology for the Laurentide Ice Sheet, Scarborough Bluffs, Toronto, Ontario*
American Alpine Club, \$750
- 2007 *Developing a cosmogenic chronology of tropical glaciation in the Peruvian Andes*

Theses Supervised

Masters

- Current Chris Halsted
Constraining Laurentide Ice Sheet thinning in New England with ¹⁰Be dipsticks
- Current Celeste Gambino
U-Pb dating of Arctic cave speleothems
- Current Cole Vickers
Current tropical glacier extent in the context of the Holocene
- 2016 Nicole Biller
Late Pleistocene permafrost thawing history of Alaska and the Yukon from cave speleothems
- 2016 Alexandria Koester
Rapid thinning of the Laurentide Ice Sheet in coastal Maine during late Heinrich Stadial 1

Undergraduate

- 2017 Peter Brennan
Late Pleistocene speleothem records of Canadian permafrost and climate
- 2016 Heather Roman-Stork
A late Holocene speleothem record of Caribbean climate from Puerto Rico
- 2016 Courtney Cameron
What controls views on climate change at Boston College?
- 2015 Kristy Barnes
A paleoclimate reconstruction using beetles at Arclid Quarry, Cheshire
- 2015 Andrew Jones
Testing the freshwater routing hypothesis for abrupt climate change with a Hudson River paleodischarge record
- 2015 Christine Pang
Global warming or global cooling? Reconstructing ocean heat content changes over the past 10,000 Years
- 2015 Caitlin Rixey
A statistical analysis of causes of temperature variability over glacial cycles

Publications

- Shakun, J. D.** 10,000 years of global warming or cooling? Nature News and Views, *invited*.
- Shakun, J. D.**, Corbett, L. B., Bierman, P. R., Underwood, K., Rizzo, D., Zimmerman, S. R., Caffee, M. W., and Naish, T. Minimal East Antarctic Ice Sheet retreat onto land during the past 8 Myr. Nature, *in review*.
- Marcott, S. A., Clark, P. U., **Shakun, J. D.**, Brook, E. J., Davis, P. T., and Caffee, M. W. New ¹⁰Be age constraints on latest Pleistocene and Holocene cirque glaciation in the western United States. Science Advances, *in review*.

- Bierman, P. R., Rood, D. H., **Shakun, J. D.**, Portenga, E., and Corbett, L. B. Directly dating post-glacial Greenlandic emergence at high resolution using *in situ* ^{10}Be . *Quaternary Research*, *in review*.
- Marcott, S. A. and **Shakun, J. D.** 2017. A record of ice sheet demise. *Science*, 358, 721-722.
- Hansen, J., Sato, M., Kharecha, P., von Schuckmann, K., Beerling, D. J., Cao, J., Marcott, S. A., Masson-Delmotte, V., Prather, M. J., Rohling, E. J., **Shakun, J. D.**, and Smith, P. 2017. Young people's burden: Requirement of negative CO_2 emissions. *Earth System Dynamics*, 8, 577-616.
- Shakun, J. D.** 2017. Modest global-scale cooling despite extensive early Pleistocene ice sheets. *Quaternary Science Reviews*, 165, 25-30.
- Koester, A., **Shakun, J. D.**, Bierman, P. R., Davis, P. T., Corbett, L. B., Braun, D., and Zimmerman, S. 2017. Rapid thinning of the Laurentide Ice Sheet in coastal Maine during late Heinrich Stadial 1. *Quaternary Science Reviews*, 163, 180-192.
- Bierman, P. R., **Shakun, J. D.**, Corbett, L. B., Rood, D. H., and Zimmerman, S. 2016. A persistent and dynamic East Greenland Ice Sheet over the past 7.5 million years. *Nature*, 540, 256-260.
➤ Highlighted in corresponding Nature News and Views article
- Shakun, J. D.**, Raymo, M. E., and Lea, D. W. 2016. An early Pleistocene $\text{Mg}/\text{Ca}-\delta^{18}\text{O}$ record from the Gulf of Mexico: Evaluating ice sheet size and pacing in the 41-kyr world. *Paleoceanography*, doi:10.1002/2016PA002956.
- Clark, P. U., **Shakun, J. D.**, Marcott, S. A., Mix, A. C., Eby, M., Kulp, S., Levermann, A., Milne, G. A., Pfister, P. L., Santer, B. D., Schrag, D. P., Solomon, S., Stocker, T. F., Strauss, B. H., Weaver, A. J., Winkelmann, R., Archer, D., Bard, E., Goldner, A., Lambeck, K., Pierrehumbert, R. T., and Plattner, G.-K. 2016. Consequences of twenty-first-century policy for multi-millennial climate and sea-level change. *Nature Climate Change*, 6, 360-369.
- Shakun, J. D.**, Clark, P. U., Marcott, S. A., Brook, E. J., Lifton, N. A., Caffee, M., and Shakun, W. R. 2015. Cosmogenic dating of Late-Pleistocene glaciation, southern tropical Andes, Peru. *Journal of Quaternary Science*, doi:10.1002/jqs.2822.
- Shakun, J. D.**, Clark, P. U., He, F., Lifton, N. A., Liu, Z., and Otto-Bliesner, B. L. 2015. Regional and global forcing of glacier retreat during the last deglaciation. *Nature Communications*, 6, doi:10.1038/ncomms9059.
➤ Highlighted in Science magazine, Editors' Choice, Sept. 11, 2015, 349, 1179.
- Cross, M., McGee, D., Broecker, W. S., Quade, J., **Shakun, J. D.**, Cheng, H., Lu, Y., and Edwards, R. L. 2015. Great Basin hydrology, paleoclimate, and connections with the North Atlantic: A speleothem trace element and stable isotope record from Lehman Caves, NV. *Quaternary Science Reviews*, doi:10.1016/j.quascirev.2015.06.016.
- Shakun, J. D.**, Lea, D. W., Lisiecki, L. E., and Raymo, M. E. 2015. An 800-kyr record of global surface ocean $\delta^{18}\text{O}$ and implications for ice volume-temperature coupling. *Earth and Planetary Science Letters*, 426, 58-68.
- Marcott, S. A. and **Shakun, J. D.** 2015. Holocene climate change and its context for the future. *PAGES Newsletter*, 23, 28.
- Shakun, J. D.** 2015. "Ice Ages" in *Discoveries in Modern Science: Exploration, Invention, Technology* (Ed. James Trefil). Macmillan, Farmington Hills, 535-541.
- Nelson, A., Bierman, P. R., **Shakun, J. D.**, and Rood, D. 2014. Using *in situ* cosmogenic ^{10}Be as a sediment source tracer in Greenland's paraglacial environment. *Earth Surface Processes and Landforms*, doi: 10.1002/esp.3565.
- Marcott, S. A., **Shakun, J. D.**, Clark, P. U., and Mix, A. C. 2013. A reconstruction of global and regional temperature for the last 11,300 years. *Science*, 339, 1198-1201.
- He, F., **Shakun, J. D.**, Clark, P. U., Carlson, A. E., Liu, Z., Otto-Bliesner, B. L., and Kutzbach, J. E. 2013. Northern Hemisphere forcing of Southern Hemisphere climate during the last deglaciation. *Nature*, 494, 81-85.
- Schmittner, A., Urban, N., **Shakun, J. D.**, Mahowald, N. M., Clark, P. U., Bartlein, P. J., Mix, A. C., and Rosell-Mele, A. 2012. Response to Comment on "Climate sensitivity estimated from temperature reconstructions of the Last Glacial Maximum." *Science*, 337, 1294.

- Shakun, J. D.**, Clark, P. U., He, F., Marcott, S. A., Mix, A. C., Liu, Z., Otto-Bliesner, B. L., Schmittner, A., and Bard, E. 2012. Global warming preceded by increasing carbon dioxide concentrations during the last deglaciation. *Nature*, 484, 49-54.
- Highlighted in corresponding Nature News and Views article
- Clark, P. U., **Shakun, J. D.**, Baker, P. A., Bartlein, P. J., Brewer, S., Brook, E. J., Carlson, A. E., Cheng, H., Kaufman, D. S., Liu, Z., Marchitto, T. M., Mix, A. C., Morrill, C., Otto-Bliesner, B., Pahnke, K., Russell, J. M., Whitlock, C., Adkins, J. F., Blois, J. L., Clark, J., Colman, S. C., Curry, W. B., Flower, B. P., He, F., Johnson, T. C., Lynch-Stieglitz, J., Markgraf, V., McManus, J. F., Mitrovica, J. X., Moreno, P. I., and Williams, J. W. 2012. Global climate evolution during the last deglaciation. *Proceedings of the National Academy of Sciences*, doi:10.1073/pnas.1116619109
- Schmittner, A., Urban, N., **Shakun, J. D.**, Mahowald, N. M., Clark, P. U., Bartlein, P. J., Mix, A. C., and Rosell-Mele, A. 2011. Climate sensitivity estimated from temperature reconstructions of the Last Glacial Maximum. *Science*, 334, 1385-1388.
- Highlighted in corresponding Science Perspective article
- Shakun, J. D.**, Burns, S. J., Clark, P. U., Cheng, H., and Edwards, R. L. Milankovitch-paced Termination II in a Nevada speleothem? 2011. *Geophysical Research Letters*, 38, L18701, doi:10.1029/2011GL048560.
- Shakun, J. D.** and Carlson, A. E. A global perspective on Last Glacial Maximum to Holocene climate change. 2010. *Quaternary Science Reviews*, 29, 1801-1816.
- Awarded as a “highly cited paper” by Quaternary Science Reviews
- Shakun, J. D.** and Shaman, J. 2009. Tropical origins of north and south Pacific decadal variability. *Geophysical Research Letters*, 36, L19711, doi:10.1029/2009GL040313.
- Clark, P. U., Dyke, A. S., **Shakun, J. D.**, Carlson, A. E., Clark, J., Wohlfarth, B., Mitrovica, J., Hostetler, S. W., McCabe, A. M. 2009. The Last Glacial Maximum. *Science*, 325, 710-714.
- Shakun, J. D.**, Burns, S. J., Fleitmann, D., Kramers, J., Matter, A., and Al-Subary, A. 2007. A high-resolution, absolute-dated deglacial speleothem record of Indian Ocean climate from Socotra Island, Yemen. *Earth and Planetary Science Letters*, 259, 442-456.
- Munroe, J. S., Laabs, B. J. C., **Shakun, J. D.**, Singer, B. S., Mickelson, D. M., Refsnider, K., and Caffee, M. W. 2006. Latest Pleistocene advance of alpine glaciers in the southwestern Uinta Mountains, Utah, USA: Evidence for the influence of local moisture sources. *Geology*, 34, 841-844.