David McGee

Department of Earth, Atmospheric and Planetary Sciences
Massachusetts Institute of Technology
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Education

2006-2009	**Columbia University,** New York, New York Ph.D. in Earth and Environmental Sciences Advisors: Robert F. Anderson, Wallace S. Broecker, Gisela Winckler
2004-2006	**Tulane University,** New Orleans, Louisiana M.S. in Earth and Environmental Sciences Advisor: Franco Marcantonio
1999-2003	**Chatham College,** Pittsburgh, Pennsylvania M.A. in Teaching with certification in Environmental Education
1993-1997	**Carleton College,** Northfield, Minnesota B.A. in Geology

Appointments

2017-	**Associate Professor**, MIT (tenure granted 2019) Department of Earth, Atmospheric and Planetary Sciences Massachusetts Institute of Technology
2014-2017	**Kerr-McGee Career Development Assistant Professor**, MIT
2012-2014	**Assistant Professor**, MIT
2009-2011	**NOAA Climate and Global Change Postdoctoral Research Fellow** University of Minnesota Mentor: R. Lawrence Edwards

Teaching Experience

2012-	**Massachusetts Institute of Technology**, Cambridge, MA Director, Terrascope First-year Learning Community (2015-) Courses taught or co-taught: Solving Complex Problems; The History of Earth's Climate; Paleoceanography; Climate Science; Global Warming Science; Analytical Techniques for Studying Environmental and Geologic Samples; Assembling Cambridge (First-year Advising Seminar); Teaching Methods in Earth Science.
2008-2009	**High School for Arts, Imagination and Inquiry,** New York, New York NSF Graduate Teaching Fellow; designed and led field and lab activities.
2003-2004	**Marion Abramson High School,** New Orleans, Louisiana High school physical science teacher.
2002-2003, 1997-2001	**The Ellis School,** Pittsburgh, Pennsylvania Middle and high school science/math teacher, outdoor education coordinator.
2001-2002	**Mennonite Central Committee,** Phnom Penh, Cambodia English language teacher at the Royal University of Phnom Penh.

Publications (*: student or postdoctoral advisee)

Tiger, B.H.*, Burns, S.J., Dawson, R., Scroxton, N., Godfrey, L.R., Ranivoharimanana, L., Faina, P., McGee, D., **Zonal Indian Ocean variability at the millennial scale recorded in a speleothem from Madagascar**. Submitted.

Fendrock, M.*, Condron, A., McGee, D. **Modeling the Production of Heinrich Layers with a Sediment-Enabled Iceberg Model**. *Paleoceanography & Paleoceanography,* in revision.

Wright, K., Johnson, K.R., Serrato Marks, G.*, McGee, D., Bhattacharya, T., Goldsmith, G.R., Tabor, C.R., Lacaille-Muzquiz, J.-L., Lum, G., Beramendi-Orosco, L., **Dynamic and thermodynamic influences on precipitation in Northeast Mexico on orbital to millennial timescales**. *Nature Communications,* in revision.

Stroup, J.S.*, Olson, K.J., Lowenstein, T.K., Jost, A.B., Mosher, H.M., Peaple, M.D., Feakins, S.J., Chen, C.Y.*, Lund, S.P., McGee, D. **A > 200 ka U-Th based chronology from lacustrine evaporites, Searles Lake, CA.** *Geochemistry, Geophysics, Geosystems*, in press.

Scroxton, N.*, Burns, S.J., McGee, D., Godfrey, L.R., Ranivoharimanana, L., Faina, P., Tiger, B.H.*, 2023. **Hydroclimate variability in the Madagascar and Southeast African summer monsoons at the Mid- to Late-Holocene transition**. *Quaternary Science Reviews* 300, 107874. https://doi.org/10.1016/j.quascirev.2022.107874.

Scroxton, N.*, Burns, S.J., McGee, D., Godfrey, L.R., Ranivoharimanana, L., Faina, P., Tiger, B.H.*, 2023. **Tropical Indian Ocean basin hydroclimate at the Mid- to Late-Holocene transition and the double drying hypothesis**. *Quaternary Science Reviews* 300, 107837. https://doi.org/10.1016/j.quascirev.2022.107837.

Peaple, M.D., Bhattacharya, T., Lowenstein, T.K., McGee, D., Olson, K.J., Stroup, J.S.*, Tierney, J.E., Feakins, S.J., 2022. **Biomarker and Pollen Evidence for Late Pleistocene Pluvials in the Mojave Desert.** *Paleoceanography & Paleoclimatology* 37(10), https://doi.org/10.1029/2022PA004471.

Wright, K.T., Johnson, K.R., Bhattacharya, T., Serrato Marks, G.*, McGee, D., Elsbury, D., Peings, Y., Lacaille-Muzquiz, J.-L., Lum, G., Beramendi-Orosco, L., Magnusdottir, G., 2022. **Precipitation in Northeast Mexico Primarily Controlled by the Relative Warming of Atlantic SSTs.** *Geophysical Research Letters* 49(22), https://doi.org/10.1029/2022GL098186.

Fendrock, M.*, Condron, A., McGee, D., 2022. **Modeling iceberg longevity and distribution during Heinrich Events.** *Paleoceanography & Paleoclimatology* 37(6), https://doi.org/10.1029/2021PA004347.

Fendrock, M.*, Chen, C.Y.*, Olson, K., Lowenstein, T.L., McGee, D., 2022. **A computer vision algorithm for interpreting lacustrine carbonate textures at Searles Valley, USA.** *Computers and Geosciences* 166, https://doi.org/10.1016/j.cageo.2022.105142.

O'Mara, N.A., Skonieczny, C.*, McGee, D., Winckler, G., Malaizé, B., Bory, A.J.-M., Bradtmiller, L.I., Polissar, P.J., 2022. **Past and future drivers of Northwest African climate and vegetation.** *Nature Communications* 13*,* https://doi.org/10.1038/s41467-022-31120-x.

Rodbell, D., Hatfield, R.G., Abbot, M., Chen, C.Y.*, Woods, A., Stoner, J.S., McGee, D., et al., 2022. **A 700,000-year record of northern high latitude forcing of glaciation in the tropical Andes**. *Nature* 607*,* 301-306, https://doi.org/10.1038/s41586-022-04873-0.

Medina, M., Perritano, S., DeCesare, M. Polanco-Martinez, J., Serrato Marks, G.*, McGee, D, 2022. **Holocene hydroclimate in the Southeastern United States during abrupt climate events:**

evidence from new speleothem isotopic records. *Paleoceanography and Paleoclimatology* 37, e2021PA004346.

Kinsley*, C., Bradtmiller, L.I., McGee, D., Galgay, M., Stuut, J.-B., Tjallingii, R., Winckler, G., deMenocal, P.B., 2022. **Orbital- and millennial-scale variability in northwest African dust emissions over the past 67,000 years**. *Paleoceanography and Paleoclimatology* 37, e2020PA004137.

Burns, S.J., McGee, D., Scroxton*, N., Kinsley*, C.W., Godfrey, L.R., Faina, P., Ranivoharimanana, L., 2021. **Southern Hemisphere Controls on Pluvial Periods in southwest Madagascar over the past 117,000 years.** *Quaternary Science Reviews* 276, 107317.

Huth, T., Passey, B.H., Cole, J.E., Lachniet, M.S., McGee, D., Denniston, R.F., Truebe, S., Levin, N.E., 2021. **A framework for triple oxygen isotopes in speleothem paleoclimatology**. *Geochimica et Cosmochimica Acta*, doi: 10.1016/j.gca.2021.11.002.

Faina, P., Burns, S.J., Godfrey, L.R., Crowley, B.E., Scroxton*, N., McGee, D., Sutherland, M.R., Ranivoharimanana, L., 2021. **Comparing the paleoclimates of northwestern and southwestern Madagascar during the late Holocene: Implications for the role of climate in megafaunal extinction.** *Malagasy Nature* 15, 108-127.

Brovkin, V., et al., 2021 **Past abrupt changes, tipping points and cascading impacts in coupled climate-ecological-social systems: Lessons for the future**. *Nature Geoscience* 14, 550-558.

Serrato Marks*, G., Medina-Elizalde, M., Burns, S., Weldeab, S., Lases-Hernandez, F., Cazares, G., McGee, D., 2021. **Evidence for reduced precipitation variability in the Yucatán Peninsula during the mid-Holocene.** *Paleoceanography and Paleoclimatology* 36, e2021PA004219.

Peaple, M., Tierney, J., Bhattacharya, T., Lowenstein, T.L., McGee, D., Feakins, S., 2021. **Reconstructing vegetation during the last glacial period from Southern California using machine learning.** *Organic Geochemistry* 156*,* 104222, doi:10.1016/j.orggeochem.2021.104222.

Biller-Celander, N., Shakun, J., McGee, D., Wong, C.I., Reyes, A.V., Hardt*, B., Tal*, I., Ford, D., Lauriol, B., 2021. **Increasing Pleistocene permafrost stability and carbon cycle conundrums inferred from Canadian speleothems**. *Science Advances* 7, eabe5799.

Munroe, J., Kimble, K., Spötl, C., Serrato Marks*, G., McGee, D., Herron, D., 2021. **Winter Wonderland Cave, Utah, USA: A natural laboratory for the study of cryogenic cave carbonate and thawing permafrost.** *Scientific Reports* 11*,* 6430, doi:10.1038/s41598-021-85658-9.

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Woods, A., Rodbell, D.T., Abbott, M.B., Hatfield, R.G., Chen, C.Y.*, Lehmann, S.B., McGee, D., Weidhaas, N.C., Tapia, P.M., Valero-Garces, B.L., Bush, M.B., Stoner, J.S., 2020. **Andean drought and glacial retreat tied to Greenland warming during the last glacial period**. *Nature Communications* 11, 5135.

Chen*, C.Y., McGee, D., Woods, A., Pérez, L., Hatfield, R.G., Edwards, R.L., Cheng, H., Valero-Garcés, B.L., Lehmann, S.B., Stoner, J.S., Schwalb, A., Tal*, I., Seltzer, G.O., Tapia, P.M., Abbott, M.B., Rodbell, D.T., 2020. **U-Th dating of lake sediments: Lessons from the 700 kyr sediment record of Lake Junín, Peru.** *Quaternary Science Reviews* 244, 106422.

Pico, T., McGee, D., Russell, J., Mitrovica, J.X., 2020. **Recent constraints on MIS 3 sea level support role of continental shelf exposure as a control on Indo-Pacific hydroclimate**. *Paleoceanography and Paleoclimatology* 35(8), doi:10.1029/2020PA003998.

Hatfield, R.G., Stoner, J. S., Solada, K. E., Morey, A. E., Woods, A., Chen, C. Y.*, McGee, D., Abbott, M.B, and Rodbell, D. T., 2020. **Paleomagnetic constraint of the Brunhes age sedimentary record from Lake Junín, Peru**. *Frontiers in Earth Science* 8.

Costa, K.M., Hayes, C.M., Anderson, R.F., et al., 2020. **^{230}Th normalization: New insights on an essential tool for quantifying sedimentary fluxes in the modern and Quaternary ocean**. *Paleoceanography and Paleoclimatology* 35(2), doi:10.1029/2019PA003820.

McGee, D., 2020. **Glacial-interglacial precipitation changes**. *Annual Review of Marine Science* 12, 525-557.

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Tissot*, F.L.H., Ibanez-Mejia, M., Boehnke, P., Dauphas, N., McGee, D., Grove, T.L., Harrison, T.M., 2019. **^{238}U/^{235}U measurement in single-zircon crystals: Implications for the Hadean environment, magmatic differentiation and geochronology**. *Journal of Analytical Atomic Spectrometry*, 34, 2035-2052.

Ward, B.M., Wong, C., Novello, V., McGee, D., Silva, L., Santos, R.V., Wang, X., Edwards, R.L., Cheng, H., 2019. **Reconstruction of Holocene coupling between the South American Monsoon System and local moisture variability from speleothem δ^{18}O and ^{87}Sr/^{86}Sr records**. *Quaternary Science Reviews* 210, 51-63, doi: 10.1016/j.quascirev.2019.02.019

Godfrey, L.R., Scroxton*, N., Crowley, B.E., Burns, S.J., Sutherland, M.R., Pérez, V.R., Faina, P., McGee, D., Ranivoharimanana, L., 2019. **A new interpretation of Madagascar's megafaunal decline: the "Subsistence Shift Hypothesis."** *Journal of Human Evolution* 130, 126-140.

Anderson, C.H., Murray, R.W., Dunlea, A.G., Giosan, L., Kinsley*, C.W., McGee, D., Tada, R., 2019. **Eolian delivery to Ulleung Basin, Korea (Japan Sea) during development of the East Asian Monsoon through the last 12 Ma.** *Geological Magazine,* 1-12, doi: 10.1017/S001675681900013X.

Scroxton*, N., Burns, S., McGee, D., Hardt*, B., Godfrey, L.R., Ranivoharimanana, L., Faina, P., 2019. **Competing temperature and atmospheric circulation effects on southwest Madagascan rainfall during the last deglaciation**. *Paleoceanography and Paleoclimatology* 34, doi: 10.1029/2018PA003466.

Skonieczny*, C., McGee, D., Winckler, G., Bory, A.., Bradtmiller, L.I., Kinsley*, C.W., Polissar, P.J., De Pol-Holz, R., Rossignol, L., Malaizé, B., 2019. **Monsoon-driven Saharan dust variability over the last 240,000 years**. *Science Advances* 5, doi: 10.1126/sciadv.aav1887.

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Anderson, C.H., Murray, R.W, Dunlea, A.G., Giosan, L., Kinsley*, C.W, McGee, D., Tada, R., 2018. **Climatically driven changes in the supply of terrigenous sediment to the East China Sea**. *Geochemistry, Geophysics, Geosystems* 19, doi: 10.1029/2017GC007339.

Scroxton*, N., Burns, S.J., Dawson P.A., Rhodes, J.M., Brent*, K., McGee, D., Heijnis, H., Gadd, P., Hantoro, W.S., Gagan, M.K., 2018. **Rapid measurement of strontium in speleothems using core-scanning micro x-ray fluorescence**. *Chemical Geology* 487, 12-22.

Omta, A.W., Ferrari, R., McGee, D., 2018. **An analytical framework for the impact of carbonate compensation on atmospheric CO_2**. *Global Biogeochemical Cycles* 32*,* 720-735.

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McGee, D., deMenocal, P.B., 2017. **Climatic changes and cultural responses during the African Humid Period recorded in multi-proxy data**. *Oxford Research Encyclopedia of Climate Science*, Oxford University Press, doi:10.1093/acrefore/9780190228620.013.529.

Rowland, G.H., Ng, H.C., Robinson, L.F., McManus, J.F., Mohamed, K.J., McGee, D., 2017. **Investigating the use of $^{232}Th/^{230}Th$ as a dust proxy using co-located seawater and sediment samples from the low-latitude North Atlantic**. *Geochimica et Cosmochimica Acta* 214, 143-156.

Scroxton*, N., Burns, S.J., McGee, D., Hardt*, B., Godfrey, L., Ranivoharimanana, L., Faina, P., 2017. **Hemispherically in-phase precipitation variability over the last 1700 years in a Madagascar speleothem record**. *Quaternary Science Reviews* 164, 25-36.

Wortham, B.E., Wong, C.I., Silva, L.C.R., McGee, D., Montañez, I.P., Rasbury, E.T., Cooper, K.M., Sharp, W.D., Glessner, J.G., 2017. **Assessing response of local moisture conditions in central Brazil to regional variability in monsoon intensity using speleothem $^{87}Sr/^{86}Sr$ values**. *Earth and Planetary Science Letters* 463, 310-322.

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Williams*, R.H., McGee, D., Ridley, D.A., Kinsley*, C.W., Hu, S., Fedorov, A., Tal*, I., Murray, R., deMenocal, P.B., 2016. **Glacial to Holocene changes in trans-Atlantic Saharan dust transport and dust-climate feedbacks**. *Science Advances* 2, doi:10.1126/sciadv.1600445.

Hayes*, C.T., McGee, D., Boyle, E.A., Mukhopadhyay, S., Maloof, A.C., 2016. **Helium and thorium isotope constraints on African dust transport to the Bahamas over recent millennia**. *Earth and Planetary Science Letters* 457, 385-394.

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Burns, S.J., Godfrey, L.R., Faina, P., McGee, D., Hardt*, B., Ranivoharimanana, L., Randrianasy, J., 2016. **Rapid human-induced landscape transformation in Madagascar at the end of the first millennium CE**. *Quaternary Science Reviews* 134, 92-99.

Bradtmiller, L.I., McGee, D., Awalt, M., Evers, J., Yerxa, H., Kinsley*, C.W., deMenocal, P.B., 2016. **Changes in biological productivity along the northwest African margin over the past 20,000 years**. *Paleoceanography* 31, doi:10.1002/2015PA002862.

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Hayes*, C.T., Fitzsimmons, J.N., Boyle, E.A., McGee, D., Anderson, R.F., Weisend, R., Morton, P.L., 2015. **Thorium isotopes tracing the iron cycle at the Hawaii Ocean Time-series station ALOHA**. *Geochimica et Cosmochimica Acta* 169, 1-16.

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Steponaitis*, E., Andrews*, A., McGee, D., Quade, J., Broecker, W.S., Hsieh*, Y.-T., Shuman, B., Burns, S.J., Cheng, H., 2015. **Mid-Holocene drying of the U.S. Great Basin recorded in Nevada speleothems**. *Quaternary Science Reviews* 127, 174-185.

Albani, S., Mahowald, N.M., Winckler, G., Anderson, R.F., Bradtmiller, L.I., et al., 2015. **12,000 years of dust: The Holocene global dust cycle constrained by natural archives**. *Climate of the Past* 11, 869–903.

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Marshall, J., Donohoe, A., Ferreira, D., McGee, D., 2014. **The ocean's role in setting the mean position of the Inter-Tropical Convergence Zone**. *Climate Dynamics* 42, 1967-1979.

Donohoe, A., Marshall, J., Ferriera, D., McGee, D., 2013. **The relationship between ITCZ location and cross equatorial heat transport: From the seasonal cycle to the Last Glacial Maximum**. *Journal of Climate*, 26, 3597-3618.

McGee, D., deMenocal, P.B., Winckler, G., Stuut, J.-B., Bradtmiller, L.I., 2013. **The magnitude, timing and abruptness of changes in North African dust deposition over the last 20,000 years**. *Earth and Planetary Science Letters*, 371-372, 163-176.

Broecker, W.S., McGee, D., 2013. **The $\delta^{13}C$ record for atmospheric CO_2: What is it trying to tell us?** *Earth and Planetary Science Letters*, 368, 175-182.

McGee, D., Mukhopadhyay, S., 2013. **Extraterrestrial He in sediments: From recorder of asteroid collisions to timekeeper of global environmental changes**. In: P. Burnard (Ed.), *The Noble Gases as Geochemical Tracers.* Berlin: Springer-Verlag, p. 155-176.

McGee, D., Quade, J., Edwards, R.L., Broecker, W.S., Cheng, H., Reiners, P.W., Evenson, N., 2012. **Lacustrine cave carbonates: Novel archives of paleohydrologic change in the Bonneville Basin (Utah, USA)**. *Earth and Planetary Science Letters* 351-352, 182-194.

McGee, D., Marcantonio, F., McManus, J.F., Winckler, G., 2010. **The response of excess ^{230}Th and extraterrestrial ^{3}He to sediment redistribution at the Blake Ridge, western North Atlantic**. *Earth and Planetary Science Letters* 299, 138-149.

McGee, D., Broecker, W.S., Winckler, G., 2010. **Gustiness: the driver of glacial dustiness?** *Quaternary Science Reviews* 29, 2340-2350.

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Winckler, G., Anderson, R.F., Fleisher, M.Q., McGee, D., Mahowald, N., 2008. **Covariant glacial-interglacial dust fluxes in the equatorial Pacific and Antarctica**. *Science* 320, 93-96.

Siddall, M., Anderson, R.F., Winckler, G., Henderson, G.M., Bradtmiller, L.I., McGee, D., Franzese, A., Stocker, T.F., Müller, S.A., 2008. **Modeling the particle flux effect on distribution of ^{230}Th in the equatorial Pacific**. *Paleoceanography* 23, doi:10.1029/2007PA001556.

McGee, D., Marcantonio, F., Lynch-Stieglitz, J., 2007. **Deglacial changes in dust flux in the eastern equatorial Pacific**. *Earth and Planetary Science Letters* 257, 215-230.

Undergraduate Student Research Supervision
>25 undergraduate researchers supervised, 20 female or non-binary

Graduate Students Advised (with current positions)
Madison Wittmer, MIT, 2022-
Benjamin Tiger, MIT-WHOI Joint Program, 2020-
Michaela Fendrock, MIT-WHOI Joint Program, 2017-2022; NSF postdoctoral fellow, U. Buffalo
Gabriela Serrato Marks, MIT-WHOI Joint Program, 2015-2020; Partner at Stellate Communications (science communications)

Christine Chen, MIT-WHOI Joint Program, 2013-2019; postdoctoral researcher at Lawrence Livermore National Laboratory
Christopher Kinsley, MIT-WHOI Joint Program, 2012-2019; postdoctoral researcher at Berkeley Geochronology Center
Elena Steponaitis, MIT, 2012-2015; Research Scientist, NASA Earth Systems Division

Postdoctoral Researchers Advised (with current positions)
Cameron Batchelor, 2022- , NSF Postdoctoral Fellow
Nicholas Scroxton, joint with UMass, 2015-2019, Lecturer, Maynooth University
Francois Tissot, 2016-2018, Assistant Professor, California Institute of Technology
Justin Stroup, 2016-2017, Assistant Professor, SUNY-Oswego
Charlotte Skonieczny, 2016, Assistant Professor, U. Paris-Sud, France
Benjamin Hardt, 2014-2015, Secondary school teacher
Christopher Hayes, 2013-2015, Assistant Professor, U. Southern Mississippi
Yu-Te (Alan) Hsieh, 2012-2013, Assistant Professor, National Taiwan University

Field Experience
Bonneville Basin, Utah: Lake deposit and cave sampling, total 10 weeks, 2008-2013
Central Andes, Chile: Lake shoreline mapping and sampling, 2 weeks, 2015
Northern and Central Vietnam caves: Reconnaissance and stalagmite sampling, 4 weeks, 2014-2016
Searles and Death Valleys, California: Drilling and shoreline sampling, 5 weeks, 2017-2020
Nahanni National Park Reserve, Northwest Territories: Cave sampling, 1 week, 2019.

Professional Activities and Awards
- MacVicar Faculty Fellow, 2022, for outstanding contributions to undergraduate education
- Associate Department Head for Diversity, Equity and Inclusion, 2020-; Chair of departmental Diversity, Equity and Inclusion Committee
- Director, MIT Terrascope Learning Community, 2015-; program engages ~50 first-year students each year in exploring environmental challenges through project-based classes; led spring break trips examining sustainable agriculture in southwestern U.S./Navajo Nation, urban sustainability in Mexico City, and climate change adaptation in the Netherlands (terrascope.mit.edu)
- NOAA Climate and Global Change Postdoctoral Fellowship Program Steering Committee, 2014-2017; Chair, 2016-2017
- Organizer of Lorenz Center Workshop on "Water and Climate Change: Connecting the Paleoclimate Record to Future Changes", June 2018
- MIT Climate Nucleus Climate Education Working Group Co-Chair, 2022-
- MIT Sustainability Leadership Steering Committee Co-Chair, 2019-2020
- MIT Climate and Sustainability Consortium Faculty Steering Committee, 2020-
- MIT Environmental Solutions Initiative and MIT Environment and Sustainability minor Faculty Advisory Boards, 2019-
- Ad Hoc Committee for Leveraging Best Practices from Remote Teaching for On-Campus Education, 2021-2022
- MIT Festival of Learning panelist, 2020
- MIT first-year advisor, Fall 2012-present; Excellence in Mentoring Award, 2018
- Regular outreach talks to community groups; paleoclimate-related outreach at Cambridge Science Festival, 2016-