

# John Andrew Higgins

Assistant Professor  
Princeton University  
Department of Geosciences  
212 Guyot Hall  
Princeton, NJ, 08544

**Tel:** 609-258-7024  
**Fax:** 609-258-5275  
**Email:** jahiggin@princeton.edu  
**Web:** carboncycle.princeton.edu

## Education:

- 2003-2009 Harvard University, Cambridge, MA  
Ph.D. in Earth and Planetary Sciences, June 2009  
Dissertation Supervisor: Daniel P. Schrag
- 2002-2003 University of Cambridge, Cambridge, UK  
M.Phil. in Earth Science, August 2003  
Dissertation Supervisor: Harry Elderfield
- 1998-2002 Harvard College, Cambridge, MA  
A.B. in Earth and Planetary Sciences (Summa Cum Laude), June 2002

## Employment:

- 2018-present Associate Professor, Department of Geosciences, Princeton University
- 2012-2018 Assistant Professor, Department of Geosciences, Princeton University
- 2011-2012 Canadian Institute for Advanced Research (CIAR) Junior Fellow
- 2009-2011 Hess Postdoctoral Fellow, Department of Geosciences, Princeton University
- 2003-2009 Graduate Research Assistant, Department of Earth and Planetary Science, Harvard University

## Fellowships and Awards:

- 2011-2013 Canadian Institute for Advanced Research (CIAR) Global Scholars Program
- 2009-2011 Hess Postdoctoral Fellow, Princeton University
- 2007-2009 National Science Foundation Graduate Research Fellowship
- 2004-2007 National Defense Science and Engineering Graduate (NDSEG) Fellowship
- 2002-2003 Henry Fellowship to the University of Cambridge
- 2002 Phi Beta Kappa, Harvard College

## Research Interests:

Interactions between Earth's climate, life, and the global geochemical cycles of carbon and oxygen on timescales of millennia to billions of years using measurements of the chemistry and isotopic composition of cations in sedimentary rocks and bubbles of trapped air in polar ice cores.

## Publications:

\*Lab-affiliated graduate student or postdoctoral fellow

\*\*First author or co-first author manuscripts

## In Review:

1. \*Yan, Y., M. Bender, E. Brook, H. Clifford, P. Kemeny, A. Kurbatov, S. Mackay, P. Mayewski, J. Ng, J.P. Severinghaus, **J.A. Higgins** (in review) 2-million-year-old climate snapshots from shallow ice cores in the Allan Hills, Antarctica. *Nature*.
2. Kast, E.R., D.A. Stolper, A. Auderset, **J.A. Higgins**, H. Ren, X.T. Wang, A Martinez-Garcia, G.H. Haug, and D. Sigman (in review) Nitrogen isotope evidence for expanded ocean suboxia in the early Cenozoic. *Science*.
3. \*Gothmann, A.M., **J.A. Higgins**, J.F. Adkins, W.S. Broecker, K.A. Farley, R. McKeon, N. Planavsky, J. Stolarski, X. Wang, and M.L. Bender (in review) A Cenozoic record of seawater uranium in fossil corals. *Geochimica et Cosmochimica Acta*.

## Published:

1. \*Ahm, A.-S. C., Maloof, A.C., Macdonald, F.A., Hoffman, P.F., Bjerrum, C.J., Bold, U., Rose, C.V., Strauss, J.V., and **J.A. Higgins** (2019) An early diagenetic deglacial origin for basal Ediacaran ‘cap dolostones’. *Earth and Planetary Science Letters*, 506, 292-307.
2. Sial, A.N., Chen, J., Lacerda, L.D., Frei, R., **Higgins, J.A.**, Tewari, V.Ch., Gaucher, C., Ferreira, V.P., Cirilli, S., Korte, C., Barbosa, J.A., Pereira, N.S., and D. Santiago Ramos (2018) Chemostratigraphy across the Cretaceous-Paleogene (K-Pg) Boundary: Testing the impact and volcanism hypotheses. *Chemostratigraphy Across Major Chronological Boundaries*, 240, 1-223.
3. Pruss, S.B., Blättler, C.L., F.A. Macdonald, and **J.A. Higgins** (2018) Calcium isotope evidence that the earliest metazoan biomineralizers formed aragonite shells. *Geology*, 46(9) 763-766.
4. Kelemen, P.B, R Aines, E Bennett, SM Benson, E Carter, JA Coggon, JC de Obeso, O Evans, G Gadikota, GM Dipple, M Godard, M Harris, **J.A. Higgins**, KTM Johnson, F Kourim, R Lafay, S Lambart, CE Manning, JM Matter, K Michibayashi, T Morishita, J Noël, K Okazaki, P Renforth, B Robinson, H Savage, R Skarbek, MW Spiegelman, E Takazawa, D Teagle, J Urai, J Wilcox (2018) In situ mineralization in ultramafic rocks: Natural processes and possible engineered methods. *Energy Procedia*, 146, 92-102.
5. \*Blättler, C.L., M.W. Claire, A.R. Prave, K. Kirisimae, **J.A. Higgins**, P.V. Medvedev, A.E. Romanshkin, D.V. Rychanchik, A.L. Zerkle, K. Paiste, T. Kreitsmann, I.L. Millar, J. A. Hayles, H. Bao, A.V. Turchyn, M.R. Warke, A. Lepland (2018) Two-billion-year-old evaporites capture Earths great oxidation. *Science*, 360, 320-323.
6. \*Syverson, D., P. Scheuermann, **J.A. Higgins**, N.J. Pester, and W.E. Seyfried (2018) Experimental partitioning of Ca isotopes and Sr into anhydrite: consequences for the cycling of Ca and Sr in subseafloor mid-ocean ridge hydrothermal systems. *Geochimica et Cosmochimica Acta*, 236, 160-178.

7. \*Ahm, A-S.C., C.J. Bjerrum, C.L. Blättler, P.K. Swart, and **J.A. Higgins** (2018) Quantifying early marine diagenesis in shallow-water carbonate sediments. *Geochimica et Cosmochimica Acta*, 236, 140-159.
8. \*Santiago Ramos, D.P., L. Morgan, and **J.A. Higgins** (2018) The role of diffusion and clay authigenesis in determining the  $^{41}\text{K}/^{39}\text{K}$  of seawater: Insights from the K isotopic composition of deep-sea pore fluids. *Geochimica et Cosmochimica Acta*, 236, 99-120.
9. \*Scheuermann, P.P., D.D. Syverson, **J.A. Higgins**, N.J. Pester, and W.E. Seyfried Jr. (2018) Calcium isotope systematics at hydrothermal conditions: Mid-ocean ridge vent fluids and experiments in the  $\text{CaSO}_4\text{-NaCl-H}_2\text{O}$  system. *Earth and Planetary Science Letters*, 226, 18-35.
10. \*Stolper, D.A., J.M. Eiler, and **J.A. Higgins** (2017) Modeling the effects of diagenesis on carbonate clumped-isotope values in deep-and shallow-water settings. *Geochimica et Cosmochimica Acta*, 227, 264-291.
11. \*\***Higgins, J.A.**, C.L. Blättler, E.A. Lundstrom, D.P. Santiago-Ramos, A.A. Akhtar, A-S. Crüger Ahm, O.M. Bialik, C. Holmden, H. Bradbury, S.T. Murray, and P.K. Swart (2018) Mineralogy, early marine diagenesis, and the chemistry of shallow-water carbonate sediments. *Geochimica et Cosmochimica Acta*, 220, 512-534.
12. \*Blättler, C.L. and **J.A. Higgins** (2017) Testing Urey's carbonate-silicate cycle using the calcium isotopic composition of sedimentary carbonates. *Earth and Planetary Science Letters*, 479, 241-251.
13. \*Dunlea, A.G., R.W. Murray, D.P. Santiago Ramos, and **J.A. Higgins** (2017) The role of reverse weathering on seawater Mg/Ca and global cooling through the Cenozoic. *Nature Communications*, 8, doi:10.1038/s41467-017-00853-5.
14. \*Gothmann, A.M., J. Stolarski, J.F. Adkins, and **J.A. Higgins** (2017) A Cenozoic record of seawater Mg isotopes in fossil corals. *Geology*, 45(11), 1039-1042.
15. \*Blättler, C.L., L.R. Kump, W.W. Fischer, G. Paris, J.J. Kasbohm, and **J.A. Higgins** (2017) Constraints on ocean carbonate chemistry and  $\text{pCO}_2$  in the Archean and Palaeoproterozoic. *Nature Geoscience*, 10(1), 41-45.
16. \*Dyer, B. **J.A. Higgins**, and A.C. Maloof (2016) A probabilistic analysis of meteorically altered  $\delta^{13}\text{C}$  chemostratigraphy from late Paleozoic ice age carbonate platforms. *Geology*, 45(2), 135-138, doi: 10.1130/G38513.1.
17. \*Stolper, D.A., M.L. Bender, G.B. Dreyfus, Y. Yan, and **J.A. Higgins** (2016) A Pleistocene ice-core record of atmospheric  $\text{O}_2$  concentrations. *Science*, 353 (6306), 1427-1430.
18. \*Gothmann, A.M., **J.A. Higgins**, P.K. Swart, S.J. Giri, J.F. Adkins, J. Stolarski, C.L. Blättler, and M.L. Bender (2016) Calcium isotopes in scleractinian fossil corals since the Mesozoic: implications for vital effects and biomineralization through time. *Earth and Planetary Science Letters*, 444, 205-214.

19. Sun, X., **J.A. Higgins**, and A.V. Turchyn (2016) Diffusive cation fluxes in deep-sea sediments and insight into the global geochemical cycles of calcium, magnesium, sodium, and potassium. *Marine Geology*, 373(1), 64-77.
20. \*Dyer, B., A. Maloof, and **J.A. Higgins** (2015) Glacioeustasy, meteoric diagenesis, and the carbon cycle during the mid-Carboniferous. *Geochemistry, Geophysics, Geosystems*, 16(10), doi:10.1002/2015GC006002.
21. \*\***Higgins, J.A.**, A.V. Kurbatov, N.E. Spaulding, E.J. Brook, D.S. Introne, L. Chimiak, Y. Yan, P.A. Mayewski, and M.L. Bender (2015) Atmospheric composition 1 million years ago from blue ice in the Allan Hills, Antarctica. *Proceedings of the National Academy of Science*, 6887-6891, doi: 10.1073/pnas.1420232112.
22. \*Blättler, C.L., N.R. Miller, and **J.A. Higgins** (2015) Mg and Ca isotope signatures of authigenic dolomite in silicious deep-sea sediment. *Earth and Planetary Science Letters*, 419, 32-42.
23. \*Husson, J.M., **J.A. Higgins**, A.C. Maloof, and B. Schoene (2015) Ca and Mg isotope constraints on the origin of Earth's deepest  $\delta^{13}\text{C}$  excursion. *Geochimica et Cosmochimica Acta*, 160, 243-266.
24. Hain, M.P., D.M. Sigman, **J.A. Higgins**, and G.H. Haug (2015) The effects of secular calcium and magnesium concentration changes on the thermodynamics of seawater acid/base chemistry: Implications for Eocene and Cretaceous ocean carbon chemistry and buffering. *Global Biogeochemical Cycles*, 29(5), doi: 10.1002/2014GB004986.
25. \*\***Higgins, J.A.** and D.P. Schrag (2015) The Mg isotopic composition of Cenozoic seawater—evidence for a link between Mg-clays, seawater Mg/Ca and climate. *Earth and Planetary Science Letters*, 416, 73-81.
26. \*Husson, J.M., A.C. Maloof, B. Schoene, C.Y. Chen, and **J.A. Higgins** (2014) Stratigraphic expression of Earth's deepest  $\delta^{13}\text{C}$  excursion in the Wonoka Formation of South Australia. *American Journal of Science*, 315(1), 1-45.
27. Fantle, M. and **J.A. Higgins** (2014) The effects of diagenesis and dolomitization on Ca and Mg isotopes in marine platform carbonates: Implication for the geochemical cycles of Ca and Mg. *Geochimica et Cosmochimica Acta*, 42, 458-481.
28. \*Blättler, C.L. and **J.A. Higgins** (2014) Calcium isotopes in evaporates record variations in Phanerozoic seawater Ca and  $\text{SO}_4$ . *Geology*, 42(8), 711-714, doi: 10.1130/G35721.1.
29. Spaulding, N.E., A.V. Kurbatov, **J.A. Higgins**, M.L. Bender, S.A. Arcone, S. Campbell, N.W. Dunbar, D.S. Introne, and P.A. Mayewski (2013) Climate archives from 80-250 ka in horizontal and vertical ice cores from the Allan Hills Blue Ice Area, Antarctica. *Quaternary Science Reviews*, 80(3), 562-574.
30. Macdonald, F.A., J.V. Strauss, E.A. Sperling, G.P. Halverson, G.M. Narbonne, D.T. Johnston, M. Kunzmann, D.P. Schrag, and **J.A. Higgins** (2013) The stratigraphic relationship between the Shuram carbon isotope excursion, the oxygenation of Neoproterozoic oceans, and the first appearance of the Ediacara biota and bilaterian trace fossils in northwestern Canada. *Chemical Geology*, 362, 250-272.

31. Schrag, D.P., **\*\*J.A. Higgins**, F.A. Macdonald, and D.T. Johnston (2013) Authigenic carbonate and the history of the global carbon cycle. *Science*, 339(540), doi: 10.1126/science.1229578.
32. **\*\*Higgins, J.A.** and D.P. Schrag (2012) Records of Neogene seawater chemistry and diagenesis in deep-sea carbonate sediments and pore fluids. *Earth and Planetary Science Letters*, 357-358, 386-396.
33. Maloof, A., S.M. Porter, J.L. Moore, F.O. Dudas, S. Bowring, **J.A. Higgins**, D.A. Fike, and M.P. Eddy (2010) Earliest Cambrian record of animal and ocean geochemical change. *Geological Society of America Bulletin*, 122 (11/12), 1731-1774.
34. **\*\*Higgins, J.A.** and D.P. Schrag (2010) Constraining magnesium cycling in marine sediments: Insights from magnesium isotopes. *Geochimica et Cosmochimica Acta*, 74(17), 5039-5053.
35. **\*\*Higgins, J.A.**, W.W. Fischer, and D.P. Schrag (2009) Oxygenation of the ocean and sediments: Consequences for the seafloor carbonate factory. *Earth and Planetary Science Letters*, 284, 25-33.
36. P.F. Hoffman, G.P. Halverson, E.W. Domack, J.M. Husson, **J.A. Higgins**, and D.P. Schrag (2007) Are basal Ediacaran (635 Ma) post-glacial “cap dolostones” diachronous? *Earth and Planetary Science Letters*, 258, 114-131.
37. **\*\*Higgins, J.A.** and D.P. Schrag (2006) Beyond methane: Towards a theory for the Paleocene-Eocene Thermal Maximum. *Earth and Planetary Science Letters*, 245, 523-537.
38. S. Barker, **J.A. Higgins**, and H. Elderfield (2003) The future of the carbon cycle: review, calcification response, ballast and feedback on atmospheric CO<sub>2</sub>. *Philosophical Transactions of the Royal Society of London Series A – Mathematical Physical and Engineering Sciences*, 361 (1810), 1977-1998.
39. **\*\*Higgins, J.A.** and D.P. Schrag (2003) Aftermath of a Snowball Earth. *Geochemistry, Geophysics, Geosystems*, 4 (3), 1028, doi:10.1029/2002GC000403.

### **Laboratory Facilities:**

Director of the metal isotope and trace element laboratory in the Department of Geosciences at Princeton University (est. 2013). Facilities consist of clean labs and instrumentation to prepare and analyze a wide range of natural samples for high-precision metal (Ca, Mg, and K) isotope ratios and major, minor, and trace element abundances by inductively-coupled plasma mass spectrometry (ICP-MS). Laboratory instrumentation consists of a Thermo Scientific Neptune Plus multi collector ICP-MS, a Thermo Scientific Element 2 single collector ICP-MS, a Thermo ICAP-Q quadrupole ICP-MS, and two Dionex ICS-5000+ ion chromatography systems for automated cation purification. The laboratory is staffed by a full time technician and current members include 3 PhD students, 2 postdoctoral fellows, and 4 undergraduates.

In addition to supporting scientific research within my group these facilities are made available for use by members of the wider Princeton community. Past users include the research groups of Profs. Schoene, Maloof, Onstott, Duffy, Myneni, and Morel within the Department of Geosciences as well as Profs. Hecht, Prud'homme, and Jaffe from the Departments of Chemistry, Chemical and Biological Engineering, and Civil and Environmental Engineering, respectively.

### **Funded Proposals:**

1. Collaborative Research: Snapshots of Early and Mid-Pleistocene Climate and Atmospheric Composition from the Allan Hills Blue Ice Area. NSF OPP. 2018-2022. \$1,055,298. Lead PI
2. MRI: Acquisition of a Thermal Ionization Mass Spectrometer for High-Precision Geochronology and Isotope Geology. NSF EAR Division #1726099. 2017-2020. \$687,605. Co-PI with Prof. Blair Schoene.
3. CAREER: What sets the CO<sub>2</sub> thermostat? Insights from the global geochemical cycles of Ca, Mg, and K. NSF OCE Division #1654571. 2017-2022. \$819,200. Lead PI.
4. Urban tap water and human health. Princeton Environmental Institute Urban Grand Challenge. 2016-2018. \$150,000. Lead PI.
5. Illuminating Earth's Past, Present, and Future: The International Ocean Discovery Program Science Plan for 2013-2023. Trustees of Columbia University (NSF-OCE). 2016-2017. \$27,500. Lead PI.
6. Ca and Mg Isotopic Indicators in Ancient Carbonates. Simons Foundation Postdoctoral Fellowship to Clara Blättler. 2016-2018. \$232,978. Lead PI.
7. Collaborative Research: Window into the 40 kyr World from Climate Records in 1 Ma ice from the Allan Hills Blue Ice Area. NSF OPP Division, #1443263. 2014-2017. \$640,282. Lead PI.
8. Collaborative Research: Toward a global timeline of biological and ocean geochemical change during the early Cambrian. Integrated Earth Systems Program #1410317. 2014-2017. \$1,054,947. Co-PI with Prof. Adam Maloof.
9. Research into non-traditional metal isotope systems (Mg, Ca, and K) in modern and fossil vertebrate teeth and bones. Department of Geosciences Scott Vertebrate Paleontology Fund. 2014-2018. \$316,572. Lead PI.
10. Magnesium isotopes and the origin of marine dolomite – new insights into an old problem. American Chemical Society Petroleum Research Fund #53802-DNI2. 2013-2014. \$100,000. Lead PI.
11. Water-rock interactions and the global CO<sub>2</sub> thermostat. Princeton Environmental Institute Energy Grand Challenge. 2012-2014. \$200,000. Lead PI.
12. Canadian Institute for Advanced Research (CIFAR) Global Scholar Fund. 2012-2014. \$42,000. Lead PI.

### **Academic Advising:**

1. Postdoctoral Scholars:

Dr. Anne-Sofie Crüger Ahm (2017-present)

Dr. Clara Blättler (2013 – 2018)

Dr. Or Bialik (2013-2014)

*Co-advised:*

Dr. Daniel Stolper (2015-2016; now an assist. prof. at UC Berkeley)

2. Graduate Students:

Jack Murphy (2015-present)  
Danielle Santiago Ramos (2013 – present)  
Alliya Akhtar (2013 - present)

*Co-advised at Princeton:*

Yuzhen Yan (2013 - present)  
Anne Gothmann (2012-2015; hired as an assist. prof. at St. Olaf College)  
Blake Dyer (2012-2015; now a postdoctoral fellow at Columbia University)  
Jon Husson (2012-2014; hired as an assist. prof. at University of Victoria)

*Co-advised at other universities:*

Peter Scheuermann (2015-present; University of Minnesota)  
Anne Dunlea (2013-2016; Boston University)

3. Graduate Advisory Committee:

Xuyuan (Ellen) Ai (2015 - present)  
Katja Luxem (2015 – present)  
Keiran Swart (2014 – present)  
Emma Kast (2014 – present)  
Victoria Luu (2014 – present)  
Jessica Lueders-Dumont (2013 – present)  
Paula Mateo (2012-present)  
Cara Magnabosco (2012-2016)  
Tony (Xingchen) Wang (2012-2016)  
Audrey Yau (2012-2014)

4. Senior Theses:

Lauren Santi (2017) - *A calcium and strontium isotope analysis of shark teeth to constrain past ocean chemistry*  
Robert Shepard (2013) - *Diagenesis in the Great Bahama Bank - an analysis of magnesium isotopes in sediment cores from Ocean Drilling Program Site 1003*  
Andrea Beale (2013) - *Fluid inclusions in marine halite as a window into the magnesium isotopic composition of past oceans*

5. Junior Research Projects:

Shayne Mckenna (2017) - *Numerical models of Sr and Os isotopes in seawater*  
Lauren Santi (2016) - *Calcium isotopes in shark teeth*  
Alison Campian (2014) - *Numerical models of meteoric diagenesis in Paleozoic carbonate sediments*  
Atleigh Forden (2014) - *Tests of dissolution methods of bulk carbonate samples for the reconstruction of seawater Sr isotopes*  
Aly Beveridge (2014) - *Analyses of satellite images of the Allan Hills, Antarctica to identify glacial-interglacial cycles based on dust content*  
Joan Cannon (2013) - *Potassium isotopes in deep-sea pore fluids*  
Preston Kemeney (2013) - *Numerical models of CO<sub>2</sub> thermostats*  
Robert Shepard (2012) - *Magnesium isotopes in Bahamas dolomites and pore fluids*

**Teaching:**

<b>Course</b>	<b>Title</b>	<b>Year</b>	<b>Enrollment</b>
GEO203-CEE235	Fundamentals of Solid Earth Science	F2012	15
GEO203-ENE203	Fundamentals of Solid Earth Science	F2013	32
GEO203-ENE203	Fundamentals of Solid Earth Science	F2014	26
GEO203-ENE203	Fundamentals of Solid Earth Science	F2015	25
GEO360	Geochemistry of the Human Environment	S2017	7
GEO506	Fundamentals of the Geosciences II	S2013	8
GEO506	Fundamentals of the Geosciences II	S2014	9
GEO506	Fundamentals of the Geosciences II	S2015	4
GEO534	Geological Constraints on Climate Sensitivity	S2013	2
GEO534	Geological Constraints on the Global Carbon Cycle	S2014	4
GEO534	Geological Constraints on the Global Carbon Cycle	S2015	3
GEO534	Geological Constraints on the Global Carbon Cycle	S2016	3

### **Outreach and Synergistic Activities:**

Collaborating with Isles, Inc., a community development organization working with Trenton, NJ residents on environmental health, to provide a no-cost monitoring program for lead in urban tap water, paint, and soil. This program constitutes the centerpiece of a new 300-level undergraduate course in the Department of Geosciences.

Organized the Northeast Geobiology Conference held on February 6-7<sup>th</sup>, 2015 at Princeton University. The conference, attended by approx. 75 undergraduates, graduate students, postdocs, and faculty from colleges and universities in the Northeast that promotes collaboration between young researchers in the geological and biological sciences.

Member of NSF/NASA committee charged with assessing the future of exobiology research in the Earth Sciences (2014). Participated in a five-day workshop to explore scientific topics related to the development of life and habitable environments in the Precambrian.

### **Popular Press:**

Following publication of Higgins et al., (2015) in PNAS:

Article on Phys.org - <http://phys.org/news/2015-05-ice-cores-atmospheric-million-years.html>

Article on LiveScience - <http://www.livescience.com/50795-antartica-old-ice-climate-change.html>

Princeton Press Release - <http://www.princeton.edu/news/2016/03/14/princeton-researchers-go-end-earth-worlds-oldest-ice?section=topstories>

Following publication of Stolper et al., (2016) in Science:

Article on Phys.org - <http://phys.org/news/2016-09-ice-core-analyses-atmospheric-oxygen.html>

Article on LiveScience - <http://www.livescience.com/56219-earth-atmospheric-oxygen-levels-declining.html>

### **Service to Princeton University and the Department of Geosciences:**



Department of Geosciences Graduate Work Committee (2012 – present)

Responsibilities include overseeing graduate admissions, curriculum, and general examinations.

Department of Geosciences Faculty Search Committee (2015 – 2016)

Responsibilities include overseeing the search, interviewing, and recruitment of a cluster of faculty hires in the broad area of climate science.

Princeton University Committee on Classrooms and Schedule (2014 – 2017)

Responsibilities include assessing classroom and teaching laboratory space, making recommendations for technological improvements, and arranging hours for undergraduate exercises and examinations.

**Service to Academia:**

Reviewer for Science, Science Advances, Nature, Nature Geoscience, Proceedings of the National Academy of Science, Geochimica et Cosmochimica Acta, Earth and Planetary Science Letters, Geology, Paleoceanography, and Geochemistry, Geophysics, Geosystems.

Proposal reviewer and panelist for the American Chemical Society Petroleum Research Fund, NASA, and NSF.

Organizer/convener of sessions, and theme chair at international conferences.

**Invited Talks (since 2012):**

10/2017 – UC Berkeley, Department of Earth and Planetary Sciences

10/2017 – California Institute of Technology, Division of Geological Sciences

9/2017 – Kavli Frontiers of Science Joint USA-GER-JPN Meeting

7/2017 – Agouron Institute Geobiology Summer Course

11/2016 – Stanford University, Department of Earth Sciences

2/2016 – Gordon Research Conference on Geobiology

10/2015 – Washington University at St. Louis, Department of Earth and Planetary Sciences

8/2015 – Goldschmidt Geochemistry Conference

12/2014 – Fall Meeting of the American Geophysical Union

11/2014 – University of Victoria, School of Earth and Ocean Sciences

11/2014 – University of Miami, Rosenstiel School of Marine and Atmospheric Science

10/2014 – Agouron Institute Geobiology Meeting on the Sulfur Cycle

10/2014 – Meeting of the Comer Family Foundation

6/2014 – Goldschmidt Geochemistry Conference

4/2014 – Rice University, Department of Earth Science

4/2014 – Stony Brook University, Department of Geosciences

3/2014 – Pennsylvania State University, Department of Geosciences

2/2014 – Yale University, Department of Geology and Geophysics

8/2013 – Goldschmidt Geochemistry Conference

5/2013 – Meeting of the Canadian Geological Society (symposium in honor of P.F. Hoffman)  
1/2013 – Weizmann Institute, Earth and Planetary Sciences  
12/2012 – Fall Meeting of the American Geophysical Union  
10/2012 – Lamont-Doherty Earth Institute, Columbia University  
7/2012 – Goldschmidt Geochemistry Conference  
3/2012 – Rutgers University, Department of Earth and Planetary Science

**Invited Talks by Advisees (since 2012):**

2017 – 1st Geobiology Society Conference: Dr. Clara Blättler  
2017 – 1st Geobiology Society Conference: Dr. Jon Husson  
2017 – Amherst College, Dept. of Geology: Danielle Santiago Ramos  
2017 – Cornell University, Dept. of Earth and Planetary Sciences: Dr. Clara Blättler  
2017 – UC Santa Cruz, Dept. of Earth and Planetary Sciences: Dr. Clara Blättler  
2017 – Washington Univ. St. Louis, Dept. of Earth and Planetary Science: Dr. Anne Gothmann  
2017 – Washington Univ. St. Louis, Dept. of Earth and Planetary Science: Dr. Clara Blättler  
2017 – UC Berkeley, Dept. of Integrative Biology: Dr. Daniel Stolper  
2017 – UC Berkeley, Center for Integrative Planetary Science: Dr. Daniel Stolper  
2017 – USGS Rocky Mountain Science Seminar: Dr. Clara Blättler  
2016 – University of Victoria, School of Earth and Ocean Science: Dr. Jon Husson  
2016 – Johns Hopkins University, Dept. of Earth and Planetary Sciences: Dr. Clara Blättler  
2016 – Brown University, Environmental and Planetary Sciences: Dr. Clara Blättler  
2016 – Texas A&M University, Dept. of Geology and Geophysics: Dr. Clara Blättler  
2016 – UC Berkeley, Dept. of Earth and Planetary Science: Dr. Clara Blättler  
2016 – Columbia University, Lamont-Doherty Earth Observatory: Dr. Clara Blättler  
2016 – Yale University, Dept. of Geology and Geophysics: Dr. Clara Blättler  
2016 – University of Washington, Friday Harbor Labs: Dr. Anne Gothmann  
2016 – University of Chicago, Dept. of the Geophysical Sciences: Dr. Daniel Stolper  
2016 – Carnegie Institute of Washington, Geophysical Lab: Dr. Daniel Stolper  
2015 – McGill University, Dept. of Earth and Planetary Sciences: Dr. Jon Husson  
2015 – University of Washington, School of Oceanography: Dr. Anne Gothmann  
2015 – University of Wisconsin at Madison, Weeks Lecture: Dr. Jon Husson  
2015 – MIT, Dept. of Earth, Atmospheric, and Planetary Sciences: Dr. Clara Blättler  
2015 – Columbia University, Lamont-Doherty Earth Observatory: Dr. Anne Gothmann  
2015 – Washington Univ. St. Louis, Dept. of Earth and Planetary Science: Dr. Jon Husson  
2015 – Johns Hopkins University, Dept. of Earth and Planetary Sciences: Dr. Jon Husson  
2014 – American Geophysical Union Fall Meeting: Dr. Clara Blättler  
2014 – Harvard University, Dept. of Earth and Planetary Sciences: Dr. Clara Blättler  
2014 – Rutgers University, Institute of Marine and Coastal Science: Dr. Clara Blättler  
2014 – Meeting of the Comer Family Foundation: Dr. Anne Gothmann  
2014 – Goldschmidt Geochemistry Conference: Dr. Anne Gothmann

2014 – Rutgers University, Department of Earth and Planetary Science: Dr. Clara Blättler

2014 – Woods Hole Oceanographic Institute: Dr. Anne Gothmann

**Conference Abstracts (since 2012):**

1. **Higgins, J.A.** (2017) Of Babies and Bathwater – Do Carbonate Sediments in the Geologic Record Track the Global Carbon Cycle? Goldschmidt Geochemistry Conference, Paris, France.
2. Akhtar, A.A. and **J.A. Higgins** (2017) Calcium Isotope Variability in Modern and Ancient Elasmobranchs, Goldschmidt Geochemistry Conference, Paris, France.
3. Akhtar, A.A. and **J.A. Higgins** (2017) Calcium isotopes in elasmobranch teeth as a window into modern and ancient marine ecology, Northeast Geobiology Conference, University of Connecticut, Storrs, CT.
4. Blättler, C.L., K.D. Bergmann, and **J.A. Higgins** (2017) An independent constraint on marine sulfate levels at the Ediacaran–Cambrian transition. Northeastern Geobiology Symposium, University of Connecticut, CT.
5. Lloyd, N., P. Field, L. Morgan, D.P. Santiago Ramos, and **J.A. Higgins** (2017) Measurements of Stable Isotope  $^{41}\text{K}/^{39}\text{K}$  by MC-ICP-MS. Goldschmidt Geochemistry Conference, Paris, France.
6. Morgan, L., D.P. Santiago Ramos, N. Lloyd, and **J.A. Higgins** (2017) Invited: High Precision  $^{41}\text{K}/^{39}\text{K}$  Measurements by MC-ICP-MS Indicate Terrestrial Variability of  $\delta^{41}\text{K}$  values. Goldschmidt Geochemistry Conference, Paris, France.
7. Santiago Ramos, D.P. and **J.A. Higgins** (2017) Potassium Cycling in Seawater and Aquatic Organisms: Insights from Stable Potassium Isotopes ( $^{41}\text{K}/^{39}\text{K}$ ). Goldschmidt Geochemistry Conference, Paris, France.
8. Santiago Ramos, D.P. and **J.A. Higgins** (2017) Potassium isotopic composition of marine and freshwater fish: An example of diffusive K fractionation in biological systems. Northeastern Geobiology Symposium, University of Connecticut, Storrs, CT.
9. Yan, Y., J. Ng., **J.A. Higgins**, A. Kurbatov, H. Clifford, N. Spaulding, J. Severinghaus, E. Brook, P. Mayewski, and M.L. Bender (2017) 2.7-Million-Year-Old Ice from Allan Hills Blue Ice Areas, East Antarctica Reveals Climate Snapshots Since the Early Pleistocene. Goldschmidt Geochemistry Conference, Paris, France.
10. Blättler, C.L., K.D. Bergmann, and **J.A. Higgins** (2016) An independent constraint on marine sulfate levels at the Ediacaran–Cambrian transition. American Geophysical Union Fall Meeting, San Francisco, CA.
11. Blättler, C.L. and **J.A. Higgins** (2016) The Isotopic Mass Balance of Calcium. Goldschmidt Geochemistry Conference, Yokohama, Japan.
12. Crockford, P.W., M. Kunzmann, C.L. Blättler, N.J. Planavsky, **J.A. Higgins**, and G.P. Halverson (2016) Ca, Mg, and Li isotope Records Leading into the Sturtian Glaciation. Goldschmidt Geochemistry Conference, Yokohama, Japan.
13. Dunlea, A.G., R.W. Murray, D.P. Santiago Ramos, and **J.A. Higgins** (2016) Deep sea authigenic clays as a sink for seawater Mg through the Cenozoic. American Geophysical Union Fall Meeting, San Francisco, CA.

14. Dyer, B., A.C. Maloof, and **J.A. Higgins** (2016) A Probabilistic Perspective on the C and Ca Isotope Stratigraphic Expression of Meteoric Diagenesis During the Late Paleozoic Ice Age. Northeastern Geobiology Symposium, Harvard University, Cambridge, MA.
15. Gothmann, A.M., **J.A. Higgins**, J.F. Adkins, J. Stolarski, and M.L. Bender (2016) Boron Isotopes in modern and Cenozoic scleractinian fossil corals. American Geophysical Union Fall Meeting, San Francisco, CA.
16. **Higgins, J.A.**, C.L. Blättler, P.K. Swart, D.P. Santiago Ramos, and A.A. Akhtar (2016) Ca isotopes in shallow water marine carbonates – How I learned to stop worrying and embrace diagenesis. American Geophysical Union Fall Meeting, San Francisco, CA.
17. Santiago Ramos, D.P., A.G. Dunlea, and **J.A. Higgins** (2016) Paired measurements of K and Mg isotopes and clay authigenesis in marine sediments. American Geophysical Union Fall Meeting, San Francisco, CA.
18. Santiago Ramos, D.P. and **J.A. Higgins** (2016) Understanding potassium isotope fractionation during authigenic clay formation in pore-fluid systems: Implications for the  $\delta^{41}\text{K}$  of seawater. Gordon Research Conference - Geobiology, Galveston, TX.
19. Santiago Ramos, D.P. and **J.A. Higgins** (2016) Understanding potassium isotope fractionation during authigenic clay formation in pore-fluid systems: Implications for the  $\delta^{41}\text{K}$  of seawater. Northeastern Geobiology Symposium, Harvard University, Cambridge, MA.
20. Stolper, D.A., M.A. Antonelli, D.P. Santiago Ramos, M.L. Bender, D.P. Schrag, D.J. DePaolo, and **J.A. Higgins** (2016) Isotopic constraints on the formation of carbonates during low-temperature hydrothermal oceanic crust alteration. American Geophysical Union Fall Meeting, San Francisco, CA.
21. Crüger Ahm, A-S., C. Bjerrum, P.F. Hoffman, F.A. Macdonald, A.C. Maloof, C.V. Rose, and **J.A. Higgins** (2015) Ca and Mg Isotope Stratigraphy of the Trezona C Isotope Excursion – Geochemical Record of the Descent into a Snowball? Goldschmidt Geochemistry Conference, Prague, Czech Republic.
22. Blättler, C.L. and **J.A. Higgins** (2015) New constraints on Archean–Paleoproterozoic carbonate chemistry and  $p\text{CO}_2$ . American Geophysical Union Fall Meeting, San Francisco, CA.
23. Blättler, C.L. and **J.A. Higgins** (2015) New constraints on Archean–Paleoproterozoic  $p\text{CO}_2$  and carbonate chemistry, Gordon Research Conference - Chemical Oceanography, Holderness School, NH.
24. Blättler, C.L. and **J.A. Higgins** (2015) New constraints on Archean  $p\text{CO}_2$  from calcium isotope measurements in marine carbonates. Astrobiology Science Conference, Chicago, IL.
25. Blättler, C.L. and **J.A. Higgins** (2015) Ca cycle constraints from the Ca isotope composition of Precambrian sedimentary carbonates. Northeastern Geobiology Symposium, Princeton University, NJ.
26. Dyer, B., A.C. Maloof, and **J.A. Higgins** (2015) Meteoric Diagenesis of Platform Carbonates During the Mid-Carboniferous. Goldschmidt Geochemistry Conference, Prague, Czech Republic.
27. Dyer, B., A.C. Maloof, and **J.A. Higgins** (2015) Late Paleozoic climate constraints from platform carbonates. Northeastern Geobiology Symposium, Princeton University, Princeton, NJ.
28. Dyer, B., A.C. Maloof, and **J.A. Higgins** (2015) How much time is missing at parasequence boundaries? Subaerial exposure and meteoric diagenesis of cyclic carbonates. Geological Society of America Annual Meeting, Baltimore, MD.

29. Dyer, B., A.C. Maloof, and **J.A. Higgins** (2015) Glacioeustasy, meteoric diagenesis, and the carbon cycle during the mid Carboniferous. Geological Society of America Annual Meeting, Baltimore, MD.
30. Dunlea, A.G., R.W. Murray, J. Sauvage, A.J. Spivack, R.N. Harris, S. D'Hondt, and **J.A. Higgins** (2015) Dust, Volcanic Ash, and the Evolution of the South Pacific Gyre. American Geophysical Union Fall Meeting, San Francisco, CA.
31. Gothmann, A.M., **J.A. Higgins**, J.F. Adkins, K.A. Farley, R. McKeon, N.J. Planavsky, X. Wang, J. Stolarski, and M.L. Bender (2015) Variations in seawater uranium concentrations during the Cenozoic. American Geophysical Union Fall Meeting, San Francisco, CA.
32. Gothmann, A.M., **J.A. Higgins**, J.F. Adkins, K.A. Farley, R. McKeon, N.J. Planavsky, X. Wang, J. Stolarski, and M.L. Bender (2015) Variations in seawater uranium concentrations during the Cenozoic as reconstructed from well preserved aragonitic fossil corals. Gordon Research Conference - Chemical Oceanography, Holderness School, NH.
33. Gothmann, A.M., **J.A. Higgins**, C.L. Blättler, J.F. Adkins, J. Stolarski, and M.L. Bender (2015) Calcium isotopes in fossil corals: implications for coral vital effects and biomineralization through time. Northeastern Geobiology Symposium, Princeton University, NJ.
34. Hain, M.P., D.M. Sigman, **J.A. Higgins**, and G.H. Haug (2015) Secular Decline of Seawater Calcium Increases Seawater Buffering and pH. Goldschmidt Geochemistry Conference, Prague, Czech Republic.
35. **Higgins, J.A.**, Y. Yan, D.A. Stolper, and M.L. Bender (2015) Keynote: The Remarkable Stability of Atmospheric O<sub>2</sub>/N<sub>2</sub> Since the Mid-Pleistocene. Goldschmidt Geochemistry Conference, Prague, Czech Republic.
36. Santiago Ramos, D.P. and **J.A. Higgins** (2015) Understanding potassium isotope fractionation during authigenic clay formation in pore-fluid systems: Implications for the  $\delta^{41}\text{K}$  of seawater. American Geophysical Union Fall Meeting, San Francisco, CA.
37. Blättler, C.L., L.C. Kah, L.R. Kump, and **J.A. Higgins** (2014) Calcium isotopes in evaporites constrain relative sulfate, calcium, and DIC levels in Phanerozoic and Proterozoic seawater. Geological Society of America Annual Meeting, Vancouver, BC.
38. Blättler, C.L., N.R. Miller, and **J.A. Higgins** (2014) Mg and Ca isotope signatures of authigenic dolomite. Northeastern Geobiology Symposium, Yale University, New Haven, CT.
39. Blättler, C.L. and **J.A. Higgins** (2014) What are your  $\delta^{13}\text{C}$  values really telling you? STEPPE Workshop, Smith College, Northampton, MA.
40. Husson, J.M., **J.A. Higgins**, A.C. Maloof, and B. Schoene (2014) Ca isotope constraints on the origin of Earth's deepest  $\delta^{13}\text{C}$  excursion. Geological Society of America Annual Meeting, Vancouver, BC.
41. Schrag, D.P., **J.A. Higgins**, F.A. Macdonald, and D.T. Johnston (2014) Keynote: Authigenic Carbonate and the History of the Global Carbon Cycle: Why Diagenesis Matters Even More. Goldschmidt Geochemistry Conference, Sacramento, CA.
42. **Higgins, J.A.**, C.L. Blättler, and J.M. Husson (2014) Is my C isotope excursion global, local, or both? Insights from the Mg and Ca isotopic composition of primary, diagenetic, and authigenic carbonates. American Geophysical Union Fall Meeting, San Francisco, CA.

43. Gothmann, A.M., **J.A. Higgins**, J.F. Adkins, J. Stolarski, and M.L. Bender (2014) Scleractinian Fossil Corals as Archives of Seawater  $\delta^{26}\text{Mg}$ . American Geophysical Union Fall Meeting, San Francisco, CA.
44. Fantle, M. and **J.A. Higgins** (2014) Evaluating the Leverage to Alter Seawater Chemistry: The Effects of Diagenesis and Dolomitization on Ca and Mg Isotopes in Shallow Marine Carbonates. Goldschmidt Geochemistry Conference, Sacramento, CA.
45. Sun, X., **J.A. Higgins**, and A.V. Turchyn (2014) Global Importance of Diffusive Cation Fluxes in Deep-Sea Sediments for the Biogeochemical Cycles of Calcium, Magnesium, Sodium, and Potassium. Goldschmidt Geochemistry Conference, Sacramento, CA.
46. Morgan, L., **J.A. Higgins**, B. Davidheiser-Kroll, N. Lloyd, J. Faithfull, and R. Ellam (2014) Keynote: Potassium Isotope Geochemistry and Magmatic Processes. Goldschmidt Geochemistry Conference, Sacramento, CA.
47. Blättler, C.L. and **J.A. Higgins** (2013) Calcium Isotopes in Evaporites Constrain Sulfate- vs. Calcite-Rich Seawater Chemistry. Goldschmidt Geochemistry Conference, Florence, Italy.
48. Gothmann, A.M., J. Stolarski, J.F. Adkins, C.L. Blätter, **J.A. Higgins**, and M.L. Bender (2013)  $\delta^{44/40}\text{Ca}$  variations of seawater from Cenozoic and Mesozoic fossil corals. American Geophysical Union Fall Meeting, San Francisco, CA.
49. Hain, M.P., D.M. Sigman, **J.A. Higgins**, and G.H. Haug (2013) Carbon Isotope Gradients in the Eocene as a Constraint on the Biological Pump, Atmospheric  $\text{CO}_2$ , and the Ocean's Major Ion Composition. Goldschmidt Geochemistry Conference, Florence, Italy.
50. **Higgins, J.A.** and D.P. Schrag (2013) Invited: Magnesium Isotope Evidence for a Link between Low-Temperature Clays, Seawater Mg/Ca, and Climate. Goldschmidt Geochemistry Conference, Florence, Italy.
51. Husson, J.M., A.C. Maloof, B. Schoene, and **J.A. Higgins** (2013) Does the Shuram  $\delta^{13}\text{C}$  excursion record Ediacaran oxygenation? American Geophysical Union Fall Meeting, San Francisco, CA.
52. Bialik, O.M., I. Halvey, and **J.A. Higgins** (2013) The Mesozoic Dolomites of the Levant Margin – Evaluating Dolomitization Style and Mechanism from Configuration and Stable Isotope Geochemistry. Goldschmidt Geochemistry Conference, Florence, Italy.
53. **Higgins, J.A.** and D.P. Schrag (2012) Cenozoic Seawater Chemistry – Insights from Mg Isotopes in Pelagic Carbonate Sediments and Pore Fluids. Goldschmidt Geochemistry Conference, Montreal, Canada.