

# Ben Kravitz

Climate Scientist  
Pacific Northwest National Laboratory

Assistant Professor (starting January 2019)  
Indiana University

## CONTACT INFORMATION

---

ben.kravitz@pnnl.gov	Atmospheric Sciences and Global Change Division
<a href="http://www.benkravitz.net">http://www.benkravitz.net</a>	Pacific Northwest National Laboratory
Tel: (509) 372-6846	P.O. Box 999, MSIN K9-30
Fax: (509) 372-6168	Richland, WA 99352

## EDUCATION

---

- 2011 **Ph.D., Atmospheric Science**, Rutgers University, New Brunswick, New Jersey  
Dissertation title: *Stratospheric Geoengineering with Black Carbon Aerosols*  
Advisor: Professor Alan Robock
- 2009 **M.S., Atmospheric Science**, Rutgers University, New Brunswick, New Jersey  
Advisors: Professor Alan Robock and Professor Georgiy Stenchikov
- 2007 **M.S., Mathematics**, Purdue University, West Lafayette, Indiana  
Advisors: Professor Shreeram Abhyankar and Professor Louis de Branges
- 2004 **B.A., Mathematics with departmental honors**, Northwestern University, Evanston, Illinois  
Departmental honors thesis title: *Investigation of the Euler Characteristic of Compact Orientable Surfaces*  
Advisor: Professor Paul Goerss

## RESEARCH INTERESTS

---

Climate dynamics, climate modeling, anthropogenic climate change, geoengineering, climate effects of volcanic eruptions, aerosol radiative forcing, climate feedbacks, control and dynamical systems

## POSITIONS HELD

---

- 2019- **Assistant Professor**, Department of Earth and Atmospheric Sciences, Indiana University

- Joint Appointee**, Atmospheric Sciences and Global Change Division,  
Pacific Northwest National Laboratory
- 2016-2018 **Scientist III**, Atmospheric Sciences and Global Change Division, Pacific  
Northwest National Laboratory
- 2015 **Scientist II**, Atmospheric Sciences and Global Change Division, Pacific  
Northwest National Laboratory
- 2012-2015 **Postdoctoral Research Associate**, Atmospheric Sciences and Global  
Change Division, Pacific Northwest National Laboratory
- 2011-2012 **Postdoctoral Research Associate**, Department of Global Ecology, Carnegie  
Institution for Science
- 2008-2011 **Graduate Research Assistant**, Department of Environmental Sciences,  
Rutgers University
- 2009 **Part Time Lecturer**, Department of Environmental Sciences, Rutgers  
University
- 2008-2009 **Teaching Assistant**, Department of Environmental Sciences, Rutgers  
University
- 2007-2008 **Excellence Fellow**, School of Environmental and Biological Sciences,  
Rutgers University
- 2004-2007 **Teaching Assistant**, Department of Mathematics, Purdue University

**PEER REVIEWED PUBLICATIONS (67 total)**

**h-index = 25, 2368 citations (Google Scholar)**

**h-index = 22, 1576 citations (Web of Science)**

**ORCID:** <http://orcid.org/0000-0001-6318-1150>

- 
1. MacMartin, D. G. and **B. Kravitz**, The engineering of climate engineering, *Annual Review of Control, Robotics, and Autonomous Systems*, accepted.
  2. Tilmes, S., J. H. Richter, **B. Kravitz**, D. MacMartin, M. J. Mills, I. Simpson, A. S. Glanville, J. T. Fasullo, A. S. Phillips, J.-F. Lamarque, J. Tribbia, J. Edwards, S. Mickelson, and S. Ghosh, CESM1(WACCM) stratospheric aerosol geoengineering large ensemble (GLENS) project, *Bulletin of the American Meteorological Society*, accepted.
  3. Ji, D., S. Fang, C. Curry, H. Kashimura, S. Watanabe, J. Cole, A. Lenton, H. Muri, **B. Kravitz**, and J. Moore, Extreme temperature and precipitation response to solar dimming and stratospheric aerosol geoengineering, *Atmospheric Chemistry and Physics*, 18, 10133-10156, doi:10.5194/acp-18-10133-2018.
  4. Richter, J. H., S. Tilmes, A. Glanville, **B. Kravitz**, D. G. MacMartin, M. J. Mills, I. R. Simpson, F. Vitt, J. J. Tribbia, and J.-F. Lamarque, Stratospheric response in the first

- geoengineering simulation meeting multiple surface climate objectives, *Journal of Geophysical Research*, 123, 5762-5782, doi:10.1029/2018JD028285.
5. Plazzotta, M., R. S  ferian, H. Douville, **B. Kravitz**, and J. Tjiputra, Land surface temperature response to stratospheric aerosol injection constrained by major volcanic eruptions, *Geophysical Research Letters*, 45, 5663-5671, doi: 10.1029/2018GL077583.
  6. Kelly, P., **B. Kravitz**, J. Lu, and L. R. Leung (2018), Remote drying in the North Atlantic as a common response to precessional changes and CO<sub>2</sub> increase over land, *Geophysical Research Letters*, 45, 3615-3624, doi:10.1002/2017GL076669.
  7. Tilmes, S., J. Richter, M. Mills, **B. Kravitz**, D. G. MacMartin, R. Garcia, D. Kinnison, J.-F. Lamarque, J. Tribbia, and F. Vitt (2018), Effects of different stratospheric SO<sub>2</sub> injection altitudes on stratospheric chemistry and dynamics, *Journal of Geophysical Research*, 123, 4654-4673, doi:10.1002/2017JD028146.
  8. Keller, D., A. Lenton, V. Scott, N. Vaughan, N. Bauer, D. Ji, C. Jones, **B. Kravitz**, H. Muri, and K. Zickfeld (2018), The Carbon Dioxide Removal Model Intercomparison Project (CDR-MIP): Rationale and experimental design, *Geoscientific Model Development*, 11, 1133-1160, doi:10.5194/gmd-11-1133-2018.
  9. Seneviratne, S. I., S. J. Phipps, A. J. Pitman, A. L. Hirsch, E. L. Davin, M. G. Donat, M. Hirschi, A. Lenton, M. Wilhelm, and **B. Kravitz** (2018), Land radiative management as contributor to regional-scale climate adaptation and mitigation, *Nature Geoscience*, 11, 88-96, doi:10.1038/s41561-017-0057-5.
  10. Stjern, C., H. Muri, L. Ahlm, O. Boucher, J. N. S. Cole, D. Ji, A. Jones, J. Haywood, **B. Kravitz**, A. Lenton, J. C. Moore, U. Niemeier, S. J. Phipps, H. Schmidt, S. Watanabe, and J. E. Kristj  nsson (2018), Response to marine cloud brightening in a multi-model ensemble, *Atmospheric Chemistry and Physics*, 18, 621-634, doi:10.5194/acp-18-621-2018.
  11. Mills, M. J., J. H. Richter, S. Tilmes, **B. Kravitz**, D. G. MacMartin, S. Glanville, A. Schmidt, J. J. Tribbia, A. Gettelman, C. Hannay, J. T. Bacmeister, D. E. Kinnison, F. Vitt, and J.-F. Lamarque (2017), Radiative and chemical response to interactive stratospheric aerosols in fully coupled CESM1(WACCM), *Journal of Geophysical Research*, 122, 13061-13078, doi:10.1002/2017JD027006.
  12. **Kravitz, B.**, D. G. MacMartin, M. J. Mills, J. H. Richter, S. Tilmes, J.-F. Lamarque, J. J. Tribbia, and F. Vitt (2017), First simulations of designing stratospheric sulfate aerosol geoengineering to meet multiple simultaneous climate objectives, *Journal of Geophysical Research*, 122, 12616-12634, doi:10.1002/2017JD026874.
  13. Tilmes, S., J. H. Richter, M. J. Mills, **B. Kravitz**, D. G. MacMartin, F. Vitt, J. J. Tribbia, and J.-F. Lamarque (2017), Sensitivity of aerosol distribution and climate response to stratospheric SO<sub>2</sub> injection locations, *Journal of Geophysical Research*, 122, 12591-12615, doi:10.1002/2017JD026888.

14. Richter, J. H., S. Tilmes, M. J. Mills, J. J. Tribbia, **B. Kravitz**, D. G. MacMartin, F. Vitt, and J.-F. Lamarque (2017), Stratospheric dynamical response to SO<sub>2</sub> injection, *Journal of Geophysical Research*, 122, 12557-12573, doi:10.1002/2017JD026912.
15. MacMartin, D. G., **B. Kravitz**, S. Tilmes, J. H. Richter, M. J. Mills, J.-F. Lamarque, J. J. Tribbia, and F. Vitt (2017), The climate response to stratospheric aerosol geoengineering can be tailored using multiple injection locations, *Journal of Geophysical Research*, 122, 12574-12590, doi:10.1002/2017JD026868.
16. Ahlm, L., A. Jones, C. W. Stjern, H. Muri, **B. Kravitz**, and J. E. Kristjánsson (2017), Marine cloud brightening – as effective without clouds, *Atmospheric Chemistry and Physics*, 17, 13071-13087, doi:10.5194/acp-17-13071-2017.
17. Lynch, C. D., C. A. Hartin, B. Bond-Lamberty, and **B. Kravitz** (2017), An open-access CMIP5 pattern library for temperature and precipitation: Description and methodology, *Earth System Science Data*, 9, 281-292, doi:10.5194/essd-9-281-2017.
18. **Kravitz, B.**, C. Lynch, C. Hartin, and B. Bond-Lamberty (2017), Exploring precipitation pattern scaling methodologies and robustness among CMIP5 models, *Geoscientific Model Development*, 10, 1889-1902, doi:10.5194/gmd-10-1889-2017.
19. Kashimura, H., M. Abe, S. Watanabe, T. Sekiya, D. Ji, John C. Moore, J. N. S. Cole, and **B. Kravitz** (2017), Shortwave radiative forcing, rapid adjustment, and feedback to the surface by sulphate geoengineering: Analysis of the Geoengineering Model Intercomparison Project G4 scenario, *Atmospheric Chemistry and Physics*, 17, 3339-3356, doi:10.5194/acp-17-3339-2017.
20. **Kravitz, B.**, D. G. MacMartin, P. J. Rasch, and H. Wang (2017), Simultaneous fully dynamic characterization of multiple input-output relationships in climate models, *Atmospheric Chemistry and Physics*, 17, 2525-2541, doi:10.5194/acp-17-2525-2017.
21. Irvine, P. J., **B. Kravitz**, M. Lawrence, D. Gerten, C. Caminade, S. Gosling, E. Hendy, B. Kassie, D. Kissling, H. Muri, A. Oeschl, and S. Smith (2017), Towards a comprehensive climate impacts assessment of solar geoengineering, *Earth's Future*, 5, 93-106, doi:10.1002/2016EF000389.
22. Gabriel, C. J., A. Robock, L. Xia, B. Zambri, and **B. Kravitz** (2017), The G4Foam experiment: Global climate impacts of regional ocean albedo modification, *Atmospheric Chemistry and Physics*, 17, 595-613, doi:10.5194/acp-17-595-2017.
23. MacMartin, D. G. and **B. Kravitz** (2016), Dynamic climate emulators for solar geoengineering, *Atmospheric Chemistry and Physics*, 16, 15789-15799, doi:10.5194/acp-2016-535.
24. MacMartin, D. G., **B. Kravitz**, J. C. S. Long, and P. J. Rasch (2016), Geoengineering with stratospheric aerosols: What don't we know after a decade of research?, *Earth's Future*, 4, 543-548, doi:10.1002/2016EF000418.

25. **Kravitz, B.**, A. B. Guenther, L. Gu, T. Karl, L. Kaser, S. G. Pallardy, J. Peñuelas, M. J. Potosnak, and R. Seco (2016), A new paradigm of quantifying ecosystem stress through chemical signatures, *Ecosphere*, 7, e01559, doi:10.1002/ecs2.1559.
26. Irvine, P. J., **B. Kravitz**, H. Muri, and M. G. Lawrence (2016), An overview of the Earth system science of solar geoengineering, *Wiley Interdisciplinary Reviews*, 7, 815-833, doi:10.1002/wcc.423.
27. **Kravitz, B.**, D. G. MacMartin, H. Wang, and P. J. Rasch (2016), Geoengineering as a design problem, *Earth System Dynamics*, 7, 469-497, doi:10.5194/esd-7-469-2016.
28. Haywood, J. M., A. Jones, N. Dunstone, S. Milton, M. Vellinga, A. Bodas-Salcedo, M. Hawcroft, **B. Kravitz**, J. Cole, S. Watanabe, and G. Stephens (2016), The impact of equilibrating hemispheric albedos on tropical performance in the HadGEM2-ES coupled climate model, *Geophysical Research Letters*, 43, 395-403, doi: 10.1002/2015GL066903.
29. Moore, J. C., A. Grinsted, X. Guo, X. Yu, S. Jevrejeva, A. Rinke, X. Cui, **B. Kravitz**, A. Lenton, S. Watanabe, and D. Ji (2015), Atlantic hurricane surge response to geoengineering, *Proceedings of the National Academy of Sciences*, 112, 13794-13799, doi: 10.1073/pnas.1510530112.
30. Yoon, J.-H., S.-Y. Wang, R. R. Gillies, L. Hipps, **B. Kravitz**, and P. J. Rasch (2015), Extreme 2014 fire season in California: A glimpse into the future? [in "Explaining Extremes of 2014 from a Climate Perspective"], *Bulletin of the American Meteorological Society*, 96(12), S5-S9, doi:10.1175/BAMS-D-15-00114.1.
31. **Kravitz, B.**, A. Robock, S. Tilmes, O. Boucher, J. M. English, P. J. Irvine, A. Jones, M. G. Lawrence, M. MacCracken, H. Muri, J. C. Moore, U. Niemeier, S. J. Phipps, J. Sillmann, T. Storelvmo, H. Wang, and S. Watanabe (2015), The Geoengineering Model Intercomparison Project Phase 6 (GeoMIP6): Simulation design and preliminary results, *Geoscientific Model Development*, 8, 3379-3392, doi:10.5194/gmd-8-3379-2015.
32. Yoon, J.-H., S.-Y. Wang, R. R. Gillies, **B. Kravitz**, L. Hipps, and P. J. Rasch (2015), Increasing water cycle extremes in California and relation to ENSO under global warming, *Nature Communications*, 6, 8657, doi:10.1038/ncomms9657.
33. **Kravitz, B.**, D. G. MacMartin, P. J. Rasch, and A. J. Jarvis (2015), A new method of comparing forcing agents in climate models, *Journal of Climate*, 28, 8203-8218, doi: 10.1175/JCLI-D-14-00663.1.
34. MacMartin, D. G., **B. Kravitz**, and P. J. Rasch (2015), On solar geoengineering and climate uncertainty, *Geophysical Research Letters*, 42, 7156-7161, doi: 10.1002/2015GL065391.
35. Yu, X., J. C. Moore, X. Cui, A. Rinke, D. Ji, **B. Kravitz**, and J.-H. Yoon (2015), Impacts, effectiveness and regional inequalities of the GeoMIP G1 to G4 solar radiation

- management scenarios, *Global and Planetary Change*, 129, 10-22, doi:10.1016/j.gloplacha.2015.02.010.
36. Kleidon, A., **B. Kravitz**, and M. Renner (2015), The hydrological sensitivity to global warming and solar geoengineering derived from thermodynamic constraints, *Geophysical Research Letters*, 42, 138-144, doi:10.1002/2014GL062589.
37. Tilmes, S., M. J. Mills, U. Niemeier, H. Schmidt, A. Robock, **B. Kravitz**, J.-F. Lamarque, G. Pitari, and J. M. English (2015), A new Geoengineering Model Intercomparison Project (GeoMIP) experiment designed for climate and chemistry models, *Geoscientific Model Development*, 8, 43-49, doi:10.5194/gmd-8-43-2015.
38. **Kravitz, B.**, H. Wang, P. J. Rasch, H. Morrison, and A. B. Solomon (2014), Process-model simulations of cloud albedo enhancement by aerosols in the Arctic, *Philosophical Transactions of the Royal Society A*, 372, 20140052, doi:10.1098/rsta.2014.0052.
39. Xia, L., A. Robock, J. N. S. Cole, D. Ji, J. C. Moore, A. Jones, **B. Kravitz**, H. Muri, U. Niemeier, B. Singh, S. Tilmes, S. Watanabe, J.-H. Yoon, and C. L. Curry (2014), Solar Radiation Management impacts on agriculture in China: A case study in the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 119, 8695-8711, doi:10.1002/2013JD020630.
40. Irvine, P. J., O. Boucher, **B. Kravitz**, K. Alterskjær, J. N. S. Cole, D. Ji, A. Jones, D. J. Lunt, J. C. Moore, H. Muri, U. Niemeier, A. Robock, B. Singh, S. Tilmes, S. Watanabe, S. Yang, and J.-H. Yoon (2014), Key factors governing uncertainty in the response to sunshade geoengineering from a comparison of the GeoMIP ensemble and a perturbed parameter ensemble, *Journal of Geophysical Research*, 119, 7946-7962, doi:10.1002/2013JD020716.
41. **Kravitz, B.**, D. G. MacMartin, A. Robock, P. J. Rasch, K. L. Ricke, J. N. S. Cole, C. L. Curry, P. J. Irvine, D. Ji, D. W. Keith, J. E. Kristjánsson, J. C. Moore, H. Muri, B. Singh, S. Tilmes, S. Watanabe, S. Yang, and J.-H. Yoon (2014), A multi-model assessment of regional climate disparities caused by solar geoengineering, *Environmental Research Letters*, 9, 074013, doi:10.1088/1748-9326/9/7/074013.
42. MacMartin, D. G., **B. Kravitz**, D. W. Keith, and A. Jarvis (2014), Dynamics of the coupled human-climate system resulting from closed-loop control of solar geoengineering, *Climate Dynamics*, 43, 243-258, doi:10.1007/s00382-013-1822-9.
43. Huneus, N., O. Boucher, K. Alterskjær, J. N. S. Cole, C. L. Curry, D. Ji, A. Jones, **B. Kravitz**, J. E. Kristjánsson, J. C. Moore, H. Muri, U. Niemeier, P. J. Rasch, A. Robock, B. Singh, H. Schmidt, M. Schulz, S. Tilmes, S. Watanabe, and J.-H. Yoon, Forcings and feedbacks in the GeoMIP ensemble for a reduction in solar irradiance and increase in CO<sub>2</sub>, *Journal of Geophysical Research*, 119, 5226-5239, doi:10.1002/2013JD021110.

44. Curry, C. L., J. Sillmann, D. Bronaugh, K. Alterskjær, J. N. S. Cole, **B. Kravitz**, J. E. Kristjánsson, H. Muri, U. Niemeier, A. Robock, and S. Tilmes (2014), A multi-model examination of climate extremes in an idealized geoengineering experiment, *Journal of Geophysical Research*, 119, 3900-3923, doi:10.1002/2013JD020648.
45. **Kravitz, B.**, D. G. MacMartin, D. T. Leedal, P. J. Rasch, and A. J. Jarvis (2014), Explicit feedback and the management of uncertainty in meeting climate objectives with solar geoengineering, *Environmental Research Letters*, 9, 044006, doi: 10.1088/1748-9326/9/4/044006.
46. Pitari, G., V. Aquila, **B. Kravitz**, A. Robock, S. Watanabe, N. De Luca, G. Di Genova, E. Mancini, S. Tilmes, and I. Cionni (2014), Stratospheric ozone response to sulfate geoengineering: Results from the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 119, 2629-2653, doi:10.1002/2013JD020566.
47. Berdahl, M., A. Robock, D. Ji, A. Jones, **B. Kravitz**, J. C. Moore, and S. Watanabe (2014), Arctic cryosphere response in the Geoengineering Model Intercomparison Project (GeoMIP) G3 and G4 scenarios, *Journal of Geophysical Research*, 119, 1308-1321, doi:10.1002/2013JD020627.
48. Moore, J. C., A. Rinke, X. Yu, D. Ji, X. Cui, Y. Li, K. Alterskjær, J. E. Kristjánsson, H. Muri, O. Boucher, N. Huneus, **B. Kravitz**, A. Robock, U. Niemeier, H. Schmidt, M. Schulz, S. Tilmes, and S. Watanabe (2014), Arctic sea ice and atmospheric circulation under the GeoMIP G1 scenario, *Journal of Geophysical Research*, 119, 567-583, doi: 10.1002/2013JD021060.
49. **Kravitz, B.**, P. J. Rasch, P. M. Forster, T. Andrews, J. N. S. Cole, P. J. Irvine, D. Ji, J. E. Kristjánsson, J. C. Moore, H. Muri, U. Niemeier, A. Robock, B. Singh, S. Tilmes, S. Watanabe, and J.-H. Yoon (2013), An energetic perspective on hydrological cycle changes in the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 118, 13087-13102, doi:10.1002/2013JD020502.
50. **Kravitz, B.**, A. Robock, P. M. Forster, J. M. Haywood, M. G. Lawrence, and H. Schmidt (2013), An overview of the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 118, 13103-13107, doi: 10.1002/2013JD020569.
51. Tilmes, S., J. Fasullo, J.-F. Lamarque, D. R. Marsh, M. Mills, K. Alterskjær, O. Boucher, J. N. S. Cole, C. L. Curry, J. M. Haywood, P. J. Irvine, D. Ji, A. Jones, D. Bou Karam, **B. Kravitz**, J. E. Kristjánsson, J. C. Moore, H. O. Muri, U. Niemeier, P. J. Rasch, A. Robock, H. Schmidt, M. Schulz, S. Yang, B. Singh, S. Watanabe, and J.-H. Yoon (2013), The hydrological impact of geoengineering in the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 118, 11036-11058, doi:10.1002/jgrd.50868.
52. **Kravitz, B.**, P. M. Forster, A. Jones, A. Robock, K. Alterskjær, O. Boucher, A. K. L. Jenkins, H. Korhonen, J. E. Kristjánsson, H. Muri, U. Niemeier, A.-I. Partanen, P. J.

- Rasch, H. Wang, and S. Watanabe (2013), Sea spray geoengineering experiments in the Geoengineering Model Intercomparison Project (GeoMIP): Experimental design and preliminary results, *Journal of Geophysical Research*, 118(19), 11175-11186, doi: 10.1002/jgrd.50856.
53. Schneider, K., J. Silverman, **B. Kravitz**, T. Rivlin, A. Schneider-Mor, S. Barbosa, M. Byrne, and K. Caldeira (2013), The inorganic carbon turnover caused by the digestion of carbonate sands and metabolic activity by holothurians, *Estuarine, Coastal and Shelf Science*, 133, 217-223, doi:10.1016/j.ecss.2013.08.029.
  54. Jones, A., J. M. Haywood, K. Alterskjær, O. Boucher, J. N. S. Cole, C. L. Curry, P. J. Irvine, D. Ji, **B. Kravitz**, J. E. Kristjánsson, J. C. Moore, U. Niemeier, A. Robock, H. Schmidt, B. Singh, S. Tilmes, S. Watanabe, and J.-H. Yoon (2013), The “termination effect” in experiment G2 of the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 118(17), 9743-9752, doi:10.1002/jgrd.50762.
  55. **Kravitz, B.**, K. Caldeira, O. Boucher, A. Robock, P. J. Rasch, K. Alterskjær, D. Bou Karam, J. N. S. Cole, C. L. Curry, J. M. Haywood, P. J. Irvine, D. Ji, A. Jones, J. E. Kristjánsson, D. J. Lunt, J. C. Moore, U. Niemeier, H. Schmidt, M. Schulz, B. Singh, S. Tilmes, S. Watanabe, S. Yang, and J.-H. Yoon (2013), Climate model response from the Geoengineering Model Intercomparison Project (GeoMIP), *Journal of Geophysical Research*, 118(15), 8320-8332, doi:10.1002/jgrd.50646.
  56. MacMartin, D. G., D. W. Keith, **B. Kravitz**, and K. Caldeira (2013), Management of trade-offs in geoengineering through optimal choice of non-uniform radiative forcing, *Nature Climate Change*, 3, 365-368, doi:10.1038/nclimate1722.
  57. Marvel, K., **B. Kravitz**, and K. Caldeira (2013), Geophysical limits to global wind power, *Nature Climate Change*, 3, 118-121, doi:10.1038/nclimate1683.
  58. **Kravitz, B.**, D. G. MacMartin, and K. Caldeira (2012), Geoengineering: Whiter skies?, *Geophysical Research Letters*, 39, L11801, doi:10.1029/2012GL051652.
  59. **Kravitz, B.**, A. Robock, D. T. Shindell, and M. A. Miller (2012), Sensitivity of stratospheric geoengineering with black carbon to aerosol size and altitude of injection, *Journal of Geophysical Research*, 117, D09203, doi:10.1029/2011JD017341.
  60. **Kravitz, B.**, A. Robock, A. Bourassa, T. Deshler, D. Wu, I. Mattis, F. Finger, A. Hoffmann, C. Ritter, L. Bitar, T. J. Duck, and J. E. Barnes (2011), Simulation and observations of stratospheric aerosols from the 2009 Sarychev volcanic eruption, *Journal of Geophysical Research*, 116, D18211, doi:10.1029/2010JD015501.
  61. **Kravitz, B.** and A. Robock (2011), The climate effects of high latitude eruptions: Role of the time of year, *Journal of Geophysical Research*, 116, D01105, doi: 10.1029/2010JD014448.
  62. **Kravitz, B.**, A. Robock, O. Boucher, H. Schmidt, K. E. Taylor, G. Stenchikov, and M. Schulz (2011), The Geoengineering Model Intercomparison Project (GeoMIP), *Atmospheric Science Letters*, 12, 162-167, doi:10.1002/asl.316.



63. Jones, A., J. Haywood, O. Boucher, **B. Kravitz**, and A. Robock (2010), Geoengineering by stratospheric SO<sub>2</sub> injection: Results from the Met Office HadGEM2 climate model and comparison with the Goddard Institute for Space Studies ModelE, *Atmospheric Chemistry and Physics*, 10, 5999-6006, doi:10.5194/acp-10-5999-2010.
64. **Kravitz, B.**, A. Robock, A. Bourassa, and G. Stenchikov (2010), Negligible climatic effects from the 2008 Okmok and Kasatochi volcanic eruptions, *Journal of Geophysical Research*, 115, D00L05, doi:10.1029/2009JD013525.
65. Robock, A., A. Marquardt, **B. Kravitz**, and G. Stenchikov (2009), Benefits, risks, and costs of stratospheric geoengineering, *Geophysical Research Letters*, 36, L19703, doi: 10.1029/2009GL039209. (Frontier Article)
66. **Kravitz, B.**, A. Robock, L. Oman, G. Stenchikov, and A. B. Marquardt (2009), Acid deposition from stratospheric geoengineering with sulfate aerosols, *Journal of Geophysical Research*, 114, D14109, doi:10.1029/2009JD011918.
67. Abhyankar, S. S., and **B. Kravitz** (2007), Two counterexamples in normalization, *Proceedings of the American Mathematical Society*, 135(11), 3521-3523.

#### **OTHER PUBLICATIONS (20 total)**

---

1. **Kravitz, B.**, A. Robock, and U. Lohmann, Modeling the impacts of geoengineering: Report on the Eighth Annual GeoMIP Meeting, 16-17 April 2018, Zürich, Switzerland, *Eos*, 99, doi:10.1029/2018EO103333.
2. **Kravitz, B.**, A. Robock, O. Boucher, M. Lawrence, J. C. Moore, U. Niemeier, T. Storelvmo, S. Tilmes, and R. Wood, The Geoengineering Model Intercomparison Project: Introduction to the Second Special Issue, *Atmospheric Chemistry and Physics*, doi:10.5194/acp-special\_issue376-preface.
3. Coleman, A. M., J. M. Brandenberger, J. D. Tagestad, D. R. Judi, N. O. Hodas, K. B. Larson, **B. Kravitz**, E. O. Jones, M. V. Disney, and J. Fowler (2018), Next Generation Geospatial Analytics Summit report: September 2017, Pacific Northwest National Laboratory, PNNL-SA-27358.
4. Weimar, M. R., **B. Kravitz**, S. A. Brown, A. Somani, D. M. Anderson, R. T. Dahowski, J. M. Niemeyer, and K. S. Judd (2018), Methodology for valuing resilience to severe events for Department of Energy sites, Pacific Northwest National Laboratory, PNNL-27257.
5. Moss, R. H., **B. Kravitz**, A. Delgado, G. Asrar, J. Brandenberger, M. Wigmosta, K. Preston, T. Buzan, M. Gremillion, P. Shaw, K. Stocker, S. Higuchi, A. Sarma, A. Kosmal, S. Lawless, J. Marqusee, F. Lipschultz, R. O'Connell, R. Olsen, D. Walker, C. Weaver, M. Westley, and R. Wright (2017), Workshop Report: Nonstationary Weather Patterns and Extreme Events: Informing Design and Planning for Long-Lived Infrastructure, ESTCP Project RC-201591.

6. **Kravitz, B.** and A. Robock (2017), Vetting new models of climate responses to geoengineering: The seventh meeting of the Geoengineering Model Intercomparison Project (GeoMIP), *Eos*, 98, doi:10.1029/2017EO089383.
7. **Kravitz, B.**, A. Robock, and J. E. Kristjánsson (2017), Sixth meeting of the Geoengineering Model Intercomparison Project (GeoMIP), *Eos Transactions of the American Geophysical Union*, 98, doi:10.1029/2016EO005279.
8. **Kravitz, B.**, A. Robock, and S. Tilmes (2016), New paths in geoengineering, *Eos Transactions of the American Geophysical Union*, 97, doi:10.1029/2016EO045915.
9. **Kravitz, B.**, A. Robock, and O. Boucher, Future directions in simulating geoengineering (2014), *Eos Transactions of the American Geophysical Union*, 95, 280, doi: 10.1002/2014EO310010.
10. MacMartin, D. G., **B. Kravitz**, and D. W. Keith (2014), Geoengineering: the world's largest control problem, in *Proceedings American Control Conference 2014*, Portland, OR, 4-6 June 2014 (pp. 2401-2406), Piscataway, NJ: IEEE Service Center. (Conference paper)
11. MacMartin, D. G. and **B. Kravitz** (2013), Geoengineering the Earth's climate: The world's largest control problem, *The Impact of Control Technology, Second Edition*, (T. Samad and A. M. Annaswamy, eds.), <http://ieeecss.org/general/impact-control-technology-2nd-ed>.
12. Robock, A. and **B. Kravitz** (2013), Use of models, analogs, and field-tests for geoengineering research, *Geoengineering Our Climate? Ethics, Politics, and Governance, The Earthscan Science in Society Series*, Routledge, 272 pages. Also available through *Working Paper Series on Ethics, Politics, and Governance*, available online at <http://wp.me/p2zsRk-99>. (Invited opinion article)
13. **Kravitz, B.**, A. Robock, and P. J. Irvine (2013), Robust results from climate model simulations of geoengineering: GeoMIP 2013; Potsdam, Germany, 15-16 April 2013, *Eos Transactions of the American Geophysical Union*, 94, 292, doi: 10.1002/2013EO330005.
14. **Kravitz, B.** (2013), Stratospheric aerosols for solar radiation management, in *Encyclopedia of Sustainability Science and Technology*, Springer, 21-38, doi: 10.1007/978-1-4614-5770-1\_3.
15. **Kravitz, B.** (2013), Climate engineering with stratospheric aerosols and associated engineering parameters, *Frontiers of Engineering: Reports on Leading-Edge Engineering from the 2012 Symposium*, National Academy of Engineering, Washington: National Academies Press.
16. **Kravitz, B.**, A. Robock, and J. M. Haywood (2012), Progress in climate model simulations of geoengineering: Second GeoMIP Stratospheric Aerosol Geoengineering Workshop, *Eos Transactions of the American Geophysical Union*, 93(35), 340, doi:10.1029/2012EO350009.

17. **Kravitz, B.**, A. Robock, and J. M. Haywood (2012), Summary of the Second GeoMIP Stratospheric Aerosol Geoengineering Workshop, *SPARC Newsletter*, No. 39, July 2012, available online at <http://www.sparc-climate.org/publications/newsletter/>.
18. Robock, A., **B. Kravitz**, and O. Boucher (2011), Standardizing experiments in geoengineering: GeoMIP stratospheric aerosol geoengineering workshop, *Eos Transactions of the American Geophysical Union*, 92(23), 197-198, doi: 10.1029/2011EO230008.
19. **Kravitz, B.**, A. Robock, O. Boucher, H. Schmidt, and K. E. Taylor (2011), Specifications for GeoMIP experiments G1 through G4, available online at [http://climate.envsci.rutgers.edu/GeoMIP/docs/specificationsG1\\_G4\\_v1.0.pdf](http://climate.envsci.rutgers.edu/GeoMIP/docs/specificationsG1_G4_v1.0.pdf).
20. Robock, A., M. Bunzl, **B. Kravitz**, and G. L. Stenchikov (2010), A test for geoengineering?, *Science*, 327(5965), 530-531, doi:10.1126/science.1186237. (Perspectives Article)

## SUBMITTED MANUSCRIPTS

---

1. **Kravitz, B.**, H. Wang, and P. J. Rasch, Quantifying feedback strength and nonlinearity through simultaneous decoupling of multiple components: An illustration with the sea ice albedo feedback, *Geophysical Research Letters*.
2. **Kravitz, B.**, D. G. MacMartin, S. Tilmes, J. H. Richter, M. J. Mills, J.-F. Lamarque, J. Tribbia, and W. Large, Holistic assessments of SO<sub>2</sub> injections using CESM1(WACCM): Introduction to the special issue, *Journal of Geophysical Research*.
3. Fletcher, C. G., **B. Kravitz**, and B. Badawy, Quantifying uncertainty from aerosol and atmospheric parameters and their impact on climate sensitivity, *Atmospheric Chemistry and Physics*.
4. MacMartin, D. G. and **B. Kravitz**, Mission-driven research for stratospheric aerosol geoengineering, *Proceedings of the National Academy of Sciences*.
5. **Kravitz, B.**, Spanning space, *Nature Physics*.
6. MacMartin, D. G., W. Wang, **B. Kravitz**, S. Tilmes, J. H. Richter, and M. J. Mills, Timescale for detecting the climate response to stratospheric aerosol geoengineering, *Journal of Geophysical Research*.
7. **Kravitz, B.**, P. J. Rasch, H. Wang, A. Robock, C. Gabriel, O. Boucher, J. N. S. Cole, J. Haywood, D. Ji, A. Jones, A. Lenton, J. C. Moore, H. Muri, U. Niemeier, S. Phipps, H. Schmidt, S. Watanabe, S. Yang, and J.-H. Yoon, The climate effects of increasing ocean albedo: An idealized representation of solar geoengineering, *Atmospheric Chemistry and Physics*.
8. MacMartin, D. G., P. J. Irvine, **B. Kravitz**, and J. B. Horton, Characteristics of a solar geoengineering deployment: Considerations for governance, in *Climate Geoengineering: Law and Governance*.

9. Link, R., C. Lynch, A. Snyder, C. Hartin, **B. Kravitz**, and B. Bond-Lamberty, Computationally efficient emulators for Earth System Models, *Geoscientific Model Development*.
10. Fasullo, J. T., S. Tilmes, J. H. Richter, **B. Kravitz**, D. G. MacMartin, M. J. Mills, and I. R. Simpson, Persistent polar ocean warming in a strategically geoengineered climate, *Nature Geoscience*.

## **TEACHING AND MENTORING**

---

Visit by Lorna Burnell (Ph.D. student at University of Nottingham), September 2017.

Served on the thesis committee of Corey Gabriel (Ph.D. student at Rutgers University)

Mentored Rick Russotto (Ph.D. student at University of Washington) during his visit to PNNL, August 2015.

Mentored Hansi Singh (Ph.D. student at University of Washington) during her visit to PNNL, June-August 2014.

Mentored Blaz Gasparini (Ph.D. student at ETH) during his visit to PNNL, May-July 2013.

Mentored Nathan Serota (B.A. student at Princeton University) for his undergraduate thesis, 2013.

Mentored Gail Bradbury (B.S. student at Rutgers University) for her undergraduate thesis project, 2011.

Graduate course in Atmospheric Chemistry (2011), Rutgers University. Assisted with grading and evaluating final presentations.

Graduate course in Physical Climatology (2010), Rutgers University. Guest lectured.

Graduate/advanced undergraduate course in Remote Sensing of the Atmosphere and Ocean (2009), Rutgers University. Planned curriculum, delivered lectures, wrote examinations, and graded.

Beginning undergraduate course on Introduction to Meteorological Analysis (2009), Rutgers University. Guest lectured, graded, and coordinated classroom activities.

Beginning undergraduate course on Energy and Climate (2008), Rutgers University. Graded.

Beginning undergraduate course in calculus (4 semesters spanning 2005-2007). Delivered lectures, wrote examinations, and graded for approximately 80 students per semester. All teaching evaluations were at least 4.2 out of 5.0. Best semester rating 4.9 out of 5.0.

Beginning undergraduate course in calculus (2 semesters spanning 2004-2005).  
Coordinated recitation sessions and graded for approximately 80 students per semester. Evaluations were 4.5 and 4.7 out of 5.0.

## HONORS AND AWARDS

---

Recognition for service to the community, Earth and Biological Sciences Directorate, Pacific Northwest National Laboratory, 2017.

Outstanding Performance Award in recognition of "willingness to provide advice and mentorship to LTE and ASF staff", Pacific Northwest National Laboratory, 2017.

Ronald L. Brodzinski Award for Early Career Exceptional Achievement, Pacific Northwest National Laboratory, 2017.

Outstanding Performance Award in recognition for "outstanding efforts for a sponsor workshop", Pacific Northwest National Laboratory, 2017.

National Security Directorate Carabiner Award (FY17 Q2), 2017.

Recognition for being one of the most active editors in *Earth System Dynamics* for 2016 and 2017.

Editors' Citation for Excellence in Refereeing for *Earth's Future*, 2016 and 2017.

CGD Special Recognition Award, National Center for Atmospheric Research, 2016.

Outstanding Contribution to the AGU Fall Meeting Program Committee of the Global Environmental Change Focus Group, 2016.

Bringing Excellence to Science and Technology, Earth and Biological Sciences Directorate, Pacific Northwest National Laboratory, 2015.

Top Reviewer in American Geophysical Union Journals, 2015.

International Union of Geodesy and Geophysics Early Career Scientist Award, 2015.

Top Author in American Geophysical Union Journals, 2014.

Outstanding Performance Award in recognition of "Significant Contributions and Exceptional Efforts to the Success of the Atmospheric Sciences and Global Change Division", Pacific Northwest National Laboratory, 2014.

"Climate model response from the Geoengineering Model Intercomparison Project (GeoMIP)" was featured in *Nature* as a research highlight (doi:10.1038/501009a)

Graduate research assistantship, NSF grant under principal investigator Professor Alan Robock to study geoengineering, Rutgers University, 2008-2011.

Winner, student poster session for FORMOSAT-3 / COSMIC Annual Science Meeting (3rd place overall). NSPO, Taipei, Taiwan, 2008.

Excellence Fellowship for Doctoral Study in Atmospheric Science, School of Environmental and Biological Sciences, Rutgers University, 2007-2008.

Nomination, Graduate School Excellence in Teaching Award, Department of Mathematics, Purdue University, 2007.

2007 Purdue University Graduate Student Award for Outstanding Teaching, Committee for the Education of Teaching Assistants, Purdue University Teaching Academy, Purdue University.

Outstanding Graduate Instructor, Department of Mathematics, Purdue University, 2007.

2006-2007 Excellence in Teaching Award, Department of Mathematics, Purdue University.

Teaching assistantship, Department of Mathematics, Purdue University, 2004-2007 including summers.

Departmental honors in mathematics, Northwestern University.

National Merit Scholarship, Northwestern University.

## **INVITED PRESENTATIONS**

---

13 June 2018. Overview of the Geoengineering Model Intercomparison Project (GeoMIP). Workshop on Arctic modeling, University of Washington, Seattle, WA.

1 March 2018. Geoengineering: Why research modifying the climate? PNNL Science and Technology Symposium Featuring Science and Engineering Achievement Award Recipients, Pacific Northwest National Laboratory, Richland, WA.

10 January 2018. Geoengineering as a design problem. Department of Earth and Atmospheric Sciences, Indiana University, Bloomington, IN.

5 December 2017. Compound events and long causal chains. Climate change implications for national security. US National Academy of Sciences, Washington, DC.

12 October 2017. The uses of Earth System Models in understanding solar geoengineering. Climate Engineering Conference 2017, Berlin, Germany.

9 October 2017. A review of the major activities in solar geoengineering. Climate Engineering Conference 2017, Berlin, Germany.

- 8 October 2017. An overview of the physical science of solar geoengineering. Solar Radiation Management Governance Initiative forum, Climate Engineering Conference 2017, Berlin, Germany.
- 23 July 2017. Geoengineering as a design problem. 2017 Climate Engineering Gordon Research Conference, Newry, Maine.
- 29 June 2017. Is stationarity really dead? Non-stationary weather patterns and extreme events: Informing design/planning applications for long-lived assets, Joint Global Change Research Institute, College Park, Maryland.
- 18 May 2017. What I talk about when I talk about geoengineering. Graduate Program in Atmospheric Science 10th Anniversary Symposium, Rutgers University, New Brunswick, New Jersey.
- 13 February 2017. Putting the “Engineering” in Climate Engineering. Emerging Frontiers in Research and Innovation, National Science Foundation.
- 11 January 2017. Putting the “Engineering” in Climate Engineering. Emerging Frontiers in Research and Innovation, National Science Foundation.
- 18 October 2016. Mapping the interdisciplinary landscape of climate engineering (Panel discussion). Climate engineering and the Arctic: Integrating public engagement and climate science, Cornell University, Ithaca, New York.
- 17 October 2016. Geoengineering as a design problem. Climate engineering and the Arctic: Integrating public engagement and climate science, Cornell University, Ithaca, New York.
- 22 June 2016. An overview of the Geoengineering Model Intercomparison Project (GeoMIP). ISI-MIP Second Workshop, Potsdam, Germany. (Poster)
- 28 January 2016. What we know about geoengineering from climate models (and what we don’t). National Center for Atmospheric Research, Boulder, Colorado.
- 20 October 2015. The Geoengineering Model Intercomparison Project Phase 6 (GeoMIP6): Simulation Design and Preliminary Results. EMBRACE-CMIP Analysis and Modelling Workshop, Dubrovnik, Croatia.
- 2 July 2015. Progress in the Geoengineering Model Intercomparison Project (GeoMIP). 26th International Union of Geodesy and Geophysics General Assembly, Prague, Czech Republic.
- 27 June 2015. Human influences on climate: Representing climate-society feedbacks in climate models. U11 Early Career Scientist Symposium, 26th International Union of Geodesy and Geophysics General Assembly, Prague, Czech Republic.

- 12 March 2015. SRM impacts on the hydrological cycle. SRM Science Conference, Cambridge, United Kingdom.
- 25 February 2015. What we know about geoengineering (and what we don't). NASA Goddard Space Flight Center, Greenbelt, Maryland.
- 18 February 2015. An energetics perspective on hydrological cycle changes due to geoengineering. Binghamton University, Vestal, New York.
- 13 February 2015. An energetics perspective on hydrological cycle changes due to geoengineering. University of Washington, Seattle, Washington.
- 10 December 2014. One postdoc's perspective on being successful at PNNL. Advanced Study and Development group, Atmospheric Sciences and Global Change Division, Pacific Northwest National Laboratory.
- 9 December 2014. The GeoMIP perspective on interactions with ESGF. ESGF and UV-CDAT Conference, Lawrence Livermore National Laboratory, Livermore, California.
- 21 November 2014. An energetic perspective on hydrological cycle changes due to geoengineering. Lawrence Livermore National Laboratory, Livermore, California.
- 15 October 2014. The role of climate models in studying Solar Radiation Management. Environmental Affairs Symposium, Lewis & Clark College, Portland, Oregon.
- 20 August 2014. Feedback, uncertainty, and the role of climate models in Solar Radiation Management. Climate Engineering Conference 2014, Berlin, Germany.
- 6 March 2014. A new method of comparing climate forcing agents. University of Illinois Urbana-Champaign, Urbana, Illinois.
- 13 January 2014. A new method of comparing climate forcing agents. University of Colorado, Boulder, Colorado.
- 19 April 2013. Climate model results from the Geoengineering Model Intercomparison Project (GeoMIP). UK Met Office, Exeter, United Kingdom.
- 16 April 2013. Mind the Gap - Climate Engineering between Models and Reality (Panel discussion). Institute for Advanced Sustainability Studies, Potsdam, Germany.
- 21 March 2013. Climate model results from the Geoengineering Model Intercomparison Project (GeoMIP). Climate 2013: The next-generation of climate models and knowledge discoveries through the extreme high-performance simulations and big data, Lawrence Berkeley National Laboratory, Berkeley, California.
- 13 September 2012. Climate engineering with stratospheric aerosols and associated engineering parameters. 2012 National Academy of Engineering Frontiers of Engineering Meeting, Warren, Michigan.



- 14 May 2012. GeoMIP – Current Status. IMPLICC final symposium, Max Planck Institute for Chemistry, Mainz, Germany.
- 27 April 2012. Geoengineering: Can we do it? Should we do it? (Panel discussion) MIT Sustainability Summit 2012, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- 26 April 2012. Geoengineering: Whiter skies? Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- 3 April 2012. Stratospheric geoengineering with black carbon aerosols. Department of Chemical Engineering, Oxford University, Oxford, United Kingdom.
- 19 January 2012. Research developments in Solar Radiation Management. Geoengineering Our Climate: Science, Ethics, and Governance, Ottawa, Ontario.
- 1 September 2011. Stratospheric geoengineering with black carbon aerosols. Interdisciplinary Centre on Climate Change, Waterloo, Ontario.
- 7 December 2010. Stratospheric geoengineering with black carbon aerosols. Pacific Northwest National Laboratory, Richland, Washington.
- 17 November 2010. Geoengineering and the climate effects of volcanic eruptions. Graduate seminar course, Department of Environmental Sciences, Rutgers University, New Brunswick, New Jersey.
- 16 April 2010. Stratospheric geoengineering with sulfate aerosols. Center for Energy and Environmental Policy Lunchtime Seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- 19 December 2008. Climate effects of the 2008 Okmok and Kasatochi eruptions. The 2008 eruptions of Okmok and Kasatochi volcanoes, Alaska, American Geophysical Union 2008 fall meeting, San Francisco, California.

**FUNDING (Principal Investigator or Named Co-Investigator only)**

Status	Title and Agency	PI(s) and amount
2018	Emulating climate models using deep learning (Laboratory Directed Research and Development, Pacific Northwest National Laboratory)	<b>Ben Kravitz:</b> \$20,000

Status	Title and Agency	PI(s) and amount
2018	Producing coherent and unbiased joint temperature-precipitation realizations from Earth System Models (Laboratory Directed Research and Development, Pacific Northwest National Laboratory)	Abigail Snyder (PNNL): \$19,461
2017	Revealing dynamic spatial patterns in earth science data using deep learning (Laboratory Directed Research and Development, Pacific Northwest National Laboratory)	Xingyuan Chen (PNNL): \$50,000
2017	Development of PNNL capability to apply the Nalu computational fluid dynamics code to simulate inflow conditions for real-world wind farms (Laboratory Directed Research and Development, Pacific Northwest National Laboratory)	Larry Berg (PNNL): \$44,000
2017	Metrics and diagnostics to quantify high latitude climate change (Laboratory Directed Research and Development, Pacific Northwest National Laboratory)	Susannah M. Burrows (PNNL) and <b>Ben Kravitz</b> : \$30,000
2017	Exploring the space of achievable climate objectives through climate engineering (U.S. Department of Defense)	<b>Ben Kravitz</b> and Douglas G. MacMartin (Caltech): \$60,000
2015 – 2016	A rigorous evaluation of the potentials and the limitations of climate perturbations using systems engineering approaches (U.S. Department of Defense)	<b>Ben Kravitz</b> and Douglas G. MacMartin (Caltech): \$196,000
2015	Using multiple-degree-of-freedom feedback to auto-tune climate models (Laboratory Directed Research and Development, Pacific Northwest National Laboratory)	<b>Ben Kravitz</b> : \$65,000
2015	A rigorous evaluation of the potentials and the limitations of climate perturbations using systems engineering approaches (U.S. Department of Defense)	<b>Ben Kravitz</b> and Douglas G. MacMartin (Caltech): \$300,000

Status	Title and Agency	PI(s) and amount
2015	Junior faculty workshop on Geoengineering Earth's Climate (National Center for Atmospheric Research)	Simone Tilmes (NCAR), Alan Robock (Rutgers), <b>Ben Kravitz</b> , and Andrew Conley (NCAR): \$40,000
2013	Chemical sensing of climate change induced stress at the ecosystem level (Signature Discoveries Initiative, Pacific Northwest National Laboratory)	<b>Ben Kravitz</b> : \$10,000
2007 – 2008	Excellence Fellowship for Doctoral Study in Atmospheric Science (School of Environmental and Biological Sciences, Rutgers University)	<b>Ben Kravitz</b> : \$25,000

## SERVICE AND SYNERGISTIC ACTIVITIES

---

**Editor**, *Earth System Dynamics*.

**Peer reviewer**, *Advances in Atmospheric Science, Advances in Space Research, Atmospheric Chemistry and Physics, Atmospheric Research, Atmospheric Science Letters, Bulletin of the American Meteorological Society, Challenges, Climate Dynamics, Climate Policy, Climatic Change, Complexity, Earth and Planetary Science Letters, Earth System Dynamics, Earth's Future, Economics Research International, Environmental Health Perspectives, Environmental Modeling and Software, Environmental Research Letters, Eos Transactions of the American Geophysical Union, Geophysical Research Letters, Geosciences, Geoscientific Model Development, Global and Planetary Change, International Journal of Climatology, Journal of Atmospheric and Oceanic Technology, Journal of Climate, Journal of Geophysical Research-Atmospheres, Marine Environmental Research, Nature, Nature Climate Change, Nature Communications, Nature Scientific Reports, Philosophical Transactions of the Royal Society A, Proceedings of the National Academy of Sciences, Proceedings of the Royal Society A, Physica Scripta, Sustainability*.

**Proposal reviewer**, *U.S. National Science Foundation, Swiss National Science Foundation*.

**Member**, *American Geophysical Union, American Association for the Advancement of Science, Complex Systems Society, European Geophysical Union*.

**Contributing Author**, Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, Working Group I, Chapter 4: Future global climate: scenario-based projections and near-term information.

**Contributing Author**, Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, Working Group I, Chapter 7: Clouds and Aerosols.

**Director**, Geoengineering Model Intercomparison Project (GeoMIP), <http://climate.envsci.rutgers.edu/GeoMIP/>.

**Division Portfolio Lead**, Atmospheric Sciences and Global Change Division, Pacific Northwest National Laboratory, 2016-present.

**Scientist and Engineer Development Program**, Pacific Northwest National Laboratory, 2017-2019.

**Organizing Team Member**, Remote Sensing trial event at the National Science Olympiad competition, 2017.

**International Steering Committee Member**, Carbon Dioxide Removal Model Intercomparison Project (CDR-MIP).

**Committee Member**, Fall Program Committee for Global Environmental Change, American Geophysical Union Fall Meeting, 2015-2017.

**Committee Member**, American Geophysical Union position statement on geoengineering, 2017.

**Coordinator**, Science Social, Atmospheric Sciences and Global Change Division, Pacific Northwest National Laboratory, 2015-2017.

**Coordinator**, Young Scientists Paper Discussion group, Pacific Northwest National Laboratory, 2014.

**Seminar committee**, Department of Global Ecology, Carnegie Institution for Science, 2011-2012 academic year.

**Scientific Organizer/Steering Committee Member**

- Eighth GeoMIP Workshop, ETH Zurich, 16-17 April 2018.
- Seventh GeoMIP Workshop, Newry, Maine, 23 July 2017.
- Climate Engineering Conference 2017 (CEC17)
- Sixth GeoMIP Workshop, University of Oslo, 21-22 June 2016.
- Fifth GeoMIP Workshop and associated Early Career Summer Workshop on Geoengineering, National Center for Atmospheric Research, Boulder, Colorado, 20-24 July 2015.
- Climate Impacts of SRM geoengineering, Institute for Advanced Sustainability Studies, Potsdam, Germany, 9-10 March 2015.
- Climate Engineering Conference 2014 (CEC14), <http://ce-conference.org/>.

- Fourth GeoMIP Workshop, Laboratoire de Météorologie Dynamique, Paris, France, 25-26 April 2014.
- GeoMIP 2013, Institute for Advanced Sustainability Studies, Potsdam, Germany, 15-16 April 2013.
- Second GeoMIP Stratospheric Aerosol Geoengineering Workshop, UK Met Office, Exeter, United Kingdom, 30-31 March 2012.
- GeoMIP Stratospheric Aerosol Geoengineering Workshop, Rutgers University, New Brunswick, New Jersey, 10-12 February 2011.

### **Conference Session Convener**

- Geoengineering and the Arctic. Ben Kravitz and Douglas G. MacMartin, conveners. Climate Engineering Conference 2017, Berlin, Germany.
- Putting the "Engineering" in Climate Engineering. Ben Kravitz and Douglas G. MacMartin, conveners. Climate Engineering Conference 2017, Berlin, Germany.
- The Geoengineering Model Intercomparison Project: Where have we been and where should we go? Ben Kravitz and Alan Robock, conveners. Climate Engineering Conference 2017, Berlin, Germany.
- Multi-disciplinary assessments of radiation management. Ben Kravitz, Alan Robock, Trude Storelvmo, and Simone Tilmes, conveners. American Geophysical Union 2016 Fall Meeting, San Francisco, California.
- Geoengineering. Alan Robock, Ben Kravitz, and Ulrike Niemeier, conveners. 9 July 2015. Our Common Future Under Climate Change, Paris, France.
- The Potential for Carbon- and Climate-Engineering to Offset Global Change (Sessions U7 and JP2), IUGG General Assembly 2015, <http://www.iugg2015prague.com/>.
- Strategies for cooling Earth: Solar geoengineering and carbon dioxide removal. Piers Forster, Jennifer Wilcox, Hauke Schmidt, Ben Kravitz, Marica McNutt, and Edward Dunlea, conveners. Session GC038, American Geophysical Union 2014 Fall Meeting, San Francisco, California.
- GC053: Climate modeling simulations to test geoengineering. Alan Robock, Ben Kravitz, William Harbert, and Lianjie Huang, conveners. American Geophysical Union 2012 Fall Meeting, San Francisco, California.

### **Edited Volumes and Special Issues of Journals**

- "The Earth system at global warming of 1.5°C and 2.0°C" special issue of *Earth System Dynamics*.

- "The model intercomparison project on the climatic response to volcanic forcing (VolMIP)" special issue of *Earth System Dynamics*.
- "Simulations of stratospheric sulfate aerosol geoengineering with the Whole Atmosphere Community Climate Model (WACCM)" special issue of *Journal of Geophysical Research – Atmospheres*. (Proposer)
- "The Geoengineering Model Intercomparison Project (GeoMIP): Simulations of solar radiation reduction methods" joint special issue of *Atmospheric Chemistry and Physics* and *Geoscientific Model Development*. (Proposer and Guest Editor)
- "The Geoengineering Model Intercomparison Project (GeoMIP)" special issue of *Journal of Geophysical Research – Atmospheres*. (Proposer)
- *Volume 1, Global Environmental Change*, of the *Springer Handbook of Global Environmental Pollution*. Section 1.10: Greenhouse Gases and Geoengineering. (Section Editor)