

K. ALLISON SMITH

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RESEARCH INTERESTS

I am interested in the physiology, behavior, and distribution of organisms in physically and chemically complex marine environments. Research areas include the biogeography of physiological and behavioral adaptations, ecological dynamics in biogeochemical cycles, and impacts of climate extremes on organismal biology. I have additional interests in data science, scientific reproducibility, and data visualization within the fields of biology and oceanography.

EDUCATION

2010	Ph.D., Biological Sciences, University of South Carolina
2005	M.A., Ecology and Evolutionary Biology, University of California, Los Angeles
2002	Fulbright Student, Marine Sciences, University of Auckland, New Zealand
2001	B.S., Biology, <i>distinction</i> , Duke University

PROFESSIONAL EXPERIENCE

2014 - present	Moore/Sloan Data Science Postdoctoral Fellow , eScience Institute, School of Oceanography, University of Washington
2014 - present	Washington Research Foundation Innovation Postdoctoral Fellow in Data Science , eScience Institute, School of Oceanography, University of Washington
2013 - 2014	Associate Research Scholar , Program in Atmospheric and Oceanic Sciences, Princeton University
2010 - 2013	Postdoctoral Research Associate , Program in Atmospheric and Oceanic Sciences, Princeton University

AWARDS AND FELLOWSHIPS

2012	Best Presentation Award, Symposium on the Effects of Climate Change on the World's Ocean, Yeosu, Korea
2007-2010	NASA Earth and Space Science Fellowship
2009	Second Place Presentation, Graduate Student Day, University of South Carolina
2006, 2007, 2008	Elsie Taber Fellowship, University of South Carolina
2007, 2009	Graduate School Travel Grant, University of South Carolina
2002-2003	Fulbright U.S. Student Grant, Institute of International Education, United States Department of State, Bureau of Educational and Cultural Affairs
1999, 2000, 2001	NSF-REU Fellowships

PUBLICATIONS

**** (I publish as K. A. S. Mislan) *****Peer Reviewed (published/in press/accepted)*

- Mislan, K. A. S.**, Deutsch, C. A., Brill, R. W., Dunne, J. P., and Sarmiento, J. L. (2017). Projections of climate driven changes in tuna vertical habitat based on species-specific differences in blood oxygen affinity. *Global Change Biology*. 23:4019-4028. doi: <http://dx.doi.org/10.1111/gcb.13799>
- Borreggine, M., Myhre, S. E., **Mislan, K. A. S.**, Deutsch, C. A., and Davis, C. V. (2017). A database of paleoceanographic sediment cores from the North Pacific, 1951-2016. *Earth System Science Data*, 9:739-749. doi: <https://doi.org/10.5194/essd-9-739-2017>
- Mislan, K. A. S.** A dissection of computational methods used in a biogeographic study. (2017). In Kitzes, J., Turek, D., & Deniz, F. (Eds.). *The Practice of Reproducible Research: Case Studies and Lessons from the Data-Intensive Sciences*. Oakland, CA: University of California Press.
- Helmuth, B., Choi, F., Matzelle A., Torossian J., Morello, S., **Mislan K. A. S.** and others. (2016). Long-term, high frequency *in situ* measurements of intertidal mussel bed temperatures using biomimetic sensors. *Scientific Data*. 3:160087 doi: <http://dx.doi.org/10.1038/sdata.2016.87>
- Mislan, K. A. S.**, Heer, J. M., and White, E. P. (2016). Elevating the status of code in ecology. *Trends in Ecology and Evolution*. 31:4-7. doi: <http://dx.doi.org/10.1016/j.tree.2015.11.006>
- Bianchi, D. and **Mislan, K. A. S.** (2016). Global patterns of diel vertical migration times and velocities from acoustic data. *Limnology and Oceanography*. 61:353-364. doi: <http://dx.doi.org/10.1002/lno.10219>
- Mislan, K. A. S.** (2016). Geographic range. In *Oxford Bibliographies in Ecology*. Ed. David Gibson. New York: Oxford University Press. doi: <http://dx.doi.org/10.1093/obo/9780199830060-0141>
- Mislan, K. A. S.**, Dunne, J. P., and Sarmiento, J. L. (2015). The fundamental niche of blood-oxygen binding in the pelagic ocean. *Oikos*. 125:938-949. doi: <http://dx.doi.org/10.1111/oik.02650>
- Mislan, K. A. S.** and Wethey, D. S. (2015). A biophysical basis to patchy mortality during heat waves. *Ecology*, 96:902-907.
- Mislan, K. A. S.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. (2014). Group behavior among model bacteria influences particulate carbon remineralization depths. *Journal of Marine Research*, 72:183-218.
- Mislan, K. A. S.**, Helmuth, B., and Wethey, D. S. (2014). Geographical variation in climatic sensitivity of intertidal mussel zonation. *Global Ecology and Biogeography*, 23:744-756.
- Stukel, M., **Mislan, K. A. S.**, Décima, M., and Hmelo, L. R. (2014). Detritus in the marine environment. *L&O: eBooks*, pages 49-76.
- Bianchi, D., Galbraith, E. D., Carozza, D. A., **Mislan, K. A. S.**, and Stock, C. A. (2013). Intensification of open-ocean oxygen depletion by vertically migrating animals. *Nature Geoscience*, 6:545-548.
- Mislan, K. A. S.** and Wethey, D. S. (2011). Gridded meteorological data as a resource for mechanistic macroecology in coastal environments. *Ecological Applications*, 21(7):2678-2690.

Mislan, K. A. S., Blanchette, C. A., Broitman, B. R., and Washburn, L. (2011). Spatial variability of emergence, splash, surge, and submergence in wave-exposed rocky-shore ecosystems. *Limnology and Oceanography*, 56(3):857-866.

Wethey, D. S., Brin, L. D., Helmuth, B., and **Mislan, K. A. S.** (2011). Predicting intertidal organism temperatures with modified land surface models. *Ecological Modelling*, 222(19):3568-3576.

Helmuth, B., Broitman, B. R., Yamane, L., Gilman, S. E., Mach, K., **Mislan, K. A. S.**, and Denny, M. W. (2010). Organismal climatology: analyzing environmental variability at scales relevant to physiological stress. *The Journal of Experimental Biology*, 213(6):995-1003.

Mislan, K. A. S., Wethey, D. S., and Helmuth, B. (2009). When to worry about the weather: role of tidal cycle in determining patterns of risk in intertidal ecosystems. *Global Change Biology*, 15(12):3056-3065.

Broitman, B. R., Szathmary, P. L., **Mislan, K. A. S.**, Blanchette, C. A., and Helmuth, B. (2009). Predator-prey interactions under climate change: the importance of habitat vs body temperature. *Oikos*, 118(2):219-224.

Mislan, K. A. S. and Helmuth, B. (2008). Microclimate. In Jørgensen, S. E. and Fath, B. D., editors, *Encyclopedia of Ecology*, volume 3, pages 2389-2393, Oxford. Elsevier.

Mislan, K. A. S. and Babcock, R. C. (2008). Survival and behaviour of juvenile red rock lobster, *Jasus edwardsii*, on rocky reefs with varying predation pressure and habitat complexity. *Marine and Freshwater Research*, 59(3):246-253.

Dissertation and Theses

Smith, K. Allison (2010). *Measuring and Forecasting Environmental Conditions from the Perspective of Rocky Intertidal Organisms*. PhD thesis, University of South Carolina.

Smith, K. Allison (2005). *The Influence of Large Predatory Fish on Juvenile Red Rock Lobster, Jasus edwardsii, Behavior and Survival*. Master's thesis, University of California - Los Angeles.

Smith, K. Allison (2001). *Understanding Species Interactions Using Case Studies of Mussels and Algae, Beetles and Fungi, and Crabs and Anemones*. Undergraduate Honors Thesis, Duke University.

CODE RELEASES

CMIP5 P₅₀ Tuna Analysis v1.0 (2017). Zenodo Repository (<https://doi.org/10.5281/zenodo.808742>)

Code in Ecology Journals (2015). Zenodo Repository (<http://dx.doi.org/10.5281/zenodo.34689>)

P₅₀ Depth Analysis v1.0 (2015). Zenodo Repository. (<http://dx.doi.org/10.5281/zenodo.31951>)

NOAH LSM Mussel v2.0 (2015). Zenodo Repository. (<http://dx.doi.org/10.5281/zenodo.13380>)

Microbial Remineralization Model v1.0 (2014). Zenodo Repository. (<http://dx.doi.org/10.5281/zenodo.16145>)

CRUISES

- Jan. 15 to Feb. 15, 2017. Zooplankton physiology, Eastern Tropical North Pacific. RV Sikuliaq.
 Feb. 13-20, 2016. Chief Scientist Training Cruise. RV Thompson.

PRESENTATIONS

- Apr., 2017 **Smith, K. A.** Projections of climate driven changes on blood oxygen affinity in pelagic habitats. Invited Presentation, University of South Florida, St. Petersburg, FL, USA
- Apr., 2017 **Smith, K. A.** Predicting animal responses to ocean deoxygenation using novel combinations of data and models. Invited Presentation, University of California-Berkeley, Berkeley, CA, USA
- Feb., 2017 **Smith, K. A.** Predicting the responses of animal traits to climate change. Invited Presentation, Hawaii Institute of Marine Biology, Honolulu, HI, USA
- Jul., 2016 **Smith, K. A.**, Deutsch, C. A., and Stock, C. A. Global estimates of bacterial attachment to particles sinking in the ocean. Oral Presentation, Society for Industrial and Applied Mathematics (SIAM) Conference on Life Sciences, Boston, MA, USA
- Feb., 2016 **Smith, K. A.**, Deutsch, C. A., Dunne, J. P., and Sarmiento, J. L. Assessing the impacts of deoxygenation on marine species using blood-oxygen binding thresholds as proxies for hypoxia tolerance in the water column. Oral Presentation, AGU/ASLO Ocean Sciences Meeting, New Orleans, LA, USA
- Jan., 2016 **Smith, K. A.** Predicting where, when, and why: Tuna species response to global environmental change. Invited Presentation, Scripps Institution of Oceanography, San Diego, CA, USA
- Mar., 2015 **Smith, K. A.**, Dunne, J. P., and Sarmiento, J. L. Diversity of blood-oxygen binding traits in the global ocean. Oral Presentation, Symposium on the Effects of Climate Change on the World's Oceans, Santos City, Brazil
- Jan., 2015 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. Group behavior of bacteria to produce exoenzymes linked to diffusion in a model of sinking marine particles. Oral Presentation, Marine Microscale Biophysics Conference, Aspen, CO, USA
- Jan., 2015 **Smith, K. A.**, Dunne, J. P., and Sarmiento, J. L. Regional variability in the vertical zonation of P₅₀ depths in the global ocean. Oral Presentation, Society for Integrative and Comparative Biology, West Palm Beach, FL, USA
- Jul., 2014 **Smith, K. A.**, Dunne, J. P., and Sarmiento, J. L. Predictions of vertical partitions in water column utilization by pelagic species in a changing environment. Poster Presentation, Gordon Research Conference on Ocean Global Change Biology, Waterville Valley, NH, USA

- Feb., 2014 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. Group behavior among model bacteria influences particulate carbon remineralization depths. Poster Presentation, AGU/ASLO Ocean Sciences Meeting, Honolulu, HI, USA
- Aug., 2013 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. A role for bacterial group behavior in particle remineralization. Poster Presentation, Trait-based approaches to Ocean Life Workshop, Copenhagen, Denmark
- Feb., 2013 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. Modeling bacteria-particle processes in the dark ocean. Oral Presentation, ASLO Aquatic Sciences Meeting, New Orleans, LA, USA
- Jan., 2013 **Smith, K. A.**, Carter, B., Dunne, J. P., and Sarmiento, J. L. Predicting the effect of multiple stressors on respiratory niches in the pelagic ocean over the next century. Oral Presentation, Society of Integrative and Comparative Biology Meeting, San Francisco, CA, USA
- Dec., 2012 **Smith, K. A.**, Changing climate, changing habitats: Predicting the future for marine organisms. Invited Seminar. University of Rhode Island, Kingston, RI, USA
- July, 2012 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. An ecophysiological model of particle remineralization in the deep ocean. Poster Presentation. Ocean Carbon & Biogeochemistry Summer Science Workshop, Woods Hole, MA, USA
- May, 2012 **Smith, K. A.**, Dunne, J. P., Carter, B., and Sarmiento, J. L. Predicting future habitat changes above oxygen minimum zones. Oral Presentation. Symposium on the Effects of Climate Change on the World's Oceans, Yeosu, Korea
**Best Presentation Award*
- Feb., 2012 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. Attached bacteria flux as a mechanistic control on mesopelagic particle remineralization. Poster Presentation. AGU/ASLO Ocean Sciences Meeting, Salt Lake City, UT, USA
- Feb., 2012 **Smith, K. A.**, Dunne, J. P., and Sarmiento, J. L. Predicting the impact of climate change on habitat size in the mesopelagic zone. Poster Presentation. AGU/ASLO Ocean Sciences Meeting, Salt Lake City, UT, USA
- Nov., 2011 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. Quantifying the role of bacterial extracellular enzymes in particle remineralization processes. Poster Presentation. GEOTRACES Data-Model Synergy Workshop on ocean particles their role in the biogeochemical cycle of trace elements & isotopes, Barcelona, Spain

- Oct., 2011 **Smith, K. A.**, Dunne, J. P., and Sarmiento, J. L. Climate change impacts on the mesopelagic habitat area above oxygen minimum zones. Poster Presentation. EUR-OCEANS Conference on ocean deoxygenation and implications for biogeochemical cycles and ecosystems, Toulouse, France
- June, 2011 **Smith, K. A.**, Stock, C. A., Dunne, J. P., and Sarmiento, J. L. Quantifying the role of bacterial extracellular enzymes in particle remineralization processes. Oral Presentation. Advances in Marine Ecosystem Modelling Research Symposium, Plymouth, UK
- Aug., 2010 **Smith, K. A.** Modeling body temperature as a mechanistic explanation for mussel bed limit line positions in the rocky intertidal: A continental scale evaluation. Oral Presentation. Ecological Society of America Meeting, Pittsburgh, PA, USA
- May, 2010 **Smith, K. A.** Modeling temperature and survival of rocky intertidal mussels at upper limits. Poster Presentation. NASA Biodiversity and Ecological Forecasting Team Meeting, Washington D.C., USA
- Dec., 2009 **Smith, K. A.** The ins and outs of modeling mussel body temperature. Invited Oral Presentation. NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ, USA
- Nov., 2009 **Smith, K. A.** Diel partitioning of surge and submergence influences intertidal barnacle species distribution patterns. Oral Presentation. Western Society of Naturalists Meeting, Monterey, CA, USA
- Sept., 2009 **Smith, K. A.** The frequency of mussel mortality at upper zonation limits caused by high temperatures. Invited Oral Presentation. Theoretical Ecology Seminar Series, Princeton, NJ, USA
- Aug., 2009 **Smith, K. A.**, Wethey, D., and Helmuth B. A comparison of weather data in a mechanistic model of organism body temperature. Oral Presentation. Ecological Society of America Meeting, Albuquerque, NM, USA
- May, 2009 **Smith, K. A.** Progress towards large-scale analyses of mussel body temperatures. Oral Presentation. NASA Biodiversity and Ecological Forecasting Team Meeting, New York, NY, USA
- May, 2009 **Smith, K. A.** An assessment of the mechanisms determining the upper limits of *Mytilus californianus* beds along 1500 km of the Pacific Coast of North America. Oral Presentation. Benthic Ecology Meeting, Corpus Christi, TX, USA
- Jan., 2009 **Smith, K. A.** An assessment of the mechanisms determining the upper limits of *Mytilus californianus* beds along 1500 km of the Pacific Coast of North America. Oral Presentation. International Temperate Reefs Symposium, Adelaide, Australia

- Nov., 2008 **Smith, K. A.** Splash, Surge, Submerge: A biophysical analysis of ocean influx in the rocky intertidal. Oral Presentation. Western Society of Naturalists Meeting, Vancouver, BC, Canada
- May, 2008 **Smith, K. A.**, Wethey, D. S., and Helmuth, B. Patterns of potential temperature risk during intertidal emergence in different tide regimes. Poster Presentation. NASA Carbon Cycle and Ecosystems Joint Science Workshop. College Park, MD, USA
- April, 2008 **Smith, K. A.**, Wethey, D. S., and Helmuth, B. Patterns of potential temperature risk during intertidal emergence in different tide regimes. Oral Presentation. AGU/ASLO Ocean Sciences Meeting, Orlando, FL, USA
- Nov., 2007 **Smith, K. A.** and Helmuth, B. When mussels die... An assessment of the mechanisms determining the upper limit of *Mytilus californianus* beds along the Pacific Coast of North America. Oral Presentation. Western Society of Naturalists Meeting, Ventura, CA, USA
- Nov., 2006 **Smith, K. A.** Determining patterns of weather risk: Can we extrapolate on a global basis? Oral Presentation. Western Society of Naturalists Meeting, Redmond, WA, USA
- Nov., 2003 **Smith, K. A.** and Babcock, R. C. The effects of marine reserves on juvenile lobster, *Jasus edwardsii*, survival and behaviour. Oral Presentation. Western Society of Naturalists Meeting, Long Beach, CA, USA
- Jan., 2003 **Smith, K. A.** and Babcock, R. C. The effects of marine reserves on juvenile *Jasus edwardsii*, survival. Poster Presentation. International Temperate Reefs Symposium, Christchurch, New Zealand
- Sept., 2002 **Smith, K. A.** and Babcock, R. C. The effects of predators on juvenile *Jasus edwardsii*, foraging and sheltering behavior. Poster Presentation. New Zealand Marine Sciences Society Meeting, Nelson, New Zealand

TEACHING EXPERIENCE

- Mar., 2017 Instructor for Git/GitHub, Software Carpentry Workshop; University of Washington
- Jan., 2017 Instructor for Git/GitHub, Software Carpentry Workshop; University of Washington
- Nov., 2016 Instructor for Docker Tutorial, Geohackweek; University of Washington
- Jun., 2016 Instructor for The Unix Shell, Software Carpentry Workshop; University of Washington
- Mar., 2016 Instructor for The Unix Shell, Software Carpentry Workshop; University of Washington
- Jan., 2016 Instructor for Programming with R, Software Carpentry Workshop; University of Washington
- Oct., 2015 Instructor for Programming with R, Software Carpentry Workshop; University of Washington

Spring, 2012	Guest Lecturer <i>Benthos</i> ; Biological Oceanography; Princeton University
Spring, 2012	Guest Lecturer <i>Coastal Ecosystems</i> ; Ocean, Atmosphere and Climate; Princeton University
Spring, 2011	Guest Lecturer <i>Coastal Ecosystems</i> ; Ocean, Atmosphere and Climate; Princeton University
Fall, 2006	Guest Lecturer <i>Hydrothermal Vents</i> ; Biophysical Ecology; University of South Carolina
Fall, 2006	Teaching Assistant; Biological Principles; University of South Carolina
Fall, 2005	Teaching Assistant; Biology of Marine Organisms; University of South Carolina
Summer, 2004	Teaching Assistant; Evolution, Ecology, and Biodiversity; UCLA
Spring, 2004	Teaching Assistant; Introduction to Marine Science; UCLA
Winter, 2004	Teaching Assistant; Invertebrate Zoology; UCLA
Fall, 2003	Teaching Assistant; Introduction to Marine Science; UCLA
Spring, 2003	Teaching Assistant; Evolution, Ecology, and Biodiversity; UCLA

STUDENTS MENTORED

2016-present	Shirley Leung , Graduate Student, Oceanography, University of Washington Dissertation topic: Forecasting the effects of climate extremes on Pacific tuna fisheries.
2012-2013	Lydia Rudnick , Senior Thesis, Geosciences Department, Princeton University Thesis title: Predicting potential geographic distribution of <i>Siganus luridus</i> and <i>Siganus rivulatus</i> , two invasive fish species in the Mediterranean Sea
Summer, 2012	Jeanette Ferrara , Princeton University Undergraduate, PEI Internship Project: Environmental barriers during salmon smolt migration to the Pacific Ocean
Fall, 2011	Alyson Tockstein , Museum Anthropology, Columbia University Reader for Master's Thesis: <i>Climate change issue-based exhibits at the American Museum of Natural History lead the way in science communication exhibit theory, and design</i>
Summer, 2011	Devika Balachandran , Princeton University Undergraduate, PEI Internship Project: Patterns of zooplankton diel vertical migration in the global ocean

SERVICE

Helper at Software Carpentry Workshop. 2015. University of Washington, Seattle, WA, USA. Assisted students learning to code in R.

Volunteer at the New York City Girls Computer Science and Engineering Conference. 2013. New York City, NY, USA. Assisted with activities and was a panelist.

Volunteer at the Children's Aid Society with the Duke Alumni Association. 2011, 2013. New York City, NY, USA. Mentored underrepresented minorities and encouraged them to pursue higher education and healthier lifestyles.

Created an exhibit on climate change and thermal physiology for students in 7th to 10th grade attending the Young Women's Conference in Science, Mathematics, Technology and Engineering, Princeton University, March, 2013, 2014

Program coordinator for six interns in the Atmospheric and Oceanic Sciences Program, Princeton University. Summer, 2012. Organized activities including orientation, journal clubs, and final presentations

Volunteer docent for Students Engaged in Aquatic Science (SEAS) outreach program. February 2010. Hopkins Middle School, Columbia, SC, USA

Volunteer for the South Carolina and Georgia Regional Competition National Ocean Sciences Bowl. February 2009. Columbia, SC, USA

Gradstudies Student Representative, University of South Carolina. 2006-2007. Columbia, SC, USA

Volunteer tutor for high school students, Student Action with Farmworkers. 1998-1999. Duke University, Durham, NC, USA

Peer reviews of manuscripts for the scientific journals: *Marine and Freshwater Research*, *Marine Ecology Progress Series*, *PLoS One*, *Deep Sea Research*, *Global Change Biology*, *Integrative and Comparative Biology*, *Marine Biology*, *Limnology and Oceanography: Methods*, *Ecology Letters*

Peer reviews of proposals for the following agencies: United States National Science Foundation (NSF), Chilean National Commission for Scientific and Technological Research (FONDECYT)

PROFESSIONAL MEMBERSHIPS

Association for the Sciences of Limnology and Oceanography (ASLO)

The Society for Integrative and Comparative Biology (SICB)

TECHNICAL STRENGTHS

Teaching: Certified Instructor for Software Carpentry and Data Carpentry Workshops

Computer Languages/Applications: R, Python, Fortran, NOAA Ferret, AWK, html5, CSS, javascript, D3.js

Instrument Experience: CTDs, McLane Large Volume Pumps, Temperature and Water Level Loggers, Weather Stations, Temperature Controllers, Thermocouples, Topcon Laser Level, Brunton

SCUBA: Scuba Schools International (SSI) Rescue Diver (200+ scientific dives)