Casey (Smith) Schine

Middlebury College
Department of Biology
Middlebury, VT 05753

Postdoctoral Research Associate
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Education

Ph.D., Earth System Science, Stanford University June 2021
Thesis: New perspectives on primary production in the Pacific sector of the Southern Ocean

M.S., Marine Science, University of South Alabama Aug 2011
Thesis: The relationship between phytoplankton pigment concentrations and DMSP, DMS, and DMSO in a diatom-dominated bloom in the Ross Sea, Antarctica

B.A., Biology, Kenyon College May 2006
Thesis: Isolated wetlands vs. non-isolated wetlands: functional role and response to surrounding land use

Research Positions

Postdoctoral Research Associate Mar 2024 – *Present*
Department of Biology, Middlebury College
Researching bryophyte functional response to environmental forcing for the purpose of parameterizing a bryophyte plant functional type to be incorporated in Earth System Models.
Advisor: Dr. Kirsten Coe

Postdoctoral Oceanographer Sep 2021 – Feb 2024
Biospheric Sciences Branch, NASA Ames Research Center
Using the ECCO-Darwin data-assimilative gobal ocean biogeochemistry model to examine the impact of the slowing of the Atlantic Meridional Overturning Circulation on nutrient transport and primary production in the North Atlantic.
Advisor: Dr. Daniel B. Whitt

Graduate Research Assistant 2011 – 2014, 2017 – 2021
Ocean Biogeochemistry Lab, Stanford University
Combined field and remote sensing techniques to examine the impact of climate change on primary production in the Southern Ocean.
Advisor: Dr. Kevin R. Arrigo

Research Technician Jun 2009 – Dec 2010
Phytoplankton Physiology Lab, Univ. of Southern Mississippi
Researched unicellular algae as a potential source of biofuel.
Supervisor: Dr. Don Redalje

Graduate Research Assistant Aug 2007 – Jun 2009
Sulfur Biogeochemistry Lab, Univ. of South Alabama
Conducted experiments on oceanic cycling of dimethylsulfide and dimethylsulfoniopropionate using algal cultures. Analyzed samples using gas and liquid chromatography.
Advisor: Dr. Ron Kiene

Research Technician Jul 2006 – Jul 2007
Sulfur Biogeochemistry Lab, Univ. of South Alabama
Managed the Sulfur Biogeochemistry Lab. Maintained gas chromatography equipment and algal cultures.
Advisor: Dr. Ron Kiene

Summer Science Intern May 2005 – Aug 2005
Wetland Ecology Laboratory, Kenyon College
Sampled over 350 wetland sites for a catchment-scale assessment of wetland health in the Cuyahoga River Watershed in conjunction with the EPA.
Advisor: Dr. Siobhan Fennessy

Research Technician Dec 2004 – Jan 2005
GRINCHES Research Cruise, RVIB Nathaniel B. Palmer
Analyzed seawater samples for dimethylsulfide and dimethylsulfoniopropionate content using gas chromatography on board the *RVIB Nathaniel B. Palmer* in the Ross Sea, Antarctica.
Supervisor: Dr. Ron Kiene

Research Education for Undergraduates Intern May 2004 – Aug 2004
Sulfur Biogeochemistry Laboratory, Univ. of South Alabama
Developed an independent research project looking at differences in dimethylsulfide and dimethylsulfoniopropionate cycling in coastal (eutrophic) versus open (oligotrophic) ocean waters. Conducted research both on Dauphin Island, AL and on board the *R/V Seward Johnson* in the Sargasso Sea.
Advisor: Dr. Ron Kiene

Teaching Experience

Guest Lecturer
Biological Oceanography (ESS 251), Stanford University Spring 2019
Instructor: Kevin Arrigo 12 students

Teaching Assistant
Biological Oceanography (ESS 251), Stanford University Spring 2020, 2019, 2014
Instructor: Kevin Arrigo 12-25 students

Remote Sensing of the Oceans (ESS 241), Stanford University — Winter 2020
Instructor: Kevin Arrigo — 25 students

Marine Chemistry (ESS 252), Stanford University — Spring 2019, 2014
Instructor: Karen Casciotti — 12-25 students

Pedagogical Training

Science and Engineering Course Design (ENGR 312) — Fall 2019
Teaching by Asking: The Power of Well-Crafted Questions — Nov 2015
Designing an Effective Syllabus — Nov 2015

Mentoring

First-year Graduate Student Mentor, Earth System Science — 2013-2014
First-year Graduate Student Mentor, Earth System Science — 2012-2013

Peer-Reviewed Publications

Schine, C.M.S., G. van Dijken, J.-E. Lundstern, S. Sergi, K.R. Arrigo. Earthquake activity and surface advection predict net primary production in a recurring bloom in the Southern Ocean.*(in revision for Nature Geoscience)*

Schine, C.M.S., A-C. Alderkamp, G. van Dijken, L.J.A. Gerringa, S. Sergi, P. Laan, H. van Haren, M. Ardyna, W.H. van de Poll, K.R. Arrigo. 2021. Massive bloom fed by elevated iron of possible hydrothermal origin in the Pacific sector of the Southern Ocean. Nature Communications. doi:10.1038/s41467-021-21339-5

Schine, C.M.S., G. van Dijken, and K.R. Arrigo. 2016. Spatial analysis of trends in primary production and relationship with large-scale climate variability in the Ross Sea, Antarctica (1997-2013). Journal of Geophysical Research: Oceans. doi:10.1002/2015JC011014

Dugger, K.M., G. Ballard, D.G. Ainley, P.O'B. Lyver, **C. Schine**. 2014. Adélie penguins coping with environmental change: results from a natural experiment at the edge of their breeding range. Frontiers in Ecology and Evolution. doi:10.3389/fevo.2014.00068

del Valle, D., D. Slezak, **C.M. Smith**, A.N. Rellinger, D.J. Kieber, and R.P. Kiene. 2011. Effect of acidification on preservation of DMSP in seawater and phytoplankton cultures: Evidence for rapid loss and cleavage of DMSP in samples containing *Phaeocystis* sp. Marine Chemistry. doi:10.1016/j.marchem.2010.12.002.

Non-Refereed Publications

Smith, Casey M. The relationship between phytoplankton pigment concentrations and DMSP, DMS, and DMSO in a diatom-dominated bloom in the Ross Sea, Antarctica. Master's Thesis, University of South Alabama. Ann Arbor: ProQuest/UMI, 2011. (Publication No. AAT 1496368.)

Invited Talks

Beneath the Surface: How hydrothermal vents drive Southern Ocean primary production. Department of Earth and Climate Sciences, Middlebury College. Middlebury, VT. September 2022. (Seminar)

Recent Presentations and Published Abstracts

Schine, C.M.S., J.-E. Lundstern, G. van Dijken, K.R. Arrigo. Earthquake activity and surface advection predict net primary production in a recurring bloom in the Southern Ocean. Ocean Sciences Meeting. New Orleans, LA. February 2024. (Presentation)

Schine, C.M.S., J.-E. Lundstern, G. van Dijken, Sara Sergi, K.R. Arrigo. Earthquake activity and surface advection predict net primary production in a recurring bloom in the Southern Ocean. Gordon Research Conference on Polar Marine Science. Ventura, CA. March 2023. (Poster)

Schine, C.M.S., A-C. Alderkamp, G. van Dijken, L.J.A. Gerringa, P. Laan, W.H. van de Poll, K.R. Arrigo. Massive bloom fed by elevated iron of possible hydrothermal origin in the Pacific sector of the Southern Ocean. Ocean Sciences Meeting. San Diego, CA. February 2020. (Presentation)

Schine, C.M.S., G. van Dijken, Z.W. Brown, K.R. Arrigo. Detailed spatial analysis of trends in primary productivity in the Ross Sea, Antarctica (1997-2013). Ocean Sciences Meeting. New Orleans, LA. February 2016. (Presentation)

Schine, C.M.S., E.C. Asher, A-C. Alderkamp, P.D. Tortell, J.W.H. Dacey, K.R. Arrigo. DMS, DMSP, and DMSO concentrations in two contrasting Phaeocystis blooms in Ross Sea sector of the Southern Ocean. DMS(P) Symposium. Barcelona, Spain. May 2014. (Presentation)

Schine, C.M.S., G. van Dijken, Z.W. Brown, K.R. Arrigo. Detailed spatial analysis of trends in primary production and sea ice for the shelf and pelagic regions of the Ross Sea, Antarctica (1997-2013). Ocean Sciences Meeting. Honolulu, HI. February 2014. (Poster)

Oceanographic Fieldwork

Phantastic I Research Cruise 18 Nov 2013 – 23 Jan 2014
RVIB Nathaniel B. Palmer, Ross Sea, Antarctica *Phaeocystis antarctica* adaptive responses in the Antarctic ecosystem

GRINCHES Research Cruise 18 Dec 2004 – 24 Jan 2005
RVIB Nathaniel B. Palmer, Ross Sea, Antarctica

Biocomplexity Research Cruise 11 Jul 2004 – 5 Aug 2004
R/V Seward Johnson, Sargasso Sea, Atlantic Ocean

Awards, Grants, and Fellowships

McGee Research Grant, School of Earth, Energy, and Environmental Sciences	2013
Dauphin Island Sea Lab Travel Grant	2009
University of South Alabama Student Government Organization Travel Grant	2009
University of South Alabama Graduate Fellowship	2007-2009
High Honors for Biology Thesis from Kenyon College	2006
Graduation with Distinction in Biology from Kenyon College	2006
National Science Foundation Summer REU Fellowship	2004

Service

Academic Service

- Executive Officer, Women in Earth Sciences 2019-2020
  School of Earth, Energy and Environmental Sciences, Stanford University
- Department Representative, Graduate Student Advisory Committee 2013-2014
  Earth Sciences Advisory Board, Stanford University
- President, Marine Science Graduate Student Organization 2008-2009
  Department of Marine Sciences, University of South Alabama
- Representative, Marine Science Graduate Student Organization 2007-2008
  Department of Marine Sciences, University of South Alabama

Community Service

- Dauphin Island Zone Captain, Coastal Cleanup, Ocean Conservancy 2008
- Graduate Student Volunteer, Coastal Cleanup, Ocean Conservancy 2006-2007
- Graduate Student Volunteer, Spooktakular, Dauphin Island Sea Lab 2006-2008
- Graduate Student Volunteer, Discovery Day, Dauphin Island Sea Lab 2006-2008