Sarah E. Lang

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ocean-slang.github.io

EDUCATION

University of Rhode Island Graduate School of Oceanography 2021-2026
Doctor of Philosophy in Oceanography (Physics Concentration)

University of Virginia 2017-2021
Bachelor of Science in Environmental Science with Highest Distinction
College Science Scholar

DIS Study Abroad in Copenhagen 2019
Environmental Science of the Arctic

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher, Scripps Institution of Oceanography 2026 - Present
Multiscale Ocean Dynamics (MOD) Group
Advisor: Dr. Filipe Pereira

Graduate Researcher, University of Rhode Island, 2021-2026
The Omand Lab
Advisor: Dr. Melissa Omand

NASA Student Airborne Research Program (SARP) Graduate Mentor 2025
National Aeronautics and Space Administration
Faculty Mentor: Dr. Tom Bell (WHOI)

Undergraduate Researcher, University of Virginia 2019-2021
Castorani Lab and Scott Doney Computational Biogeochemistry Lab
Advisors: Dr. Max Castorani and Dr. Scott Doney

Undergraduate Researcher, University of Virginia 2021
Ice and Ocean Group
Advisor: Dr. Lauren Simkins

NSF Research Experience for Undergraduates 2019
National Science Foundation
Advisors: Dr. Max Castorani and Dr. Scott Doney

PUBLICATIONS

Peer-reviewed publications

- **S. E. Lang,** M. M. Omand, M. A. Freilich, A. Y. Shcherbina, J. T. Farrar, L. Middleton, E. Rodríguez. Estimating submesoscale-driven particulate organic carbon flux from remote sensing at a dynamic upwelling front. *JGR: Oceans*. https://doi.org/10.1029/2025JC023752
- **S. E. Lang**, M. M. Omand, L. Lenain. 2025. Airborne remote sensing of concurrent sub-mesoscale dynamics and phytoplankton. *Earth and Space Science*. https://doi.org/10.1029/2025EA004285
- **S. E. Lang**, K. M.A. Luis, S.C. Doney, O. Cronin-Golomb, M. CN. Castorani. 2023. Modeling Coastal Water Clarity Using Landsat-8 and Sentinel-2. *Earth and Space Science*. https://doi.org/10.1029/2022EA002579
- J.T. Farrar, et al. S-MODE: the Sub-Mesoscale Ocean Dynamics Experiment. 2025. *Bulletin of the American Meteorological Society* https://doi.org/10.1175/BAMS-D-23-0178.1
- S. Gangrade, M.A. Freilich, É. Beaudin, K. M.A. Luis, I. Leyba, M. Omand, **S. E. Lang,** L. O'Neill, D. Capone. Open ocean biogeochemical impacts of extreme terrestrial precipitation. 2026. *Geophysical Research Letters*. https://doi.org/10.1029/2026GL122966

Papers in review and preparation

- É. Beaudin, D. A. Capone, **S. E. Lang,** M. Omand, E. DiLorenzo, M. Décima, M. Freilich, Submesoscale Eddy Trapping Supports Planktonic Activity Beyond the Coastal Upwelling Zone. In Revision at *PNAS*.
- A. E. Jones-Kellett. K. Abbott, S. Gangrade, **S.E. Lang**, J. Veatch. Tracking the Ocean's Motion: Methods and Considerations for Using Lagrangian Simulations to Analyze (Sub)Mesoscale Biophysical Interactions. In preparation for submission to *Limnology and Oceanography*
- **S. E. Lang**, A.E. Jones-Kellett, M. M. Omand. Lagrangian evolution of phytoplankton patchiness and community structure in a cyclonic Gulf Stream eddy. In preparation for submission to *Geophysical Research Letters*
- **S.E. Lang**, F. Pereira. Submesoscale instabilities in the North Brazil Current retroflection drive subduction of carbon from the Amazon River Plume. In preparation for submission to *Science Advances*

PUBLISHED DATASETS AND REPORTS

- S. Lang, M. Omand, L. Lenain (2025). Data for: Airborne remote sensing of concurrent submesoscale dynamics and phytoplankton. UC San Diego Library Digital Collections. https://doi.org/10.6075/J0RN386Z
- **S. Lang**, et al., 2023. S-MODE Shipboard Flow-through Bio-Optical Measurements Version 1. Ver. 1. PO.DAAC. https://doi.org/10.5067/SMODE-RVBO2
- **S. Lang**, et al., 2022. S-MODE Shipboard Bottle Data Version 1. Ver. 1. PO.DAAC. https://doi.org/10.5067/SMODE-RVBOT
- **S. Lang,** M. Omand, & R. P. Kelly. 2022 S-MODE Bio-optical Data (V2) Report for IOP-1.
- **S. Lang,** M. Omand, & R. P. Kelly. 2023 S-MODE Bio-optical Data (V2) Report for IOP-2.
- **S. Lang,** M. Omand, & R. P. Kelly. 2022 S-MODE Bio-optical Data (V2) Report for PFC.
- **S. Lang**, O. Cronin-Golomb, and M.C.N. Castorani. 2022. Satellite-based remote sensing of water clarity Environmental Data Initiative. https://doi.org/10.6073/pasta/fe66683665a0133b2d831e552ecbae10

TEACHING AND MENTORSHIP EXPERIENCE

- **NASA Student Airborne Research Program (SARP) Graduate Mentor**
  Wallops Island & Richmond, VA, 2025
  Advised six undergraduate students conducting independent research projects on a wide range of topics within ocean sciences. Taught students how to work with a variety of satellites and large datasets in Python and JupyterLab. Helped students prepare AGU-style presentations. Mentorship and teaching were well received, as communicated through my final performance review and the caliber of the student's final projects. I also participated and facilitated learning during the SARP airborne campaign onboard the P-3 aircraft, as well as helped lead field work at the UVA Coastal Research Center collecting drone imagery and conducting quadrat surveys for multispectral imaging validation.
- **Guest lecturer, Scripps Institution of Oceanography** (Class: Physical-Biological Interactions)
  San Diego, CA, 2026
- **Biological sampling lead for NOPP2-Amazon Deployment Cruise**
  Amazon River Plume, 2026
  Trained an undergraduate researcher to collect and filter water samples for chlorophyll-a and nutrient analysis.
- **Research mentor for high school senior project**
  Narragansett, RI, 2023
  Designed and advised a student project involving the collection and analysis of satellite and field-based ocean color measurements to study the water quality of a local reservoir, using free and accessible tools.

FIELD WORK (total days at sea: 75 days)

Internal Wave Resolving Array NOPP2-Amazon Deployment Cruise, The National Oceanographic Partnership Program (NOPP) October 1 - 17, 2026. *Amazon River Plume*

- Wirewalker and biological sampling lead.
- Responsible for programming and calibrating instruments on the Wirewalker (Signature 1000 ADCP in high resolution mode (turbulence), RBR Tridente (chl-fl and backscatter), RBR Quadrante radiometer, SUNA nitrate sensor, RBR Concerto CTD, RBR ODO optical dissolved oxygen, PAR sensor).
- Tracked and forecasted the Wirewalker's trajectory using ocean forecast models and Lagrangian particle tracking, as the Wirewalker freely drifted with a surface float.
- Led sampling for chlorophyll-a and nutrients for Wirewalker calibrations.

NASA Sub-Mesoscale Ocean Dynamics Experiment (S-MODE) Intensive Operations Period 2 (IOP-2) Research Cruise, April 8 – May 3, 2023. *North Pacific Ocean*

- Optical flow-through system lead.
- Responsible for the set-up, operation, and data collection of an ac-s Spectral Absorption and Attenuation Sensor (Sea-bird Scientific), Imaging Flow-Cytobot (McLane Labs), chlorophyll-fluorometer (Sea-bird), and C-Star transmissometer (Sea-bird).

- Calibrated ship-based and autonomous-vehicle based (e.g. Saildrones, Wavegliders, Seagliders) optical instruments for the 3 S-MODE field campaigns. Created optical proxies for chlorophyll-a and particulate organic carbon.
- Sampled and filtered seawater samples for biological parameters including chlorophyll-a, nutrients, pigments, and particulate organic carbon.
- Contributed to the planning of bio-optical sampling strategies.

NASA Sub-Mesoscale Ocean Dynamics Experiment (S-MODE) Intensive Operations Period 1 (IOP-1) Research Cruise, October 3 – November 1, 2022. *North Pacific Ocean*

- Optical flow-through system lead. Similar responsibilities as IOP-2.

Virginia Coast Reserve Long Term Ecological Research, Water Quality Survey, Summer 2019.

SELECTED CONFERENCES AND PRESENTATIONS

- **S. Lang**, et al., Estimating submesoscale-driven particulate organic carbon flux from remote sensing. Oral. Ocean Sciences Meeting 2026, Glasgow, Scotland
- **S. Lang,** et al., Estimating submesoscale-driven particulate organic carbon flux from remote sensing. Oral. S-MODE 2025 Science Team Meeting at NASA Ames, May 2025, Mountain View, CA.
- **S. Lang**, et al., Airborne remote sensing of phytoplankton and physics at the sub-mesoscale with SIO MASS. Oral. S-MODE 2024 Science Team Meeting at NASA Ames, October 2024, Mountain View, CA.
- **S. Lang**, et al., Airborne remote sensing of phytoplankton and physics at the sub-mesoscale. Oral. University of Washington Physical Oceanography Seminar, October 2024, Seattle, WA.
- **S. Lang**, et al., Airborne relationships between fine-scale dynamics and ocean color. Poster. OCB Summer Workshop, June 2024, Woods Hole, MA.
- **S. Lang**, et al., Submesoscale dynamics and biological distributions from airborne remote sensing. Poster. Ocean Sciences Meeting, March 2023, New Orleans, LA.
- **S. Lang**, et al., Ship-based and autonomous bio-optical measurements and calibrations. Poster. S-MODE 2023 Science Team Meeting at NASA Ames, August 2023, Mountain View, CA.
- **S. Lang**, et al., S-MODE (IOP-2). Poster. OCB Summer Workshop, June 2023, Woods Hole, MA.
- **S. Lang**, M. Omand. Biological Observations from S-MODE Poster. OCB Workshop, June 2022, Woods Hole, MA.
- **S. Lang**, K. Luis, S. Doney, O. Cronin-Golomb, M. Castorani. Modeling Coastal Water Clarity Using Landsat-8 and Sentinel-2. Poster. Ocean Sciences Meeting, March 2022, Online.
- **S. Lang**. Modeling Coastal Water Clarity Using Landsat-8 and Sentinel-2. Anchor Talk. Coastal and Estuarine Research Federation 26th Biennial Conference, November 2021, Online.

COMPUTER AND TECHNICAL SKILLS

Python, MATLAB, cloud computing, high performance computing, OceanParcels, NASA SeaDAS (GUI and CLI), R, GIS, Arduino and soldering, Oceananigans

FELLOWSHIPS AND AWARDS

- Finalist for the Cooperative Institute for Climate, Ocean, and Ecosystem Studies Postdoctoral Fellowship, NOAA-PMEL and University of Washington, Seattle, WA 2026
- NASA Group Achievement Award for the Sub-Mesoscale Ocean Dynamics Experiment (S-MODE) "For Outstanding Achievements in advancing the understanding of small-scale ocean dynamics and their role in the Earth's Climate System," Mountain View, CA 2024
- Webb Family Graduate Fellowship in Oceanography, URI Graduate School of Oceanography, Narragansett, RI 2023 **$3,715**
- NASA-Rhode Island Space Grant Graduate Student Fellowship, Providence, RI 2022 **$26,138**
- Wilbur A. Nelson Award, University of Virginia, Charlottesville, VA 2021 **$5,000**
- Virginia Space Grant Consortium Undergraduate Research Scholarship, Hampton, VA 2020 $**8,500**
- Patrick Sean Murphy '87 Scholarship, University of Virginia, Charlottesville, VA 2020 **$8,000**
- Raven Society, University of Virginia, Charlottesville, VA 2020

MEDIA AND OUTREACH

- Panelist, NASA's Earth Day event at the Chabot Space and Science Center for K-12 students: *"Dr. Brenna Biggs Presents "Wave" Hello to NASA S-MODE: A Study of Sub-Mesoscale Ocean Processes".* Event by NASA Ames Research Center.
- Author, NASA blogs: *NASA's S-MODE Mission: "Sea-ing" through Rainbow-Colored Glasses*: Using ocean color to illuminate the biogeochemistry of the ocean
- Author, NASA blogs: *Life at Sea: A "First-Timer" Chronicles NASA's S-MODE Field Campaign* by Sarah Lang.
- Interviewee, *A Month at Sea: Scientists Prepare to Set Sail for NASA's S-MODE Mission.* Video from NASA Goddard Space Flight Center.
- Interviewee, *PACE Hosts First Hackathon* by Sara Blumberg. Published by NASA Goddard Space Flight Center.
- Interviewee, *The new wave of oceanographers: Sarah Lang. PhD student focusing on how submesoscale ocean dynamics affect phytoplankton communities and plankton distribution.* Published by SWOT AdAC Consortium Blogs.
- Science Saturday at the Graduate School of Oceanography, URI: community outreach event 2021, 2022

REMOTE SENSING TRAINING AND WORKSHOPS

- NASA PACE Hackweek, August 2024, Baltimore, MD
- What's behind the curtain of the NASA Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission? (NASA, Goddard, University of Baltimore Maryland, SRON/AIRBUS NL), August 2022, Baltimore, MD
- Calibration & Validation for Ocean Color Remote Sensing ("the Ocean Optics Class;" 4-week intensive workshop sponsored by NASA, University of Maine, and Bowdoin College), July-August 2021, Orr's Island, ME
- NASA ARSET: Fundamentals of Remote Sensing; Hyperspectral Data for Land and Coastal Systems

EXTRACURRICULAR ACTIVITIES

2025-present Peer Reviewer for Journal of Physical Oceanography and Geophysical Research Letters
2026-present Lagrangian Biophysical Working Group
2024-2026 University of Washington's Sub-mesoscale Journal Discussion Club
2024-2025 S-MODE Sub-mesoscale Journal Discussion Club
2023-2024 Educational Policy Committee, Student Representative (URI-GSO)
2023-2024 Physical oceanography departmental seminars, Co-coordinator (URI-GSO)
2022-2023 URI-GSO graduate mentorship program, Mentor (URI-GSO)
2022-2023 Unlearning Racism in Geosciences, Member (URI-GSO)
2018-2019 Madison House Youth Mentoring, Program Director (UVA)
2018-2019 Write Climate, Vice President (UVA)