James Lauer

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Department of Earth System Science
Stanford University, Stanford, CA 94305

Education

Stanford University 2022 - Present
Ph.D. Earth System Science
Advisor: Kevin Arrigo
Expected Graduation: Spring 2027

University of Michigan 2017 - 2021
B.S. Biochemistry and Environment (PitE), with Specialization in Microbial Ecology
High Honors and High Distinction

Research Experience

Graduate Student: Arrigo Lab Sept. 2022 - Present
Stanford University

- Polar Marine Biogeochemistry
- Methods: satellite remote sensing, research vessel-based sampling and incubations, particle interceptor traps, trace-metal clean sampling and incubations, image-based taxonomy (PlanktoScope), single-turnover active fluorometry (LabSTAF)

Laboratory Technician: Denef Lab Jan. 2019 - Feb. 2022
University of Michigan
Department of Ecology and Evolutionary Biology

- Algal-Bacterial Interactions, Harmful Algal Blooms
- Methods: algal culture, bacterial isolation and culture, culture experiments, natural products isolation and identification, solid phase extraction, high-performance liquid chromatography, molecular networking, DNA extraction, amplification, and sequencing, phylogenetic analysis

Research Assistant: Jakob Lab Dec. 2017 - Dec. 2018
University of Michigan
Department of Molecular, Cellular, and Developmental Biology

- Amyloidogenic Protein Biochemistry
- Methods: human cell culture and experiments, biosafety level 2 (BSL-2) laboratory procedure, confocal laser scanning microscopy, scanning electron microscopy

Publications

*Denotes equal contribution.

4. **Lauer, J. A.**, Van Dijken, G. L., Mills, M. M., Pickart, R. S., Arlen, L., Lim, S. M., Li, E., Payne, C. M., Proctor, C., Zhong, G., Prakash, M., Michel, C., Arrigo, K. R. (Sept. 2026). "Particle Interceptor Trap Deployments Demonstrate Enhanced Export Driven by Frontal Dynamics in the Chukchi Sea". *Journal of Geophysical Research: Oceans*. DOI: 10.1029/2025JC023507.

3. Proctor, C., Mills, M. M., Van Dijken, G. L., **Lauer, J. A.**, Lim, S. M., Palm, A., Payne, C. M., Pickart, R. S., Mordy, C. W., Li, E., Prakash, M., Arrigo, K. R. (Sept. 2026). "Evolution of an Extensive Under-Ice Phytoplankton Bloom in the Chukchi Sea". *Journal of Geophysical Research: Oceans*. DOI: 10.1029/2025JC023528.

2. Baker, D. J.*, **Lauer, J. A.***, Ortega, A., Jackrel, S. L., Denef, V. J. (Dec. 2022). "Effects of Phycosphere Bacteria on Their Algal Host Are Host Species-Specific and Not Phylogenetically Conserved". *Microorganisms*. DOI: 10.3390/microorganisms11010062.

1. Lempart, J., Tse, E., **Lauer, J. A.**, Ivanova, M. I., Sutter, A., Yoo, N., Huettemann, P., Southworth, D., Jakob, U. (Oct. 2019). "Mechanistic Insights into the Protective Roles of Polyphosphate Against Amyloid Cytotoxicity". *Life Science Alliance*. DOI: 10.26508/lsa.201900486.

Submitted

2. Arrigo, K. R., **Lauer, J. A.**, Palm, A., Li, E., Lim, S. M., Mills, M. M., Proctor, C., Van Dijken, G. L., Prakash, M. (Oct. 2026). "Composition of Microalgal Communities in the Chukchi and Northern Bering Sea". *Submitted to Elementa*.

1. Proctor, C., Mills, M. M., Payne, C. M., **Lauer, J. A.**, Mordy, C. W., Van Dijken, G. L., Arrigo, K. R. (Oct. 2026). "Photoacclimation Strategies of Under-Ice and Open Water Phytoplankton in the Chukchi Sea". *Submitted to Limnology and Oceanography*.

In Development

2. **Lauer, J. A.**, Monreal, P. J., Mills, M. M., Barrett, P. A., Buck, N. J., Davis, J. E., Van Dijken, G. L., Baumberger, T., Bundy, R. M., Resing, J. A., Arrigo, K. R. "Addition of Hydrothermally-Influenced Subsurface Water Relieves Fe-Limitation in Surface Waters of the Australian-Antarctic Ridge". *In Development*.

1. **Lauer, J. A.**, Van Dijken, G. L., Baumberger, T., Bundy, R. M., Resing, J. A., Arrigo, K. R. "Phytoplankton Community Composition in the Northwest Ross Sea". *In Development*.

Presentations

Seminars

2. **Lauer, J. A.**, Van Dijken, G. L., Mills, M. M., Pickart, R. S., Arlen, L., Lim, S. M., Proctor, C., Payne, C. M., Zhong, G., Arrigo, K. R. "Water Mass Front Drives Enhanced Export in the Chukchi Sea". Stanford University. Apr. 2024.

1. **Lauer, J. A.**, Van Dijken, G. L., Mills, M. M., Arlen, L., Proctor, C., Arrigo, K. R. "ToTS Cruise 2023: Measuring Export in the Chukchi Sea". Stanford University. Aug. 2023.

Posters

7. **Lauer, J. A.**, Mills, M. M., Monreal, P. J., Barrett, P. A., Buck, N. J., Davis, J. E., Van Dijken, G. L., Jenness, S. E., Walker, S., Baumberger, T., Bundy, R. M., Resing, J. A., Arrigo, K. R. "Addition of Hydrothermally-Influenced Subsurface Water Relieves Fe-Limitation in Surface Waters of the Australian-Antarctic Ridge". *Ocean Sciences Meeting*. Glasgow, Scotland. Feb. 2026.

6. **Lauer, J. A.**, Van Dijken, G. L., Mills, M. M., Arlen, L., Zhong, G., Arrigo, K. R. "Sediment Trap Deployments Demonstrate Enhanced Export Driven by Water Mass Front". *Gordon Research Conference: Polar Marine Science*. Lucca, Italy. Mar. 2025.

5. **Lauer, J. A.**, Van Dijken, G. L., Mills, M. M., Arlen, L., Zhong, G., Arrigo, K. R. "Export Flux of Ice Algae and Phytoplankton in the Chukchi Sea". *Ocean Sciences Meeting*. New Orleans, LA. Feb. 2024.

4. Arrigo, K. R., Prakash, M., Mills, M. M., Van Dijken, G. L., Payne, C. M., Lim, S. M., Proctor, C., **Lauer, J. A.** "The Tale of Three Systems: Fate of Primary Production in the Chukchi Sea". *Gordon Research Conference: Polar Marine Science*. Ventura, CA. Mar. 2023.

3. **Lauer, J. A.**, Baker, D. J., Ortega, A., Schmidt, K. C., Jackrel, S. L., Denef, V. J. "Investigating the Growth Effects of Phycosphere-Associated Bacteria on Freshwater Algal Hosts". *ASM World Microbe Forum*. Virtual. June 2021.

2. **Lauer, J. A.**, Baker, D. J., Ortega, A., Schmidt, K. C., Jackrel, S. L., Denef, V. J. "Investigating the Growth Effects of Phycosphere-Associated Bacteria on Freshwater Algal Hosts". *ASM Microbe Online*. Virtual. June 2020.

1. **Lauer, J. A.**, Lempart, J., Jakob, U. "The Role of Polyphosphate in Neurodegeneration". *Undergraduate Research Opportunity Program Symposium*. Ann Arbor, MI. Apr. 2018.

Field Experience

Oceanographic Cruise, RVIB *Nathaniel B. Palmer* Dec. 2024 - Feb. 2025
Pacific Sector, Southern Ocean and Northwest Ross Sea (53 Days)
Role: Graduate Student Researcher & Night Shift Science Lead

- Trace-metal clean sampling, trace-metal clean incubations, CTD surveys, water sampling (macronutrients, chlorophyll *a*, particulate organic carbon and nitrogen, environmental DNA), cell imaging (PlanktoScope), photophysiology (LabSTAF)

Oceanographic Cruise, R/V *Sikuliaq* Jun. - Jul. 2023
Chukchi Sea, Arctic Ocean (45 Days)
Role: Graduate Student Researcher

- Instrument design, deployment, and recovery, CTD surveys, multi-corer deployment and sample processing, water sampling (macronutrients, chlorophyll *a*, particulate organic carbon and nitrogen, environmental DNA), cell imaging (PlanktoScope)

Limnology Fieldwork Jun. - Jul. 2019, 2020
Lake Michigan (Multiple single-day trips)
Role: Laboratory Technician

- Water sampling, environmental DNA sampling, sediment core processing

Teaching Experience

Courses

The Oceans: An Introduction to the Marine Environment Spring 2026
Co-Instructor of Record *Stanford University*

- Introductory course covering major ocean ecosystems, their dominant organisms, and interactions under natural conditions and anthropogenic stress.

- Designed and delivered lectures, created assignments and exams, and held office hours.

Remote Sensing of the Oceans Winter 2026
Teaching Assistant *Stanford University*
- Required course for Earth Systems students in the Oceans track covering principles of satellite remote sensing, sensor calibration and validation, and interpretation and processing of satellite data with SeaDAS.
- Led four lab sections covering reprojection and mosaicking, masking and data extraction, satellite–in situ matchup validation against SeaBASS data, and Level 1-4 product discovery using NASA Earthdata Search.
- Rebuilt lab materials for a new SeaDAS release, held office hours, graded assignments, and supported student final projects.

Honors Organic Chemistry Fall 2019, 2020; Winter 2020, 2021
Structured Study Group Leader *University of Michigan*
- Led weekly honors discussion sessions for Organic Chemistry I and II.
- Planned and taught lessons (in-person and virtual) covering course material and advanced topics, graded assignments, and served as a mentor to first- and second-year undergraduates.

Pedagogical Development

Teaching as Research (TAR): Leverage Your Skills as a Scholar to Improve Your Teaching
Center for Teaching and Learning, Stanford University Summer 2025
- Graduate course on evidence-based pedagogical strategies and techniques for course design and instruction.

Mentoring Experience

Stanford Young Investigators Program Summer 2025
Research Mentor
- Mentored a visiting high school student in their first laboratory research position.
- Student developed and presented a research poster at the Stanford Young Investigators Symposium and submitted an abstract to the 2025 American Geophysical Union (AGU) Annual Meeting.

Stanford Science Small Groups Winter 2026, Spring 2026
Mentor
- Mentored 5 community college students through virtual research training program designed to increase access to careers in STEM.
- Program aims to address educational inequities by providing research training to students from institutions without research laboratories.

University of Michigan Jun. 2021 - Feb. 2022
Undergraduate Research Mentor
- Supervised and mentored undergraduate research assistants working in the Denef Lab using bacterial and algal culture techniques to detect natural products exchange

Service

Reviewer for *Environmental Research Communications* 2025

Doerr School Graduate Student Advisory Council (GSAC)
Co-Chair 2025-2026
Department Representative 2022-2025

Stanford Doerr School of Sustainability Research Review
Lead Organizer 2025
Organizing Committee 2024, 2026

ESSCapades Student Seminar Series
Organizer 2024-2026

Doerr School Office of Access, Belonging, and Inclusion
Recruitment Ambassador 2025-2026

Honors & Awards

Earth System Science Excellence in Community Award 2025
Antarctic Service Medal 2025
Phi Beta Kappa 2021
Royal Society of Chemistry Award 2021
University of Michigan James B. Angell Scholar 2020-2021
Bader Family Scholarship 2017-2021
Michigan Competitive Scholarship 2017-2021
Department of Chemistry First Year Alumni Achievement Award 2017
University of Michigan Regents Merit Scholarship 2017

Skills

Field: CTD operations, productivity and biomass measurements, nutrient measurements, trace-metal clean water sampling and incubations, gas sampling, instrument deployment and recovery, sediment traps, sediment cores

Laboratory: Phytoplankton culture, bacterial culture, cell culture, microscopy and imaging, trace-metal clean protocols, BSL-2 protocols, DNA extraction, PCR, qPCR, solid phase extraction

Programming & Computing: Python, R, Fortran, Git/GitHub, LaTeX, HPC/parallel computing, ImageJ, EcoTaxa, reproducible research workflows