DANIEL E. SANDBORN

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EDUCATION

University of Minnesota *Intended 2024*
Ph.D. Limnology and Oceanography

California Polytechnic State University San Luis Obispo *2020*
B.S. Chemistry *summa cum laude* with Honors

RESEARCH EXPERIENCE

University of Minnesota Duluth — Large Lakes Observatory Duluth, MN
Ph.D. Dissertation Research with Dr. Elizabeth Minor *August 2020 - Present*

· Designed, built, and tested novel open-source alkalinity measurement instrumentation to advance the accessibility of high-quality environmental chemical analysis.
· Observed carbon dynamics and fluxes in Laurentian Great Lakes using underway and discretely sampled inorganic carbon chemistry timeseries.
· Advanced the use of carbonate saturation state as a predictor of invasive Dreissenid mussel habitat in freshwater ecosystems.

California Polytechnic State University San Luis Obispo, CA
Research Assistant to Dr. Emily Bockmon *January 2018 - June 2020*

· Pioneered seawater carbonate chemistry timeseries on the California Central Coast.
· Built spectrophotometric pH instrument capable of high-accuracy measurement of seawater chemistry.
· Coordinated and volunteered with community marine science outreach.

Research Assistant to Dr. Corinne Lehr *September 2017 - June 2020*

· Determined solubility behavior of cyanuric acid.
· Operated HPLC instrumentation for quantitative analysis.

Pacific Northwest National Laboratory Richland, WA
Summer Undergraduate Laboratory Internship with Dr. Aditi Sengupta *June 2019 - September 2019*

· Developed methods for respiration rate analysis of soil and sediment samples.
· Participated in soil, water, and gas sampling study of salinity encroachment upon terrestrial ecosystems.
· Assisted with WHONDRS global biogeochemistry sampling campaign.

TEACHING EXPERIENCE

University of Minnesota Duluth Duluth, MN
Graduate Teaching Assistant *August 2020 - Present*

· CHEM 2212: Environmental Chemistry — *3 semesters*

Redeveloped laboratory experiment manual to promote student engagement and application of environmental chemistry concepts to real-world contexts. Designed and delivered lectures on analytical methods. Led field science activities.

· CHEM 1153: General Chemistry I — *2 semesters*

Led discussion groups with undergraduate students.

· CHEM 1154: General Chemistry I Laboratory — *2 semesters*

Led laboratory activities with undergraduate students.

California Polytechnic State University San Luis Obispo, CA
Undergraduate Learning Assistant *August 2019 - January 2020*

· CHEM 124: General Chemistry I — *1 quarter*

Assisted faculty in studio chemistry classrooms.

GRANTS AND FELLOWSHIPS

Graduate Research Fellowship 2022-2023
Cooperative Institute for Great Lakes Research *$25,000*

· "Aragonite Saturation State as a Driver of Invasive Dreissenid Habitat"

Early Career Travel Award 2022
Association for the Sciences of Limnology and Oceanography *$400*

· *Presentation at the Joint Aquatic Sciences Meeting*

COAST Undergraduate Research Award 2019
Central Coast Center for Marine Sciences *$500*

· "Purifying *meta*-Cresol Purple Indicator Dye for Accurate Measurements of Ocean pH"

HONORS

Outstanding Graduate Teaching Assistant Award *2022*
Swenson College of Science and Engineering

Learning Assistant of the Year *2020*
Cal Poly Department of Chemistry and Biochemistry

Award for Excellence in Analytical Chemistry *2018*
Cal Poly Department of Chemistry and Biochemistry

PRESENTATIONS

Invited Presentations

1. Minor, E.C.; **Sandborn, D.E.**; Brinkley, G. 2022. "Are increasing atmospheric CO_2 concentrations causing lake acidification in Lake Superior?". MN AWWA Annual Conference. September 2022. Duluth, MN. [*Minor, invited oral presentation*]

Abstracts

1. Kittaka, P. K.; **Sandborn, D.E.**; Minor, E.C. "Diel, Seasonal and Storm-related Changes in Carbonate System Variables in Lake Superior Tributaries". Meeting of the American Geophysical Union. December 2022. Chicago, IL.

Presentations

1. **Sandborn, D.E.**; Minor, E.C.; Errera, R.M. "$CaCO_3$ Saturation State: The Case for a Comprehensive Dreissenid Chemical Predictor". October 2022. Poster presentation. Cooperative Insitute for Great Lakes Research All Partners Meeting. *Virtual.*

2. **Sandborn, D.E.**; Minor, E.C. "CO_2 Acidification in Lake Superior: Developing a Chemical Forecast". May 2022. Poster presentation. Joint Aquatic Sciences Meeting, Grand Rapids, MI.

3. **Sandborn, D.E.**; Minor, E.C. "Quantifying Spatiotemporal Heterogeneity in Inorganic Carbon Chemistry of Lakes Superior and Michigan". June 2021. Oral presentation. Association for the Sciences of Limnology and Oceanography Meeting. *Virtual*.

4. **Sandborn, D.E.**; Sengupta, A. "Developing methods for sediment carbon flux measurement via incubation". August 2019. Poster presentation, Pacific Northwest National Laboratories Undergraduate Symposium, Richland, WA.

5. Bockmon, E.; **Sandborn, D.E.**; Schmidt, G.; Norgaard, A. "Improving instrumentaion for characterizing the carbon dioxide system in seawater". August 2018. Poster presentation, Cal Poly Frost Symposium.

6. Bockmon, E.; **Sandborn, D.E.**; Schmidt, G.; Norgaard, A. "Seawater carbonate chemistry at the Cal Poly Pier, Avila Beach". August 2018. Poster presentation, Cal Poly Frost Symposium.

7. **Sandborn, D.E.**; Lehr, C.R.; "Solubility behavior of Cyanuric Acid". May 2018. Southern California Undergraduate Research Conference. Pomona, CA.

PUBLICATIONS

Journal Articles

1. **Sandborn, D.E.**; Minor, E.C.; Hill, C. "Total Alkalinity Measurement Using an Open-Source Platform". *In review, Limnology and Oceanography Methods*

2. Stegen, J.C.; Sengupta, A.; Garayburu-Caruso, V. Fansler, S.; Chu, R.K.; Danczak, R.; Garcia, M.; Goldman, A.; Kaufman, M.; Ren, H.; Renteria, L; **Sandborn, D.E.**; Song, H.-S.' Willi, K.; Ross, M.; Torgeson, J.; Toyoda, J. "Functional Trait Relationships in Organic Matter are Conserved in River Corridors Across Continents" *In review, PNAS*

Software

1. Humphreys, M. P., Schiller, A. J., **Sandborn, D. E.**, Gregor, L., Pierrot, D., van Heuven, S. M. A. C., Lewis, E. R., and Wallace, D. W. R. (2022). PyCO2SYS: marine carbonate system calculations in Python. Zenodo. doi:10.5281/zenodo.3744275.

PROFESSIONAL SERVICE AND AFFILIATIONS

Professional Affiliations	American Chemical Society Member 2016-Present
	Assn. for the Sciences of Limn. and Oceano. Member 2020-Present
	International Assn. for Great Lakes Research Member 2022-Present
Profesional Service	Student Fees Coordinator for Large Lakes Observatory 2022-Present
	Water Resources Students in Action Coordinator 2021-2022
Outreach	UMN Day of Data Presenter 2022
	UMD Chemistry Mole Day Volunteer 2022
	CCMS Pier Open House Volunteer 2019