

Zach B. Bunnell B.S. M.S.

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EDUCATION

University of South Florida, College of Marine Science St. Petersburg, FL
Master of Science in Marine Science August 2022
Concentration in Chemical Oceanography. GPA: 4.0.
Thesis: “*Elucidating the Sources Supplying Aerosol Iron, Zinc, and Cadmium to the Surface of the North Pacific Ocean.*”
Major Advisor: Dr. Tim Conway.

University of Rochester Rochester, NY
Bachelor of Science in Geological Science August 2018
Major in Geochemistry (Minor in Sustainability). GPA: 3.49

RESEARCH EXPERIENCE

University of South Florida, College of Marine Science August 2019 – August 2022
Graduate Research Assistant with Dr. Tim Conway
Project: *Elucidating the Sources Supplying Aerosol Iron, Zinc, and Cadmium to the Surface of the North Pacific Ocean*

- Analyzing stable isotope ratios of iron, zinc, and cadmium in aerosols collected during the 2018 GEOTRACES transect GP15 in the North Pacific Ocean.
- Quantifying the fraction of anthropogenically produced iron, zinc, and cadmium aerosols from fossil fuel, biomass, and biofuel combustion that makes up the Northern Pacific iron budget.
- Samples extracted and purified in ISO Class 6 clean room, and stable isotope ratios measured by Neptune HR-ICP-MS.

University of Rochester—Early Earth Geochemistry Group November 2017 - April 2018
Undergraduate Research Assistant with Dr. Marlon Jean
Project: *Metal Analysis of the Novosibirsk Meteorite and Early Solar System Implications*

- Utilized LA-ICP-MS to analyze metals within the meteorite’s silicate and metal minerals to provide insights on the conditions, processes, and location of origin within the solar system.
- Examined meteorite’s metamorphic characteristics, such as splash-melt regions and melt veins, using a SEM and petrographic microscope.
- Concluded the unique texture and petrography of the meteorite was due to an initial parent-body impact or a splash melt that formed as it fell through Earth’s atmosphere.

University of Rochester—Ocean Biogeochemistry Group July - August 2017
Undergraduate Research Assistant with Dr. John Kessler
Project: *Characterizing Ocean Acidification and Atmospheric Emission Caused by Methane Released from Gas Hydrate Systems along the US Atlantic Margin*

- Prepared seawater samples from a CTD using a nitrogenous head-space equilibrium technique.
- Utilized gas chromatography to analyze methane concentrations within seawater samples.
- Obtained water column samples using a CTD and prepared them with Woods Hole’s prescribed methodology for radiocarbon dating.

HONORS AND AWARDS

Kent A. Fanning Endowed Memorial Fellowship in Marine Science Recipient (\$10,000)	2021
Paul Getting Endowed Memorial Fellowship in Marine Science Recipient (\$13,000)	2020
UR Earth & Environmental Sciences Lattimore Prize Recipient (\$700)	2018
UR Undergraduate Research Exposition Dean's Medal Recipient	2018
Graduate with Distinction in Geological Science	2018

PEER REVIEWED PUBLICATIONS

2. Tian, H., van Manen, M., **Bunnell, Z. B.**, Laan, P., Jung, J., Hoon Lee, S., Kim, T.-W., Aoki, S., Reichart, G.-J., Conway, T.M., Middag, R. (in review) *Dissolved Fe isotopic contribution in the Amundsen Sea Polynas, Antarctica: insights for external Fe sources and biogeochemical processes.*
1. Sieber, M., Lanning, N.T., **Bunnell, Z. B.**, Bian, X., Yang, S. C., Marsay, C. M., Landing, W. M., Buck, C. S., Fitzsummons, J. N., John, S. G., Conway, T. M. (in review) *Biological, physical, and atmospheric controls on the distribution of cadmium and its isotopes in the North Pacific Ocean.*

CONTRIBUTED PRESENTATIONS

6. Tian, H., van Manen, M., **Bunnell, Z. B.**, Laan, P., Jung, J., Hoon Lee, S., Kim, T.-W., Aoki, S., Reichart, G.-J., Conway, T.M., Middag, R. Dissolved Fe isotopic compositions in the Amundsen Sea Polynas, Antarctica: insights for external sources and biogeochemical processes. Poster and Talk. NIOZ Days, Texel, Netherlands June 1, 2022
5. Tian, H., van Manen, M., **Bunnell, Z. B.**, Laan, P., Jung, J., Hoon Lee, S., Kim, T.-W., Aoki, S., Reichart, G.-J., Conway, T.M., Middag, R. (2022) *Identification of sources of dissolved Fe in the Amundsen Sea, Antarctica: insights from Fe isotopic composition.* NIOS OCS Departmental Seminar, Texel, Netherlands March 8, 2022
4. **Bunnell, Z. B.**, Sieber, M., Marsay, C. M., Buck, C. S., Landing, W. M., John, S. G., and Conway, T. M. (2022) *Tracing anthropogenic iron aerosols delivered to the surface of the North Pacific Ocean.* 38th Annual USF Graduate Student Symposium, St. Petersburg, FL July 28, 2021.
3. **Bunnell, Z. B.**, Sieber, M., Marsay, C. M., Buck, C. S., Landing, W. M., John, S. G., and Conway, T. M. (2021) *Tracing anthropogenic iron aerosols delivered to the surface of the North Pacific Ocean.* Iron at the Air-Sea Interface Workshop, Asheville, NC July 28, 2021.
2. Conway, T. M., **Bunnell, Z. B.**, Sieber, M. *The state of play for using Fe isotopes as source tracers in aerosols and the surface ocean.* Iron at the Air-Sea Interface Workshop. Asheville, NC, July 26, 2021.
1. **Bunnell, Z. B.** and Jean, M.M. *Metal Analysis of the Novosibirsk Meteorite and Early Solar System Implications.* University of Rochester Undergraduate Research Exposition. Rochester, NY, April 20, 2018.

PROFESSIONAL MEMBERSHIPS

The Oceanography Society	2019 - present
Sigma Gamma Epsilon Honor Society	2018 - present

SHIPBOARD EXPERIENCE (19 days at sea)

- R/V Weatherbird II, Gulf of Mexico, USA Feb. 2-6, 2020
- Tested and calibrated USF CMS's new trace-metal clean CTD rosette in the Gulf of Mexico.

R/V Hugh Sharp, US Atlantic Margin, USA

Aug. 24–Sep. 7, 2017

- Investigated methane fluxes from surface waters to the atmosphere along the US Atlantic Margin during a two-week research expedition.

ANALYTICAL TECHNIQUES AND EXPERIENCE

Laser Ablation-Inductively Coupled Plasma-Mass Spectrometer (LA-ICP-MS)

Thermo Neptune Multi-collector-Inductively Coupled Plasma-Mass Spectrometer (MC-ICP-MS)

Thermo Element XR High Resolution-Inductively Coupled Plasma-Mass Spectrometer (HR-ICP-MS)

ESI seaFAST system (for extraction of seawater trace metals)

Clean Lab Experience (ISO 6)

Agilent 6850 Gas Chromatograph (GC)

OUTREACH AND CLUBS

University of South Florida College of Marine Science Seminar Committee

2021-present

University of South Florida College of Marine Science Student Mentor

2020-present