



NASA EARTH + SPACE SCIENCE FELLOW

CAITLIN CASAR

CONTACT

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TECHNICAL SKILLS

Python, R, SQL, Git
Adobe Illustrator, Photoshop, InDesign, Premiere Pro, After Effects
Bioinformatics
Scanning Electron Microscopy
Fluorescence Microscopy
Microbial Culturing
DNA Extraction
PCR
XRD
2015 ArcGIS Certification
2011 NAUI Master Scuba Diver Certification

TEACHING EXPERIENCE

2018 Teaching Assistant
Communication for Geoscientists
2012-2015 Teaching Assistant
Global Environmental Change
Earth, Energy, and the Environment
Physical Systems in Earth and Space Science

RESEARCH INTERESTS

I characterize microbial life in extreme environments on Earth as an analog for life on other planets using field and lab-based cultivation experiments, bioinformatics, thermodynamic modeling, machine learning, and electron microscopy. I am passionate about effectively communicating science to my peers and to the public.

EDUCATION

2016-Current Ph.D. Candidate, Earth and Planetary Sciences, Northwestern University
2015 M.S. Earth and Environmental Science, University of Illinois at Chicago
2012 B.S. Magna Cum Laude, Geology, East Carolina University

AWARDS AND FELLOWSHIPS

2019 Love Data Week Poster Contest Honorable Mention
2018 NASA Earth and Space Science Fellowship
2018 Illinois Space Grant Fellowship
2017 Northwestern Conference Travel Grant
2017 AbSciCon Travel Grant
2017 CoSURF Travel Grant
2014 UIC Departmental Citizenship Award
2014 UIC Provost Award
2013 Knourek Scholarship
2011 NAGT Fellowship

PUBLICATIONS

Casar, C. P., Kruger B., Flynn, T., Masterson, A. L., Momper, L., Osburn, M. R. (in prep). Mineral-hosted biofilm communities in the continental deep subsurface, Deep Mine Microbial Observatory, SD, USA. *Geobiology*.
Osburn, M. R., Kruger, B., Masterson, A. L., Casar, C. P., Amend, J. P. (2019). Establishment of the Deep Mine Microbial Observatory (DeMMO), South Dakota, USA, a Geochemically Stable Portal Into the Deep Subsurface. *Frontiers in Earth Science*, 196.
Meyer-Dombard, D. R., Casar, C. P., Simon, A. G., Cardace, D., Schrenk, M. O., & Arcilla, C. A. (2018). Biofilm formation and potential for iron cycling in serpentinization-influenced groundwater of the Zambales and Coast Range ophiolites. *Extremophiles*, 1-25.

FIELD EXPERIENCE

- 2016-2019** Deployment of field experiments and collection of fluids, biofilms, and fluid geochemical data from the Deep Mine Microbial Observatory, South Dakota for characterization of deep subsurface geomicrobiology
- 2016** Northwestern Earth and Planetary Science field course on sedimentology and stratigraphy of the Western Interior Seaway
- 2014** Collection of fluid geochemical data from the Coast Range Ophiolite Microbial Observatory, California
- 2013** Collection of serpentinizing spring fluids and sediments and spring fluid geochemical data from the Zambales Ophiolite, Philippines for characterization of spring geobiology
- 2013** Collection of hot spring fluid samples and geochemical data from Yellowstone National Park as part of an effort to study nitrogen and carbon fixation in hot spring systems
- 2012** Collection of sediment cores from the Pamlico Sound, NC for X-Ray diffraction and grain size analysis with depth as part of an investigation of coastal system response to sea level rise, climate dynamics, and geomorphic change
- 2011** Two week research cruise on the NOAA R.V. Nancy Foster collecting water column samples along canyon transects for particulate organic matter analysis from Cape Hatteras to the Gulf of Maine as part of a deep water canyon ecology research effort
- 2010** Geologic mapping of northern New Mexico and Southern Colorado as part of the six week ECU Geology summer field camp course

ORAL PRESENTATIONS

- Casar, C., Osburn, M., Flynn, T., Masterson, A., Kruger, B. Mineral-hosted biofilm communities in a deep subsurface Mars-analog system: The Deep Mine Microbial Observatory (DeMMO), SD, USA. Astrobiology Science Conference, Seattle, WA, 2019.
- Casar, C., Osburn, M., Flynn, T., Masterson, A., Kruger, B. Mineral-hosted biofilm communities within the Continental Deep Subsurface. Midwest Geobiology Symposium, Northwestern University, Evanston, IL, 2018.
- Casar, C., Osburn, M., Flynn, T., Masterson, A., Kruger, B. Cultivating the Deep Subsurface Microbiome. CoSURF Conference, South Dakota School of Mines, SD, 2017.
- Casar, C., Osburn, M., Flynn, T., Masterson, A., Kruger, B. Cultivating the Deep Subsurface Microbiome. Astrobiology Science Conference, Mesa, AZ, 2017.

RESEARCH EXPERIENCE

- Current** Geomicrobiology of deep fracture-hosted mineral-associated biofilms in the Deep Mine Microbial Observatory, Lead, South Dakota. (Advisor: Magdalena Osburn, Collaborators: Theodore Flynn, Andrew Masterson, Brittany Kruger)
- 2012-2015** Microbially influenced iron cycling in high pH serpentinizing systems in the Zambales Ophiolite, Philippines and Coast Range Ophiolite, California (Advisor: D'Arcy Meyer-Dombard, Collaborators: Dawn Cardace, Matthew Schrenk, Caloy Arcilla)
- 2012** Cultivating and characterizing deep sea hydrothermal vent archaea (Advisor: Matthew Schrenk)
- 2011** Community composition and connectivity of deep sea coral and cold seep ecosystems in the Gulf of Mexico. (USGS Internship through NAGT Fellowship program)

SELECTED POSTER PRESENTATIONS

- Casar, C., Osburn, M. Big Data in Geobiology: Applications to DeMMO. Midwest Geobiology Symposium, St. Louis, MO, 2019.
- Casar, C., Karbelkar, A., Vinnichenko, G., Chen, M., Osburn, M., Orphan, V., Fischer, W., Sessions, A., 2018 International Geobiology Course Participants. Transformation of ancient organic carbon in exposed organic-rich black shale of the Monterey Formation, Naples Beach, Ca. American Geophysical Union Fall Meeting, Washington D.C., 2018.
- Casar, C., Osburn, M., Flynn, T., Masterson, A., Kruger, B. Mineral-hosted biofilm communities in the Continental Deep Subsurface. North American International Society of Microbial Electrochemistry and Technology, University of Minnesota, St. Paul, MN, 2018.
- Casar, C., Osburn, M., Flynn, T., Masterson, A., Kruger, B. Cultivating the Deep Subsurface Microbiome. American Geophysical Union Fall Meeting, New Orleans, LA, 2017.

PROFESSIONAL ACTIVITIES

- 2019** President of NU Academics for Careers in Data Science
- 2019** SatRDays Chicago Conference Attendee
- 2019** NU R User Group workshop attendee
- 2019** NU Data Science Nights attendee
- 2018** Interviewee for NU Science Journalism Workshop
- 2018** Interviewee for Bill Nye children's science book
- 2018** Midwest Geobiology Symposium Organizing Committee
- 2018** International Geobiology Field Course
- 2017** NU RSG Workshop for Communicating Science Research
- 2017-2018** President of NU Geoclub
- 2016** ECOGEO Workshop - Intro to Environmental 'Omics University of Hawaii at Mānoa, Honolulu Hawai'i
- 2013-2015** President of UIC Terra Society
- 2014** Natural Sciences Teaching Laboratory Revision UIC Earth and Environmental Science, Education Dept.'s
- 2009** ECU Geology Field Camp Manager