

**SAMANTHA R. BAKER**  
samanthabaker@caltech.edu

## EDUCATION

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### **California Institute of Technology**

Ph.D. in Planetary Science in progress, expected June 2026

- NSF Graduate Research Fellowship
- GPA: 3.9/4.0

### **University of Chicago**

B.S. in Geophysical Sciences with Honors, *summa cum laude*, June 2021

Thesis: “Investigating the behavior of volatiles on Ceres and Vesta through vacuum experiments”

- GPA: 3.9/4.0
- Illinois Space Grant Consortium Scholarship, Enrico Fermi Scholar in the Physical Sciences, Student Marshal Honor, Phi Beta Kappa

## RESEARCH EXPERIENCE

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**California Institute of Technology**, Department of Geological and Planetary Sciences, 2021 –  
Advisor: Bethany Ehlmann, Ph.D.

- Integrating spectroscopic data with high-resolution visual imaging and digital elevation models to analyze mineralogy and textural relationships to understand the chemistry and duration of Noachian water.

**California Institute of Technology**, Department of Geological and Planetary Sciences, 2022 –  
Advisor: Michael Lamb, Ph.D.

- Development and implementation of a methodology to use thermal infrared remotely sensed data to analyze the spatial and temporal patterns of river temperature, with particular implementation to determining the thermal response of Alaskan rivers to climate change.

**University of Chicago**, Department of Geophysical Sciences, 2019 – 2021

Advisor: Andrew Davis, Ph.D.

- Honors thesis analyzing volatiles of Ceres and Vesta in post-impact conditions.

**NASA Jet Propulsion Laboratory**, Summer Internship Program, Summers 2019 – 2020

Planetary Science Section, Small Bodies Group

Advisors: Jennifer Scully, Ph.D., Michael Poston, Ph.D., and Elizabeth Carrey, M.S.

- Experimentally simulated the behavior of volatiles in Ceres and Vesta post-impact conditions using the vacuum chamber and instrumentation at JPL’s Extraterrestrial Materials Simulation Lab.

**NASA Jet Propulsion Laboratory**, Summer Internship Program, Summer 2018

Planetary Science Section, Planetary Mission Development

Advisors: Chester Borden, Ph.D. and Jennifer Scully, Ph.D.

- Developed methodology to select a landing site for potential future Ceres exploration

mission to fulfill engineering and scientific objectives.

- Chemical and physical analysis of Dawn mission data to understand the structure, terrain, and composition of Ceres using ArcMap and ArcScene.

**University of Chicago**, Department of Geophysical Sciences, 2018–2019

Advisor: Edwin Kite, Ph.D.

- Geomorphological analysis of Martian craters using ArcGIS and JMARS with images from the Mars Reconnaissance Orbiter to determine mechanism of development of Martian crater outflow channels.

**Duke University**, Earth & Ocean Sciences Division, Summers 2015 – 2017

Advisor: Alan Boudreau, Ph.D.

- Igneous petrology and geochemical analysis of Skaergaard Intrusion (Greenland) and Stillwater igneous complex (Montana) using electron microprobe elemental analysis and petrographic microscopy to determine if hydration was the cause of troctolite formation.

## PUBLICATIONS

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**Baker SR**, Boudreau AE (2019). The Influence of the Thick Banded Series Anorthosites on the Crystallization of the Surrounding Rock of the Stillwater Complex, Montana. *Contributions to Mineralogy and Petrology*, 174(99).

Scully JEC, **Baker SR**, Castillo-Rogez JC (2021). The In-Situ Exploration of a Relict Ocean World: An Assessment of Potential Landing and Sampling Sites for a Future Mission to the Surface of Ceres. *Planetary Science Journal*, 2(94).

Poston MJ, **Baker SR**, Scully JEC, Carey EM, McKeown LE, Castillo-Rogez JC, Raymond, CA (in review). Experimental Examination of Brine and Water Lifetimes After Impact on Airless Worlds. *Planetary Science Journal*.

## SELECTED CONFERENCE PROCEEDINGS

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**Baker SR**, Lamb MP. *Remote Sensing Spatial and Temporal Patterns of Alaskan River Temperature*. Southern California Geomorphology Symposium. Santa Barbara, CA. May 2023.

**Baker SR**, Ehlmann BE. *Chemical Weathering Conditions on Mars as Indicated by Aluminum Phyllosilicates and Associated Mineralogy*. American Geophysical Union Annual Meeting. Chicago, IL. December 2022.

**Baker SR**, Scully JEC, Poston M, Carey E, Castillo-Rogez JC, Raymond CA. *Investigating the Behavior of Volatiles on Vesta and Ceres Through Vacuum Experiments*. Geological Society of America Annual Meeting. Montreal, Canada. October 2020.

**Baker SR**, Scully JEC, Borden CS. *An Analysis of Possible Landing Sites on Ceres*. Geological Society of America Annual Meeting. Indianapolis, IN. November 2018.

**Baker SR**, Boudreau AE. *Analyzing Hydration as the Potential Cause of Olivine and Plagioclase Troctolites*. Geological Society of America Annual Meeting. Denver, CO. September

2016.

**Baker SR.** *Surface Layer Thermal Inertia Reveals Presence and Depth of Subsurface Ice.* Lunar and Planetary Science Conference, Houston, TX. March 2015.

**Baker SR,** Breitfeld A, Quiambao R, et al. *The Effect of Porosity on the Thermal Inertia of Pebble Gravel.* Lunar and Planetary Science Conference, Houston, TX. March 2014.

#### INSTRUMENTATION AND DATA ANALYSIS EXPERIENCE

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**Laboratory Equipment:** imaging spectrometer, scanning electron microscope, electron microprobe, vacuum chamber system

**Remote Sensing Data:** CRISM, HiRISE, Mars Context Camera, MOLA, Landsat

**Programming Languages and Software:** Python, ArcGIS, ENVI, Google Earth Engine, Ames Stereo Pipeline, SOCET SET, WISER, JMARS, ImageJ