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## Overview

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Geysers provide a window into fluid flow within the crust and serve as natural volcanic analogs. I study geysers from an observational standpoint to understand the

- controls on geyser eruption properties,
- causes for dormancy and reactivation, and
- connections between events at individual geysers to the deeper hydrothermal system

Beyond geysers, I have experience planning and deploying long-term monitoring instruments and managing the data they produce. I seek out opportunities to incorporate community/citizen science into my work.

## Education

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- 2025 **PhD: Earth and Planetary Science** *Expected May 2025*  
University of California, Berkeley  
Advisor: Michael Manga
- 2018 **BSci: Physics, *summa cum laude***  
University of Wisconsin, Eau-Claire

## Honors and Awards

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- 2023–2025 **ARCS Scholar**  
Achievement Rewards for College Scientists, Northern California Chapter
- Awarded to outstanding STEM graduate students at ARCS partner universities
- 2023 **Jack Kleinman Grant**  
U.S. Geological Survey/Community Foundation for Southwest WA
- Funded \$4,860 grant proposal: "A pilot study for monitoring Norris Geyser Basin disturbances"
- 2023 **Grad Slam Semi-finalist**  
UC Berkeley
- Competition in which graduate students present their research to a general audience in three minutes
- 2022 **Louderback Award**  
UC Berkeley
- Awarded for outstanding graduate student research in earth science
- 2019 **Honorable Mention**  
NSF Graduate Research Fellowship Program (NSF GRFP)

- 2017 **Member**  
Sigma Pi Sigma
- Honor society for physics and astronomy
- 2016 **Jacob Clarkson Memorial Scholarship**  
UW-Eau Claire
- Awarded to a student who has demonstrated academic achievement, leadership skills, and a commitment to fellow students and faculty
- 2014–2015 **Blugold Fellow**  
UW-Eau Claire
- Research fellowship awarded on merit to 20 incoming students

## Refereed Publications

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5. **Reed, M. H.**, Barth, A., Taira, T., Farrell, J., & Manga, M. (2024). A shake and a surge: Assessing the possibility of an earthquake-triggered eruption at Steamboat Geyser. *Volcanica*, 7(2), 733–748. [doi.org/10.30909/vol.07.02.733748](https://doi.org/10.30909/vol.07.02.733748)
4. Hurwitz, S., King, J., Pederson, J., **Reed, M. H.**, Harrison, L., Hungerford J., et al. (2023). The relation between decadal droughts and eruptions of Steamboat Geyser in Yellowstone National Park, USA. *Geochemistry, Geophysics, Geosystems*, 24(10), e2023GC010988. [doi.org/10.1029/2023GC010988](https://doi.org/10.1029/2023GC010988)
3. **Reed, M. H.**, & Manga, M. (2023). Snow suppresses seismic signals from Steamboat Geyser. *Geophysical Research Letters*, 50(12), e2023GL103904. [doi.org/10.1029/2023GL103904](https://doi.org/10.1029/2023GL103904)
2. Liu, C.-N., Lin, F.-C., Manga, M., Farrell, J., Wu, S.-M., **Reed, M. H.**, et al. (2023). Thumping cycle variations of Doublet Pool in Yellowstone National Park, USA. *Geophysical Research Letters*, 50(4), e2022GL101175. [doi.org/10.1029/2022GL101175](https://doi.org/10.1029/2022GL101175)
1. **Reed, M. H.**, Munoz-Saez, C., Hajimirza, S., Wu, S.-M., Barth, A., Girona, T., et al. (2021). The 2018 reawakening and eruption dynamics of Steamboat Geyser, the world’s tallest active geyser. *Proceedings of the National Academy of Sciences*, 118(2). [doi.org/10.1073/pnas.2020943118](https://doi.org/10.1073/pnas.2020943118)

## Academic Presentations and Posters

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10. **Reed, M. H.**, Barth, A., Taira, T., Farrell, J. & Manga, M. (2024). Can a small earthquake trigger a big geyser eruption? 2024 GSA Joint Cordilleran and Rocky Mountain Section Meeting. *Conference talk*
9. **Reed, M. H.** (2024). Revisiting Norris Geyser Basin disturbances. USGS Kleinman Seminar. *Invited talk*
8. **Reed, M. H.**, & Manga, M. (2023). Not-so-seasonal disturbances at Norris Geyser Basin, Yellowstone. 2023 AGU Fall Meeting, Abstract V14B-07. *Conference talk*

7. **Reed, M. H.**, Bellingham, MA, Cross, T., & Glennon, A. (2023). Geysers gazing: Engaging with the geysers enthusiast community in Yellowstone. 2023 IAVCEI Scientific Assembly, Abstract 0812. *Conference talk*
6. **Reed, M. H.**, & Manga, M. (2023). Snow suppresses seismic signals from Steamboat Geysers. 2023 IAVCEI Scientific Assembly, Abstract 0580. *Conference poster*
5. **Reed, M. H.**, Barth A., & Manga, M. (2022). The underwater sights and sounds of thumping hot springs in the Upper Geysers Basin. 15th Biennial Scientific Conference on the Greater Yellowstone Ecosystem. *Conference poster*
4. Young, J. W., Altstidl, J. M., Altstidl, T. R., **Reed, M. H.**, Boekel, W. (2022). GeysersTimes: a platform for crowdsourced geysers data. 15th Biennial Scientific Conference on the Greater Yellowstone Ecosystem. *Conference poster*
3. **Reed, M. H.**, Barth, A., Girona, T., Hajimirza, S., Hurwitz, S., Karlstrom, L., Karplus, M. S., Manga, M., Muñoz-Saez, C., Rashtbehesht, S. H., & Wu, S. M. (2019). Multiparameter Study of Eruptive Behavior at Steamboat Geysers, Yellowstone. 2019 AGU Fall Meeting, Abstract V33D-0196. *Conference poster*
2. **Reed, M.**, Liberty, L. M., Mikesell, T. D., & Harper, T. (2016). Two-phase evolution of the Camas Prairie, Idaho revealed by active seismic methods. 2016 AGU Fall Meeting, Abstract T51F-2993. *Conference poster*
1. **Reed, M.** (2015). In hot water and tight spots: Navigating obstacles in research and in life. UW-Eau Claire Provost's Honors Symposium. *Invited conference talk*

## Teaching and Work Experience

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- 2021/08 **Graduate Student Researcher**  
 –present UC Berkeley  
*and*
- Analyzes and interprets a wide variety of time series data including stream discharge, geysers eruption intervals, seismic, acoustic, temperature, and weather
  - Reconstructs historical geysers activity by locating and synthesizing information from archival materials
- 2018/08  
 –2019/11
- 2024/01 **Graduate Student Instructor: [EPS C12 "The Planets"](#)**  
 –05 UC Berkeley
- Lectured and provided active learning opportunities for students in two weekly 50-minute discussion sections
  - Developed homework assignments
  - Managed grading logistics for team of teaching assistants and graders
  - Led weekly teaching team meetings
- 2023/08 **Graduate Student Instructor: [EPS 80 "Environmental Earth Sciences"](#)**  
 –12 UC Berkeley

- Managed online course hub
  - Developed and applied grading rubrics to student work
  - Assisted students with course material in weekly office hours
- 2023/01 **Reader: [EPS 150 "Case Studies in Earth Systems"](#)**  
 –05 UC Berkeley
- Provided detailed feedback on weekly student writing samples
- 2022/08 **Graduate Student Instructor: [EPS 20 "Earthquakes in Your Backyard"](#)**  
 –12 UC Berkeley
- Managed Zoom portion of a hybrid classroom
  - Wrote quiz and exam questions
  - Assisted students with course material in weekly office hours
- 2022/08 **Consultant**  
 Guinness World Records
- Provided fact-checking for records related to geysers and hot springs for *Guinness World Records 2024*
- 2020/09 **Administrative Processor II**  
 –2021/08 Insight Global
- As **Administrative Processor I:**
- Reviewed applications to the Pacific Gas and Electric (PG&E) Net Energy Metering program with great attention to detail
  - Routinely exceeded production targets by 25%
- Promoted to **Administrative Processor II** after 4 months (2021/01):
- Managed 3 direct reports
  - Trained new hires in the application review process and implemented new training modules to promote active learning
  - Handled complicated interactions with solar installers and customers with clear communication
  - Created and maintained documentation of process guidelines
- 2017/08 **Tutor**  
 –2018/05 UW-Eau Claire
- Reinforced concepts and provided homework help for peers in lower division physics and chemistry courses
- 2016/06 **Geophysics Intern**  
 –08 Incorporated Research Institutions for Seismology/Boise State University
- IRIS REU internship with mentors Dylan Mikesell and Lee Liberty
  - Investigated small-scale tectonics in the Camas Prairie, ID basin with active and passive seismic methods
  - Interpreted active seismic data and well logs to identify previously unmapped faults

## Service

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- 2024/09 **Hybrid Seminar Facilitator**  
 –present EPS Department Colloquium, UC Berkeley
- Manages technology and Zoom room for weekly seminars

- 2021/02 **Scientific Advisor**  
 –present *GeyserTimes*
- Volunteers for the nonprofit organization [GeyserTimes](#), which hosts a database of crowdsourced geyser observations
  - Moderates entries and cleans data to improve database quality
  - Leads project to create a repository of curated datasets that are ideal for scientific and educational use
  - Creates guidelines and policy for entering data
  - Responds to support questions from users
- 2023/08 **Mentor**  
 –2024/05 EPS Mentoring Program, UC Berkeley
- Met periodically with junior graduate students in the Department of Earth and Planetary Science to establish a sense of community and provide guidance on qualifying exams, work-life balance, and goal setting
- 2023/07 **Thermal Area Protection Program Volunteer**  
 Geology Program, Yellowstone Center for Resources, National Park Service
- Picked up trash and retrieved lost items in thermal areas
  - Provided informal interpretation to park visitors
- 2022/09 **Mentor**  
 –12 Mathematical and Physical Science Scholars, UC Berkeley
- Provided academic guidance to two STEM undergraduates during monthly meetings

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## Science Communication and Outreach

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### Publications:

5. Cross, T., & **Reed, M. H.** (2024). Digging into the history of hydrothermal explosions in Biscuit Basin. *Yellowstone Caldera Chronicles*. [[link](#)]
4. **Reed, M.** (2024). Highlights from the Fall 2023 American Geophysical Union Meeting. *The Geyser Gazer Sput*, 38(1), 14–17. [[link](#)]
3. **Reed, M. H.** (2023). New research sheds light on Steamboat Geyser’s eruptions, past and present. *Yellowstone Caldera Chronicles*. [[link](#)]
2. **Reed, M. H.**, & Manga, M. (2021). A mysterious reawakening of the world’s tallest geyser from decades of sleep. *TheScienceBreaker*, 7(3). [[link](#)]
1. **Reed, M. H.**, & Manga, M. (2021). Insights into the eruptions of Steamboat Geyser. *Yellowstone Caldera Chronicles*. [[link](#)]

### Presentations:

- 2024/09/18 **Invited Speaker**  
 Nerd Nite SF, San Francisco, CA
- Audience: adults
- 2024/09/13 **Invited Speaker**

Yellowstone National Park Service Resource Education and Youth Programs Team Meeting, online

- Audience: National Park Service interpretive staff
- Explained the causes of hydrothermal explosions and provided updates on research related to the hydrothermal explosion in Biscuit Basin

2024/03/19 **Speaker**

Geyser Observation and Study Association Winter Presentation Series, online

- Audience: geyser enthusiasts

2024/02/07 **Invited Speaker**

Marin Science Seminar, Terra Linda High School, San Rafael, CA

- Audience: high school students

2024/01/09 **Intersession Facilitator**

The Nueva School, San Mateo, CA

- Audience: high school students
- Created and taught a 75-minute lesson on volcanoes and geysers

2019/05/17 **Lesson Presenter**

Bay Area Scientists Inspiring Students

- Audience: middle school students
- Taught lessons on tectonics with hands-on lab demonstrations

#### Contributions to Podcasts:

2021 ***Hello, Nature* (Episode 5: ["Hello, Yellowstone"](#))**

Dustlight Productions and REI Co-op Studios

- Audience: general public
- Provided background information on geysers and hot springs in addition to audio narration

2021 ***Science Sessions* (Episode: ["Eruption of Steamboat Geyser"](#))**

Proceedings of the National Academy of Sciences

- Audience: general public
- Interviewed about research findings published in *PNAS*

## **Field Experience**

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### Field Skills

- Field safety in hydrothermal areas with geysers, hot springs, fumaroles, and mudpots
- Monitoring instrument deployment and retrieval: geophones, HOBO temperature sensors, hydrophones, and pressure transducers
- Cross-country travel with a heavy pack
- Capable swimmer
- Caving in varied underground terrain including tight squeezes down to 23 cm height
- Single rope technique: changeovers, rebelay, knot crossings, and rigging
- Completed the National Cave Rescue Commission's [Level 1 course](#) including 7 days of instruction in haul systems, search and rescue, and decision making

### Selected Fieldwork Campaigns:

- 2024/07/23 **Rapid response to hydrothermal explosion at Biscuit Basin**  
 -07/28 Yellowstone National Park, WY
  - Deployed in-situ temperature loggers in anticipation of follow-up explosive activity
  - Contributed to a ballistics map recording the dimensions and lithology of >1,400 sedimentary rocks ejected in the explosion
  
- 2021-2023 **In-situ monitoring of geysers and hot springs**  
 (4 trips) Yellowstone National Park, WY
  - Installed a hydrophone, HOBO temperature loggers, and pressure sensors for short-term deployments at multiple thermal features
  - Lowered cameras with a custom-built apparatus into hot springs and pool geysers to image bubble collapse and shallow plumbing structure
  
- 2021/11/12 **Dense geophone arrays in the Upper Geyser Basin**  
 -11/14 Yellowstone National Park, WY
  - Deployed geophones around Old Faithful Geyser, Grand Geyser, and Black Sand Pool while taking care not to damage delicate formations
  - Marked geophone locations with handheld GPS
  
- Summer 2019 **Water sampling from major eruptions of Steamboat Geyser**  
 (2 trips) Yellowstone National Park, WY
  - Wrote the permit application for, organized, and led two campaigns to obtain water samples from major eruptions of Steamboat Geyser
  
- Summer 2017 **Active seismic imaging of faults and fractures**  
 Camas Prairie, ID
  - Collected seismic reflection data along miles of dirt roads using a mobile streamer full of geophones

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## Technical Skills

- Python
- Seismic data analysis with ObsPy
- Time series analysis
- Markdown
- ArcGIS and QGIS
- Photography, specializing in cave photography
- ImageJ
- GIMP
- Audacity
- Microsoft Office

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## Affiliations

- International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)
- Geological Society of America (GSA)
- American Geophysical Union (AGU)
- National Speleological Society (NSS)