Nathan J. McGregor

University of California Santa Cruz
Department of Earth and Planetary Sciences
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Research Interests

Experimental petrology; isotopic tracers of planetary processes; mineralogical, chemical, and isotopic analysis of extraterrestrial materials; thermal evolution modeling, thermodynamic modeling, and aqueous geochemical modeling; geochemistry of worlds beyond the Solar System; interdisciplinary approaches that bridge planetary science, cosmochemistry, and astrophysics using geochemical and isotopic systems

Education

University of California Santa Cruz
Ph.D., Earth and Planetary Sciences, 2027
Certificates: Pedagogical Leadership; Equity-Minded Mentoring; Equitable Course Design

Boise State University
B.S., Physics and Astrophysics, 2021
B.A., Political Science, 2012
Minors: Applied Mathematics; Criminal Justice

Employment

University of California Santa Cruz, Earth and Planetary Sciences
Advisors: Profs. Francis Nimmo and Myriam Telus
Graduate Student Researcher, 2021–2027
Teaching Assistant, 2022–2027

Boise State University, Physics
Advisor: Prof. Daryl Macomb
Undergraduate Student Researcher, 2019–2021, 2011–2012
Teaching Assistant, 2019–2021
Lab Instructor, 2019–2021

University of Hawai'i at Mānoa, Oceanography
Advisor: Prof. Angelos Hannides
Undergraduate Student Researcher, 2012–2013

Publications

3. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, Lourenço, D. L. (In prep). Rates of true polar wander on Venus driven by mantle convection. *Geophys. Res. Lett.*
2. **McGregor, N. J.**, Thompson, M. A., Telus, M., Schaefer, L., Elling, M., and Trodden, M. (In Prep). Linking the atmospheric and bulk compositions of rocky exoplanets: Constraints from meteorite outgassing analyses. *Nature Astronomy.*
1. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, G. J., Plattner, A. M., and Conrad, J. W. (2025). Probing the viscosity of Venus's mantle from dynamic topography at Baltis Vallis. *J. Geophys. Res. Planets*, 130, e2024JE008581. https://doi.org/10.1029/2024JE008581.

Conference Presentations (*indicates undergraduate student)

20. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, Lourenço, D. L. (2026). Rates of true polar wander on Venus driven by mantle convection. Lunar and Planetary Science Conference.
19. **McGregor, N. J.**, Thompson, M. A., Telus, M., and Schaefer, L. (2026). Linking planetary bulk composition and secondary atmospheres through novel meteorite outgassing experiments. Rocky Worlds 4.
18. **McGregor, N. J.**, Thompson, M. A., Telus, M., and Schaefer, L. (2025). Linking rocky exoplanetary atmospheres and interiors through meteorite outgassing experiments. American Geophysical Union Fall Meeting.
17. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, Lourenço, D. L. (2025). True polar wander of Venus. American Geophysical Union Fall Meeting.
16. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, Lourenço, D. L. (2025). Rates of true polar wander on Venus driven by mantle convection. Venus Exploration and Analysis Group (VEXAG) Meeting.
15. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, Lourenço, D. L. (2025). Rates of true polar wander on Venus driven by mantle convection. Bay Area Planetary Science Conference.
14. **McGregor, N. J.** (2025). What meteorites tell us about planets around other stars. UC Santa Cruz Graduate Research Symposium.
13. **McGregor, N. J.**, Thompson, M. A., Telus, M., and Schaefer, L. (2024). Meteorite outgassing experiments as a tool for linking the atmospheric and bulk compositions of rocky planets. 56th Annual Division for Planetary Sciences Meeting.
12. **McGregor, N. J.**, Thompson, M. A., Telus, M., and Fortney, J. (2023). Chondritic meteorite outgassing experiments: A novel technique to constrain the early atmospheric composition of terrestrial planets. American Geophysical Union Fall Meeting.
11. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, G., Plattner, A. & Conrad, J. W. (2023). Dynamic topography of Baltis Vallis reveals low viscosity of the Venusian mantle. American Geophysical Union Fall Meeting. #3145.
10. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, G., Plattner, A. & Conrad, J. W. (2023). Dynamic topography of Baltis Vallis reveals low viscosity of the Venusian mantle. Venus as a System Conference.
9. Trodden, M.*, Elling, M.*, **McGregor, N. J.**, Thompson, M. A., and Telus, M. (2023). Chondritic meteorite outgassing experiments: A novel technique to constrain the early atmospheric composition of terrestrial planets. Bay Area Planetary Sciences Conference.
8. **McGregor, N. J.**, Thompson, M. A., Kirk, J., Telus, M., and Nimmo, F. (2023). Constraining accretional volatile depletion with meteorite outgassing experiments. The Meteoritical Society Meeting.
7. **McGregor, N. J.** (2023). Evidence for a heat-pipe Venus. UC Santa Cruz Graduate Research Symposium.
6. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, G., Plattner, A., and Conrad, J. W. (2023). Constraining Venus' convection regime using Baltis Vallis topography. European Geosciences Union General Assembly.
5. **McGregor, N. J.**, Nimmo, F., Gillmann, C., Golabek, G., Plattner, A., and Conrad, J. W. (2023). Constraining Venus' convection regime using Baltis Vallis topography. Lunar and Planetary Science Conference.
4. Calderon, T.*, Jorge-Chavez, F.*, **McGregor, N. J.**, & Telus, M. (2022). Investigating Mn rims of chondrule meteorites. UC Santa Cruz Research Experiences for Undergraduates

Program on Sustainable Materials.

3. **McGregor, N. J.** & Macomb, D. (2020). Photometric monitoring of MRK 501: A model for measuring the optical variability of BL Lacs. Idaho Conference on Undergraduate Research.
2. **McGregor, N. J.** & Macomb, D. (2020). Photometric monitoring of MRK 501: A model for measuring the optical variability of BL Lacs. Boise State University Research Showcase.
1. **McGregor, N. J**. & Macomb, D. (2012). Identifying X-ray sources in Local Group galaxies using Fourier analysis of time series data. Boise State University Undergraduate Research and Scholarship Conference.

Funding and Awards

Kathryn D. Sullivan Research Impact Award in Earth and Marine Sciences, $20,000
Graduate Pedagogy Fellowship, 2026, $2,000
ARCS Foundation Fellowship, 2025–2026, $13,333
Regent's Fellowship, 2025–2026, $7,560
Venus Exploration Analysis Group (VEXAG) Meeting Travel Award, 2025, $2,000
Best Presentation of the Physical and Biological Sciences Division, 2025 UC Santa Cruz Graduate Symposium, $250
Rita Olsen Pister Endowed Scholarship, Women's Club, 2025, $1,000
STARRS Re-entry Scholarship, 2025, $1,000
Japan Society for the Promotion of Science (JSPS) Summer Fellowship, 2024, $5,000
SOKENDAI Japan International Internship, 2023, $3,000
Venus as a System Conference Travel Award, 2023, $1,200
Culturally Inclusive Planetary Engagement Workshop, 2023, $500
Regent's Fellowship, 2021–2023, $24,000
Inclusive Leadership Fellowship, 2020–2021, $8,850
Higher Education Research Council Fellowship, 2020, $3,000
Social Impact Fellowship, 2014, $4,000
Student Research Initiative Fellowship, 2014, $2,000

Teaching

Instructor (Teaching Fellow), University of California Santa Cruz (4 courses)
- **EART 165/268** History and Geochemistry of the Solar System, Spring 2027
- **EART 203** Introductory Teaching Seminar, Fall 2026
- **ASTR 3** Introductory Astronomy: Planetary Systems, Summer 2026
- **EART 5** California Geology, Summer 2026

Teaching Assistant, University of California Santa Cruz (4 courses)
- **EART 111** Mathematics in the Earth Sciences, Fall 2025
- **EART 160** Planetary Science, Fall 2024
- **EART 111** Mathematics in the Earth Sciences, Fall 2023
- **EART 111** Mathematics in the Earth Sciences, Fall 2022

Lab Instructor, Boise State University (7 courses)
- **PHYS 212L** Physics II with Calculus, Summer 2021
- **PHYS 105** Stars and Cosmology (2 sections), Spring 2021
- **PHYS 101** Introduction to Physics, Fall 2020
- **PHYS 111** General Physics I, Summer 2020
- **PHYS 111** General Physics I, Spring 2020
- **PHYS 112** General Physics II, Fall 2019

Teaching Assistant, Boise State University (7 courses)

PHYS 341 Classical Mechanics, Spring 2021
PHYS 111 General Physics I, Spring 2020
PHYS 111 General Physics I, Fall 2019
MATH 170 Calculus I, Fall 2013
MATH 175 Calculus II, Summer 2012
MATH 170 Calculus I, Spring 2012
MATH 170 Calculus I, Fall 2011

Undergraduate Students Advised

Kayla Kuehmann, UC Santa Cruz, 2026
Matteo Pedri, UC Santa Cruz, 2026
Mia Trodden, UC Santa Cruz, 2023–2024 (currently a Ph.D. student at Purdue University)
Matraca Elling, Stony Brook University, Lamat REU Program, 2022–2023, 2025–2026 (currently a Postbaccalaureate Researcher at NASA Goddard Space Flight Center)
Malcolm Seemann, UC Santa Cruz, 2022–2024

Invited Talks

Probing the viscosity of Venus's mantle from dynamic topography at Baltis Vallis, Organization for Venus Early-Career Networking, 2025
The return to Venus: What we've learned and what's next, Yakima Valley College, 2025
What meteorites tell us about planets around other stars, Yakima Valley College, 2025
Linking rocky exoplanetary interiors and atmospheres through meteorite outgassing, Department of Earth and Planetary Sciences Alumni Webinar Series, UC Santa Cruz, 2025
What meteorites tell us about rocky exoplanetary atmospheres, Space Cafe Tokyo, 2024
Pride in space: Queer astronauts and the 2023 solar eclipse, Central California Queer Youth Summit, 2023
Pride in STEM: LGBTQ+ youth changing the world through STEM, Central California Queer Youth Summit, 2022
Graduate Student Panel, Idaho Conference on Undergraduate Research, 2022
OSIRIS-REx Mission, Boise State University, 2021
Lunar eclipses, Boise State University, 2021

Professional Activities

Venus Exploration Analysis Group (VEXAG) Steering Committee, Scribe, 2024–2027
VEXAG Working Groups: Inclusion, Diversity, Equity, and Access; Venus as an Analog for Terrestrial Exoplanets; Venus Mapping, 2024
VEXAG 2024 Scientific Organizing Committee, 2024
AAS DPS 2024 Scientific Organizing Committee, 2024
The Bulletin of the American Astronomical Society (BAAS), Celebrating the Wonder of Science in the Shadow, Editor, 2024
Bay Area Planetary Science Conference Organizing Committee, Member, 2023
NASA Proposal Review Panel, 2022
NASA Proposal Writing and Evaluation Academy, 2020

Professional Development

Graduate Pedagogy Fellowship, UC Santa Cruz, 2026
Equity-Minded Mentoring in Higher Education: Fostering Inclusive Research and Learning Environments, UC Santa Cruz, 2026
Equitable Course Design for Graduate Student Instructors, UC Santa Cruz, 2026
Recent Developments and Applications in Earth and Planetary Sciences of Electron Probe Microanalysis, Agricultural University of Athens, 2026
Supporting All Students in the Geosciences Professional Development Program, San Jose State University Science Education Program, 2025–2026
Equity-Based Holistic Admissions in Graduate Education, 2024
Recent Developments and Applications in Earth Sciences of Electron Probe Microanalysis, Agricultural University of Athens, 2023
Culturally Inclusive Planetary Engagement Workshop, Planetary Resources and Content Heroes (ReaCH), NASA Science Mission Directorate Science Activation Program, 2023
Advancing IDEA in Planetary Science Workshop, Lunar and Planetary Institute, 2022
STEM Pedagogy Seminar, Boise State University Advising and Academic Support Center, 2019–2020
STEM Pedagogy Seminar, Boise State University Advising and Academic Support Center, 2011–2012

Service and Outreach

Science Graduate Advisory Council, UCSC Science Division, Graduate Representative, 2025–2026
Alumni Advisory Council, UCSC EPS Department, Graduate Representative, 2025–2026
Geophysics and Planetary Physics Seminar, UCSC EPS Department, Coordinator, 2025
Planetary Group Meeting, UCSC EPS Department, Coordinator, 2025
Faculty Meetings, UCSC EPS Department, Graduate Representative, 2025
Project for Inmate Education, Santa Cruz County Main Jail, Instructor, College Algebra, 2025
Committee on Teaching, UCSC Academic Senate, Graduate Representative, 2024–2027
NASA Community College Network, Subject Matter Expert, 2023–2026
UCSC GradPath Mentorship Program, Women in Science and Engineering, Mentor, 2023–2024
Committee on Diversity, Equity, and Inclusion, UCSC Academic Senate, Graduate Representative, 2022–2024
Santa Cruz Queer Youth Task Force and Safe Schools Project, STEM Coordinator, 2022–2024
Cosmochemistry Reading Group, UCSC EPS Department, Organizer, 2022–2023
Astrobiology Reading Group, UCSC EPS Department, Organizer, 2022–2023
Undergradute Mentorship Program, UCSC EPS Department, Mentor, 2022–2024
Diversity, Equity, and Inclusion Committee, UCSC EPS Department, Member, 2021–2024
Geoscientists Encouraging Openness and Diversity in the Earth Sciences, UCSC EPS Department, Leadership Board Member, 2021–2023
STEM Camp, Sacajawea Elementary School, Volunteer, 2021
STEM Camp, Caldwell High School, Volunteer, 2021
Third Thursday Astronomy Series, Boise State Physics Department, Volunteer, 2021
Idaho State Correctional Institution Inmate Education, Volunteer, 2020
First Friday Astronomy Series, Boise State Physics Department, Volunteer, 2019–2021