Graham Harper Edwards

— he, him —

Assistant Professor
Earth & Environmental Geosciences
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APPOINTMENTS

Trinity University 2024 →

Assistant Professor of Earth & Environmental Geosciences

Dartmouth College 2021 – 2024

NSF Astronomy & Astrophysics Postdoctoral Fellow

"Planetesimal formation, giant planet migration, and stellar accretion in our solar system and beyond"
Advisors: Profs. C. Brenhin Keller (Earth Sciences) & Elisabeth R. Newton (Physics & Astronomy)

Lecturer 2023–24

Department of Physics & Astronomy

EDUCATION

University of California Santa Cruz 2021

PhD in Earth Sciences

Applications of the uranium decay systems in deep time and the Quaternary: chronologic insights within planetary interiors and beneath glaciers [PDF]
Committee: Profs. Terrence Blackburn (Chair), Slawek Tulaczyk, Myriam Telus.

Bowdoin College Brunswick, ME, U.S.A. 2014

Bachelor of Arts

Earth and Oceanographic Science with Honors, minor in Classics (*Summa cum Laude*, ΦBK Society)

PUBLICATIONS

* mentored student author

… A. Abuawad, M. Griffiths, **G.H. Edwards**, A. Eftekhari, M. El-Ebweini, H. Al-Najar, A. Butmeh, R. Abu Dayyeh, M. Al-Shewy, A. Aker. From ecocide to genocide: a call to action for scientists globally to address the destruction in Gaza. *Environmental Health Perspectives* [submitted]. Preprint: doi:10.2139/ssrn.5021472

10. **G.H. Edwards**, G.G. Piccione, T. Blackburn, S. Tulaczyk. 2025. Uranium-series isotopes as tracers of physical and chemical weathering in glacial sediments from Taylor Valley, Antarctica. *Chemical Geology*, 671. doi:10.1016/j.chemgeo.2024.122463

9. **G.H. Edwards**, C.B. Keller, E.R. Newton, C.W. Stewart*. 2024. An early giant planet instability recorded in asteroidal meteorites. *Nature Astronomy*, 1–13. doi:10.1038/s41550-024-02340-6. `arXiv:2309.10906`. **Press:** Astrobites.

8. **G.H. Edwards**. 2024. Giant planets migrated shortly after the Solar System's protoplanetary disk dispersed. *Nature Astronomy*, Research Briefing. doi:10.1038/s41550-024-02341-5

7. R. Rampalli*, M.K. Ness, **G.H. Edwards**, E.R. Newton, M. Bedell. 2024. The Sun remains relatively refractory depleted: elemental abundances for 17,412 Gaia RVS solar analogs and 50 planet hosts. *The Astrophysical Journal*, 965. doi:10.3847/1538-4357/ad303e. `arXiv:2402.16954`.

6. M.A. Thompson, M. Telus, **G.H. Edwards**, et al. 2023. Outgassing composition of the Murchison meteorite: implications for volatile depletion of planetesimals and interior-atmosphere connections for terrestrial exoplanets. *Planetary Science Journal*, 4. doi:10.3847/PSJ/acf760. `arXiv:2310.02028`.

5. **G.H. Edwards**, T. Blackburn, G. Piccione, S. Tulaczyk, G.H. Miller, C. Sikes*. 2022. Terrestrial evidence for ocean forcing of Heinrich events and subglacial hydrologic connectivity of the Laurentide Ice Sheet. *Science Advances*, 8. doi:10.1126/sciadv.abp9329.

4. T. Blackburn, **G.H. Edwards**, S. Tulaczyk, M. Scudder*, G. Piccione, B. Hallet, J.C. Zachos, B. Cheney, N. McLean, J.T. Babbe. 2020. Ice retreat in Wilkes Basin of East Antarctica during a warm interglacial. *Nature*, 583. doi:10.1038/s41586-020-2484-5. **Press:** National Geographic

3. **G.H. Edwards**, T. Blackburn. 2020. Accretion of a large LL parent planetesimal from a recently formed chondrule population. *Science Advances*, 6. doi:10.1126/sciadv.aay8641

2. **G.H. Edwards**, T. Blackburn. 2018. Detecting the extent of ca. 1.1 Ga Midcontinent Rift plume heating using U-Pb thermochronology of the lower crust. *Geology*, 46. doi:10.1130/G45150.1

1. **G.H. Edwards**. 2014. Geochemical and stratigraphic analysis of the Linnévatnet sediment record: a study of Late Holocene cirque glacier activity in Spitsbergen, Svalbard. [*Honor's Thesis*] Bowdoin College: Brunswick, ME, U.S.A. 73 pp. [Undergraduate Research Commons]

TEACHING & MENTORING

Trinity University

Courses Taught

Fall 2024	Global Climate Change

Dartmouth College

Courses Taught

Spring 2024	Exploration of the Solar System
Fall 2023	Exploring the Universe
Fall 2023	"The Stretch" (Field Camp) — Glacial and climate history section (*Co-Instructor*)

Guest Lectures

Winter 2024	Astrobiology
Spring 2022–24	Igneous and Metamorphic Petrology

Research Group Leader 2022 – 2023

Acting leader of a research group (4 graduate, 2 undergraduate students) in the Department of Physics & Astronomy while the Primary Investigator was on leave. Responsibilities included:

- Coordinate and facilitate group meetings.
- Provide non-specialist research guidance.
- Evaluate progress and assign grades.
- Organize/present mini-workshops on research tools and skills.

Mentored Graduate Researchers

2022 → Rayna Rampalli (PhD student)

Mentored Undergraduate Researchers

2023	Jack Duranceau (thesis 2023)	2022	Cameron Stewart
2023	Chase Alvarado-Anderson (thesis 2023)		

University of California Santa Cruz

Graduate Teaching Assistant

Spring 2021	*Measuring Earth's 4.5 Billion-Year History* (radiogenic and stable isotope geochemistry)
Fall 2020	*Evolution of Earth* (Earth history overview)
Fall 2019	*Elements of Field Geology*
Spring 2018	*Geochemistry of the Solar System*
Winter 2018	*Geologic Principles* (introductory Earth science)

Mentored Undergraduate Researchers

2019–21	Cosmo Varah-Sikes (thesis 2021)	2018	Frances O'Byrne
2020	Linh Phan	2018	Alexander Levinson
2018–20	Michael Scudder (thesis 2020)	2017–18	Paul Colosi

Bowdoin College Brunswick, ME, U.S.A.

Laboratory Teaching Assistant

Fall 2012, 2013 *Investigating Earth* | Fall 2013 *Marine Biogeochemistry*

Bozeman & Livingston Public Schools MT, U.S.A. 2015

Substitute Teacher

- Instructor and paraprofessional in K-12 classrooms.

OUTREACH & PUBLIC SERVICE

Montshire Museum of Science 2022 – 2024

Guest Scientist

- Lead and assist educational activities within the museum.
- Explain Earth and space science concepts to pre-K through adult audiences.
- Develop programming focused on planetary science topics.

Santa Cruz Museum of Natural History 2018 – 2022

Volunteer Scientist

- Created educational content and hosted activities at monthly museum events.
- Co-hosted monthly educational video streams covering geoscience topics.
  Link: *Rockin' Pop-Up* Archives.

Skype a Scientist 2019–2023

Volunteer Scientist

- Prepare educational content and host video calls with elementary and secondary school classrooms.
- Teach geoscience concepts and share stories about experiences as a scientist.

Geoscientists Encouraging Openness and Diversity in the Earth Sciences (GEODES) 2019 – 2020

Graduate Student Leader

- A student-run group in the UCSC Earth & Planetary Sciences Department.
- One of six graduate student leaders responsible for the operation and development of GEODES.
- Organized and implemented outreach events centered on promoting underrepresented groups in the geosciences and cultivating a culture of inclusivity within the department.

Peary-MacMillan Arctic Museum Brunswick, ME, U.S.A. 2015 – 2016

Curatorial Intern 2015 – 2016

- Developed outreach programming and exhibit content.
- Supplemented undergraduate courses with lectures and discussions drawing on museum collections.
- Mentored and trained undergraduate student interns and employees.

Student Tour Guide 2012 – 2014

- Led museum tours for all age groups of museum exhibits and interactive collections.

Museum of the Rockies Bozeman, MT, U.S.A. 2015

Security Volunteer

- Answered visitors' questions and facilitated interpretive discussions about natural history exhibits.

INVITED ACADEMIC TALKS

11. **The University of Akron** | Invited Research Talk, 6 February 2024
    Title: *Reconstructing and deconstructing ice sheets from the ground up*

10. **Trinity University** | Invited Research Talk, 29 January 2024
    Title: *Reconstructing and deconstructing ice sheets from the ground up*

9. **Colby College** | Invited Research Talk, 1 December 2023
    Title: *Reconstructing and deconstructing ice sheets from the ground up*

8. **Center for Astrophysics | Harvard & Smithsonian** | Astrophysics Data System, 25 October 2023
    Title: *Reconstructing and deconstructing ice sheets from the ground up*

7. **Goldschmidt Conference (Lyon)** | Invited Keynote, 12 July 2023 [abstract]
    Title: *Data & computational science for Earth & planetary history: lessons from the terrestrial archive*

6. **Center for Astrophysics | Harvard & Smithsonian** | Astrophysics Data System, 13 June 2023
    Title: *Transcribing the cosmochemical codex*

5. **Colby College** | Geology Seminar, 17 Mar 2023
    Title: *In the light of a newborn sun: transcribing the first chapters of our solar system from meteorites*

4. **Thayer School of Engineering, Dartmouth College** | Ice+Climate Seminar Series, 10 Feb 2023
    Title: *A terrestrial record of Heinrich events*

3. **Carnegie Institution for Science** | Astronomy Seminar Series, 28 Oct 2022
    Title: *Reconstructing asteroid assembly from the thermal records of chondrites*

2. **Massachusetts Institute of Technology** | Planetary Lunch Seminar, 3 May 2022
    Title: *The early history of the LL chondrite parent planetesimal*

1. **Princeton University** | Environmental Geology and Geochemistry Seminar, 31 Mar 2022
    Title: *Peering beneath the northern Laurentide ice sheet during the last glacial maximum*

INVITED OUTREACH & COMMUNITY TALKS

6. **Dartmouth College** | 8 April, 2024
   Featured scientist for eclipse-viewing in Hanover, NH. (Photo from event)

5. **Montshire Museum of Science** | 7 April, 2024
   Guest scientist presentation on the science of eclipses.

4. **Woodstock Union Middle School** | 29 February, 2024
   Guest scientist presentation and discussion with grade 8 science students.

3. **Moosilauke Ravine Lodge** | 11 August, 2023
   Guest scientist & speaker for Perseid meteor shower. Public talk for families.

2. **Richmond Middle School** | 5 April, 2023 (Hanover, NH)
   Guest scientist presentation for all grade 6 students.

1. **Montshire Museum of Science** | 21 Januray, 2023
   Public talk on meteorites at "Astronomy Day" event (middle to high school learning level).

ACADEMIC SERVICE & EXPERIENCE

Interdisciplinary Earth Data Alliance 2 (IEDA^2) 2023 →

Community Advisory Board, Co-Chair

- Co-chair of primary community advising body for the NSF-funded IEDA^2 data facility.
- Guide approaches to promote and ensure access, preservation, and re-usability of Earth system data.
- Write annual recommendation reports based on advisory board discussions.

Departmental Service

Department of Earth Sciences, Dartmouth

Postdoc Representative for Faculty Search Committee (2 searches) 2023, 2024

- Organized meetings with candidates and departmental postdocs.
- Compiled and presented quantitative and qualitative feedback to Search Committee.

Earth & Planetary History Journal Club — Organizer Spring 2022

- Scheduled, coordinated, and oversaw multidisciplinary reading group.

Department of Earth & Planetary Sciences, UCSC

Whole Earth Seminar — Organizer Spring 2019

- Coordinated departmental seminar series (one of two graduate student organizers)
- Contacted and scheduled speakers from diverse disciplines in Earth and planetary sciences.

Laboratory Research & Management

Analytical Experience:
Expert: TIMS
Proficient: MC-ICP-MS, ICP-MS, SEM-EDS
Limited: IRMS, ICP-OES, XRF, XRD

W.M. Keck Isotope Facility, UC Santa Cruz 2016 – 2021

Under the advisorship of lab director Prof. Terry Blackburn, I was partially responsible for the operation and maintenance of this multi-user clean lab facility, including:

- Maintenance and operation of mass spectrometers and wet chemistry labs.
- Training and supporting researchers in chemical and mass spectrometric methods.
- Preparation, measurement, and reporting of isotopic analyses of geologic and biomineral material for external contracts.

- Procurement and preparation of lab consumables.

Academic Meetings

American Astronomical Society

2023 Chambliss Award Judge (best student poster presentation)

Meteoritical Society Annual Meeting

2022 McKay Award Judge (best student oral presentation)

AGU Fall Meeting

2017 Co-Chair/Co-Convener: Applications of Thermochronology to Understand Crustal Systems

Reviewer for: *Geochronology*, *Geology*, *Nature Communications*

Society Affiliations: Meteoritical Society, American Astronomical Society, Geochemical Society, National Association of Geoscience Teachers, Geological Society of America, American Geophysical Union.

FUNDING

2021–24	$310 000	National Science Foundation	Award #2102591
2020–21	$10 000	ARCS Foundation	Scholar Award
2016–17		University of California Santa Cruz	Regent's (Graduate) Fellowship
2013	$2 000	Bowdoin College	Grua/O'Connell Research Award
2012	$3 700	Bowdoin College	Freedman Research Fellowship

AWARDS & HONORS

2024	A. Lincoln Washburn Award for Outstanding Mentoring, Dartmouth Earth Sciences
2020	UCSC Earth & Planetary Sciences Outstanding TA Award (Honorable Mention)
2019	Aaron and Elizabeth Waters Award — *Issued annually for the most outstanding proposal for PhD research in the UCSC Department of Earth & Planetary Sciences*
2014	National Association of Geoscience Teachers Outstanding TA Award
2011–13	Sarah and James Bowdoin Scholar (Dean's List)

POPULAR MEDIA

2024	Sky & Telescope	Meteorites tighten timeline for giant planets' movement…
2024	Science Magazine	Giant planets ran amok soon after solar system's birth
2020	National Geographic	Biggest ice sheet on Earth more vulnerable to melting than thought

TEN SELECTED CONFERENCE ABSTRACTS

More comprehensive lists of abstracts are available on the Astrophysical Data System and Google Scholar.

10. **G.H. Edwards**, C.B. Keller, E.R. Newton, C. Stewart. 2023. [Talk]: Disk-driven migration of Jupiter: support from meteorite thermochronology. *Goldschmidt Conference*, Lyon, FR. doi:10.7185/gold2023.18450

9. **G.H. Edwards**, C.B. Keller, E.R. Newton, C. Stewart. 2023. [iPoster]: Constraining the timescales of giant planet migration from the meteorite record. *241st American Astronomical Society Meeting*, Seattle, WA, U.S.A.

8. **G.H. Edwards**, G. Piccione, M. Gomez. 2022. [Poster]: Comparing in-person and virtual modes of a 4-year museum-based geoscience outreach program. *Earth Educators' Rendezvous 2022*, Minneapolis, MN, U.S.A.

7. **G.H. Edwards**, T. Blackburn, G. Piccione, S. Tulaczyk, G.H. Miller, C. Sikes. 2020. [Talk]: Baffin Island subglacial precipitates record subglacial melting beneath the northern Laurentide Ice Sheet concurrent with Heinrich events. *American Geophysical Union Fall Meeting*, New Orleans, LA, U.S.A.

6. C.T. Varah-Sikes, **G.H. Edwards**, T. Blackburn. 2020. [Poster]: Thermal histories in Type 7 ordinary chondrites: interpreting residence in parent body using petrologic observation and Pb-Pb phosphate thermochronology. *Geological Society of America Annual Scientific Meeting*, Virtual.

5. **G.H. Edwards**, T. Blackburn, S. Tulaczyk, G.G. Piccione. 2019. [Poster]: U-Series isotopics constrain timescale of bedrock comminution and glacial incision in Taylor Valley, Antarctica. *Goldschmidt Conference*, Barcelona, ES.

4. **G.H. Edwards**, T. Blackburn, G.G. Piccione. 2018. [Talk]: Cooling and disruption of the LL chondrite parent body. *Lunar and Small Bodies Graduate Forum (LunGradCon)*, Mountain View, CA, U.S.A.

3. **G.H. Edwards**, T. Blackburn, C.M.O'D. Alexander. 2017. [Talk]: Accretion and disruption histories of the ordinary chondrite parent bodies. *80th Annual Meeting of the Meteoritical Society*, Santa Fe, NM, U.S.A.

2. **G.H. Edwards**, T. Blackburn, K.V. Smit. 2017. [Poster]: Timescales of crustal cooling of the Superior Craton near Attawapiskat, Ontario, Canada, and implications for extent of Keweenawan plume heating. *American Geophysical Union Fall Meeting*, New Orleans, LA, U.S.A.

1. **G.H. Edwards**. 2014. [Poster]: Geochemical and stratigraphic analysis of the Linnévatnet sediment record: a provenance study of Late Holocene cirque glacier activity in Linnédalen, Spitsbergen, Svalbard. *44th International Arctic Workshop*, Boulder, CO, U.S.A.

Additional Work Experience

Wildland Firefighter (Type 2) — U.S. Forest Service, Winthrop, WA, U.S.A. — 2015.
Server & Bartender — Trio Restaurant, Fish Creek, WI, U.S.A. — 2014.

Non-Academic Interests

Bicycling, cross-country skiing, birdwatching, breadmaking, classical history and literature.