

Usha Farey Lingappa (she/her)

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EDUCATION

2015 – 2021	California Institute of Technology PhD, Geobiology
2008 – 2012	Hampshire College BA, self-designed major in Astrobiology

RESEARCH POSITIONS

2021 – present	University of California Berkeley Branco Weiss Society in Science Fellow (2025 – present) Visiting scientist, Lawrence Livermore National Laboratory (2022 – present) Postdoctoral scholar, Institute for Quantitative Biosciences (2021 – 2026)
2015 – 2021	California Institute of Technology NSF Graduate Research Fellow (2016-2019) Graduate researcher, Division of Geological and Planetary Sciences
2012 – 2015	NASA Ames Research Center/SETI Institute Ames Associate, Division of Space Sciences and Astrobiology
2009 – 2015	Prosetta Biosciences Program manager, Rabies Drug Discovery (2014 – 2015) Assistant research scientist, Biochemistry Team (2012 – 2015) Intern, Biochemistry Team (summer 2009, summer 2010)
2009 – 2011	Hampshire College Undergraduate researcher, School of Natural Sciences
2010	Cerro Tololo Inter-American Observatory Research assistant

PATENTS

E J Trower, **U F Lingappa**, J P Grotzinger, W W Fischer. “Microabrasive compositions containing ooids.” US Patent US10407601 (2018).

PUBLICATIONS

*equal contribution

U F Lingappa, S D Borrego, E S Sindermann, J L Edwards, L Chiang, J L Chastain, C Perrino, R J Craig, C D Nicora, S O Purvine, S S Merchant. “Field strains of the unicellular alga *Chlamydomonas reinhardtii* exhibit multicellular characteristics that shape their interactions.” *ISME J* 20:wrag202 (2026).

S Dupuis, **U F Lingappa**, S O Purvine, L Chiang, S D Gallaher, C D Nicora, M S Lipton, S S Merchant. “Mono-mix strategy enables comparative proteomics of a cross-kingdom microbial symbiosis.” *PLOS One* 21(1):e0340253 (2026).

T Lincoln, **U Lingappa**, B Hibner, E J Trower. “Influence of environment and mineralogy on euendolithic microboring patterns.” *The Depositional Record* 11:1596–1612 (2025).

S Dupuis, **U F Lingappa**, X Mayali, E S Sindermann, J L Chastain, P K Weber, R Stuart, S S Merchant. “Scarcity of fixed carbon transfer in a model microbial phototroph-heterotroph symbiosis.” *ISME J* 18:

wrae140 (2024).

M Michon*, A Müller-Schiffmann*, and 55 others including **U F Lingappa**. “A pan-respiratory antiviral chemotype targeting a transient host multi-protein complex.” *Open Biology* 14: 230363 (2024).

R Murali, L A Pace, R A Sanford, L M Ward, M M Lynes, R Hatzenpichler, **U F Lingappa**, W W Fischer, R B Gennis, J Hemp. “Diversity and evolution of nitric oxide reduction in Bacteria and Archaea.” *Proceedings of the National Academy of Sciences* 121:e2316422121 (2024).

N T Stein, J P Grotzinger, D P Quinn, **U F Lingappa**, T M Present, E J Trower, M L Gomes, E Orzechowski, M Cantine, K S Metcalfe, W W Fischer, B L Ehlmann, A H Knoll. “Geomorphic and environmental controls on microbial mat fabrics on Little Ambergris Cay, Turks and Caicos Islands.” *Sedimentology* 70:1915-1944 (2023).

U F Lingappa, N T Stein, K S Metcalfe, T M Present, V J Orphan, A H Knoll, J P Grotzinger, E J Trower*, M L Gomes*, W W Fischer*. “Early impacts of climate change on a coastal marine microbial mat ecosystem.” *Science Advances* 8:eabm7826 (2022).

- Featured in *The Science Breaker*, August 2023.
[<https://thesciencebreaker.org/breaks/earth-space/of-microbes-and-megastorms/>]
- Featured in *The Times of the Islands*, September 2023.
[<https://www.timespub.tc/2023/09/microbial-mats/>]

B Kim*, **U F Lingappa***, J S Magyar, D R Monteverde, J S Valentine, W W Fischer, J Cho. “Challenges of measuring soluble Mn(III) in natural samples.” *Molecules* 27:1661 (2022).

H Yu, G L Chadwick, **U F Lingappa**, J R Leadbetter. “Comparative studies on cultivated and uncultivated, freshwater and marine “*Ca. Manganitrophaceae*” genomes implicates their worldwide reach in manganese chemolithoautotrophy.” *mBio* e0342121 (2022).

U F Lingappa, C M Yeager, A Sharma, N L Lanza, D P Morales, G Xie, A D Atencio, G L Chadwick, D R Monteverde, J S Magyar, S M Webb, J S Valentine, B M Hoffman, W W Fischer. “An ecophysiological explanation for manganese enrichment in rock varnish.” *Proceedings of the National Academy of Sciences* 118(25):e2025188118 (2021).

M M Douglas, **U F Lingappa**, M P Lamb, J C Rowland, A J West, G Li, P C Kemeny, A J Chadwick, A Piliouras, J Schwenk, W W Fischer. “Impact of river channel lateral migration on microbial communities across a discontinuous permafrost floodplain.” *Applied and Environmental Microbiology* 01339-21 (2021).

T M Present, M L Gomes, E J Trower, N T Stein, **U F Lingappa**, J Naviaux, M T Thorpe, M D Cantine, W W Fischer, A H Knoll, J P Grotzinger. “Non-lithifying microbial ecosystem dissolves peritidal lime sand.” *Nature Communications* 12:3037 (2021).

Y Liu, W W Fischer, C Ma, Y Guan, J R Beckett, O Tschauer, Y Guan, **U F Lingappa**, S M Webb, V B Prakapenka, N L Lanza, C B Agee. “Manganese oxides in Martian meteorites Northwest Africa (NWA) 7034 and 7533.” *Icarus* 364:114471 (2021).

L M Ward, **U F Lingappa**, J Grotzinger, W Fischer. “Microbial mats in the Turks and Caicos Islands reveal diversity and evolution of phototrophy in the Chloroflexota order Aggregatilineales.” *Environmental Microbiome* 15:9 (2020).

B P Smith, M Ingalls, E J Trower, **U F Lingappa**, T M Present, J S Magyar, W W Fischer. “Physical Controls on Carbonate Intracasts: Modern Flat Pebbles from Great Salt Lake, Utah.” *Journal of Geophysical Research: Earth Surface* 125:e2020JF005733 (2020).

M Gomes, L A Reidman, S O'Reilly, **U F Lingappa**, K Metcalfe, D A Fike, J P Grotzinger, W W

Fischer, A H Knoll. “Taphonomy of biosignatures in microbial mats on Little Ambergris Cay, Turks and Caicos Islands.” *Frontiers in Earth Science* 8:576712 (2020).

U F Lingappa, D Monteverde, J Magyar, J S Valentine, W W Fischer. “How manganese empowered life with dioxygen (and vice versa).” *Free Radical Biology and Medicine* 140:113-125 (2019).

- Featured on NASA Astrobiology Portal, April 2019.

[<https://astrobiology.nasa.gov/news/how-manganese-played-a-pivotal-role-in-photosynthesis-and-oxidation-protection/>]

U F Lingappa, W W Fischer. “Oxygenic Photosynthesis.” Entry in: Gargaud M et al. (eds) *Encyclopedia of Astrobiology*. Springer, Berlin, Heidelberg (2019).

E J Trower, M Cantine, M Gomes, **U F Lingappa**, S O'Reilly, T M Present, N Stein, J V Strauss, M P Lamb, J P Grotzinger, A H Knoll, W W Fischer. “Active ooid growth driven by sediment transport in a high energy shoal, Little Ambergris Cay, Turks and Caicos Islands.” *Journal of Sedimentary Research* 88(9):1132-1151 (2018).

U F Lingappa*, X Wu*, A Macieik, S F Yu, A Atuegbu, J Francis, C Nichols, A Calayag, H Shi, J A Ellison, E K T Harrell, V Asundi, J R Lingappa, M D Prasad, W I Lipkin, D Dey, C R Hurt, V R Lingappa, W J Hansen, C E Rupprecht. 2013. “Host-rabies virus protein-protein interactions as druggable antiviral targets.” *Proceedings of the National Academy of Sciences* 110(10):E861-868 (2013).

- Featured in *Cell Select Leading Edge*, May 2013.

[[https://www.cell.com/cell/pdf/S0092-8674\(13\)00515-1.pdf](https://www.cell.com/cell/pdf/S0092-8674(13)00515-1.pdf)]

FIELDWORK

		Key
2026	Carrie Bow Cay and Twin Cays, Belize ●▲	▲ microbes
2024	Point Bonita and Point Reyes, CA, USA ◆▲	■ rocks
2024	Southeast Farallon Island, CA, USA ◆▲	● sediments
2023	Hampshire College Farm, MA, USA ◆▲	◆ soil
2023	Paradise Valley Farm, CA, USA ◆▲	
2022	Gill Tract Farm, CA, USA ◆▲	
2021, 2022, 2025, 2026	UC Berkeley Botanical Garden, CA, USA ◆▲	
2021	Big Pine Key and Marquesas Keys, FL, USA ●▲	
2019	Great Salt Lake, UT, USA ●▲	
2019	Et-then Group and Pethei Group, NWT, Canada ■	
2017	Transvaal Supergroup, NC, South Africa ■▲	
2017	Black Point Lava Flow, AZ, USA ■▲	
2017	Chapin Wash Formation and Pinal Creek, AZ, USA ■	
2016, 2017, 2018, 2019	Little Ambergris Cay, Turks and Caicos Islands ●▲	
2016	Van Horn Formation, TX, USA ■	
2016	Little Hot Creek, CA, USA ▲	
2011, 2013	Mars Desert Research Station, UT, USA ■▲	
2010	San Pedro de Atacama, Chile ■▲	
2009, 2016, 2017, 2018	Death Valley, CA, USA ■▲	

SCIENTIFIC PRESENTATIONS

Talks

2026	Keynote, NASA NExSS Extraterrestrial Photosynthesis Workshop, Green Lake, WI
2026	Symposium on Microbial Genetics, University of Göttingen, Göttingen, Germany
2024	Symbiosis Virtual Gathering, Gordon and Betty Moore Foundation, online
2024	Invited seminar, Leipzig University, Leipzig, Germany
2024	Invited seminar, University of Göttingen, Göttingen, Germany

2024	Yosemite Symbiosis Workshop, UCNRS Yosemite Field Station, Wawona, CA
2023	International Chlamydomonas Conference, Princeton, NJ
2022	Invited seminar, Arcadia Science, online
2022	Gordon Research Conference on Geobiology, Ventura, CA
2022	Bioenergetics Seminar Series, UC Berkeley/LBNL, online
2022	Invited seminar, Microsoft Research Health Futures Group, online
2020	Geobiology Supergroup seminar, CU Boulder, online
2019	Yuk Lunch Seminar Series, Caltech Planetary Sciences, Pasadena, CA
2018	MicroMorning Seminar Series, Caltech CEMI, Pasadena, CA
2018	Berkeley Symposium on Photosynthesis, Carbon, and the Environment, Berkeley, CA
2017	Gordon Research Conference on Photosynthesis, Sunday River, ME
2017	Western Photosynthesis Conference, Marshall, CA
2013	Bay Area Symposium on Viruses, Berkeley, CA

Posters

2024	Gordon Research Conference on Geobiology, Galveston, TX
2019	American Geophysical Union Fall Meeting, San Francisco, CA
2019	Workshop on Cyanobacteria, Boulder, CO
2018	International Society on Photosynthesis Research Conference, Vancouver, BC
2017	Southern California Geobiology Symposium, Los Angeles, CA
2016	American Geophysical Union Fall Meeting, San Francisco, CA
2013	International Conference on Antiviral Research, San Francisco, CA
2012	American Society for Cell Biology Meeting, San Francisco, CA
2010	International Conference on Antiviral Research, San Francisco, CA

TEACHING

2016 – 2020	Teaching assistant, Caltech • Ge197: Special Topics in Geobiology: Photosynthesis (2020) • Ge11b/Ge104: Earth and the Biosphere/Intro. to Geobiology (2016 – 2019)
2010 – 2012	Teaching assistant, Hampshire College • NS-212: Organic Chemistry I (2012) • NS-257: Astrobiology (2011) • NS-227: Life on Mars (2011) • NS-101: Gene Cloning (molecular biology bootcamp, 2010) • NS-204: Physics I (2009)

MENTORSHIP

2021 – 2026	Research mentor, UC Berkeley • Lauren Chiang, UC Berkeley undergrad (fall 2024 – spring 2026) • Jude Edwards, full-time research technician (summer 2023 – summer 2024) • Jordan Chastain, UC Berkeley undergrad (fall 2021 – spring 2024) • Eve Sequoia Sindermann, full-time research technician (fall 2022 – fall 2023) • Delia Rodríguez González De Lara, U of Granada undergrad (summer 2022)
2017 – 2019	Research mentor, Caltech • Joshua Phelan, CSU Fullerton undergraduate (summer 2019) • Jenny Ji, Troy Tech high school student (summer 2018) • Kabir Mohammed, Caltech undergraduate (summer 2017)
2014 – 2015	Girls Climb On mentor, GirlVentures

ACADEMIC SERVICE

Journal reviewer

Geochimica et Cosmochimica Acta, Science Advances, Nature Communications, Algal Research, Proceedings of the National Academy of Sciences, Frontiers in Microbiology, Astrobiology, Earth and Planetary Science Letters

External reviewer

NASA Planetary Science Division FINESST-22

Other

2016, 2019 Organizer and session chair, Southern California Geobiology Symposium, Caltech
 2017 – 2018 Organizer, Geoclub Seminar Series, Caltech
 2009 – 2010, Voting student rep, School of Natural Science faculty meetings, Hampshire College
 2011 – 2012
 2008 – 2010 Community Council Subcommittee for Public Health and Safety, Hampshire College

SCIENCE COMMUNICATION

Television appearances

2023 PBS NOVA, season 50, episode 11
 Ancient Earth: Birth of the Sky
 <https://www.pbs.org/video/ancient-earth-birth-of-the-sky-vgs18a/>
 2023 BBC Earth, series 1, episode 4
 Atmosphere

Public lectures

2025 Hotspells Rocks & Minerals, Los Angeles, CA
 2023 Lamorinda Sunrise Rotary Club, Lafayette, CA
 The Origin of Oxygenic Photosynthesis
 2022 Science Journeys, Caltech Public Programming
 The Art and Science of Photosynthesis
 <https://events.caltech.edu/series/science-journeys/2022-03-25>

Youth outreach

2010 – 2026 College Preparatory School, Watertown High School, Gann Academy, TechBoston Academy, El Cerrito High School, Gateway High School, Hamilton Elementary School, Muir High School, Blair High School, Techbridge, ACE Middle School, Los Altos High School, NASA ARC Women's Influence Network, Girl Scouts of Northern California, Nava Elementary School, NexGeneGirls, SETI Institute

ART EXHIBITIONS

Contributor to *Incendiary Traces* by Hillary Mushkin
 2020 Prepared for COLA exhibition, LA Municipal Art Gallery, Los Angeles, CA
 2022 Included in *Plein Air*, MoCA Tucson, Tucson, AZ
 2017 Contributor to *Art of Science*, Armory Center for the Arts, Pasadena, CA
 2016 *Blueshift*, PRACTICE Gallery, Philadelphia, PA (collaboration with Ian Etter)
 2012 *That's Life*, Centrum Gallery, Amherst, MA (collaboration with Casey Andrews)

DANCE PERFORMANCE

2022 – present

Hālau Ka Ua Tuahine

Major performances:

- *Pōpoloheno: Songs of Resilience and Joy* (touring company)
Museum of the African Diaspora, San Francisco, CA (2025, 2026)
Leeward Theater, Pearl City, HI (2025)
Yerba Buena Center for the Arts, San Francisco, CA (2025)
- Rhythmix presents *Rising Seas* (soloist)
Shoreline Park, Alameda, CA (2025)
- *Wai Ola: 'Aukele and the Waters of Life* (touring company)
Dance Mission Theater, San Francisco, CA (2024)
Tenney Theater, Honolulu, HI (2024)
Rhythmix Cultural Works, Alameda, CA (2023)

Other appearances: Monterey Peninsula Country Club, Del Valle Theater, Stern Grove Trocadero Clubhouse, Suisun Pride, The Grand Theater, Sunset Cultural Center, Berkeley Public Library, Yerba Buena Gardens Festival, Eden United Church of Christ, Capitol Modern Museum, Humanist Hall, Collage des Cultures Africaines, Castro Valley Center for the Arts, Backroad Vines Winery, Berkeley Unified School District office, Journey Downtown Theater, Oakland Asian Cultural Center, Rossmoor Event Center, Ashkenaz Music & Dance Community Center, Berkeley City Ballet

2013 – 2015

Swing Cats Rhythm Revue

Selected appearances: Salesforce Tower, The GAP Headquarters, Cubberly Theater, History Park, Savanna Jazz Club, The Saddle Rack, Alameda Yacht Club, Waverly Street Festival, Balançoire
