# Alexander Berne

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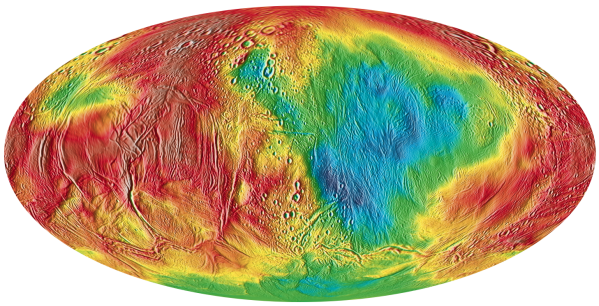

▲ *Global Shape Model of Enceladus*

## Research Interests

Numerical modelling of planetary interior processes, including tidal dynamics, fault deformation, and thermal evolution. Space geodesy and associated applications, particularly using radar imaging and gravimetry. Bayesian methods for geophysical inverse problems.

## I. Employment

**Postdoctoral Research Associate** **2025 - present**
Lunar and Planetary Laboratory
University of Arizona
*Supervisor:* Isamu Matsuyama

**Graduate Research Associate** **2022 - 2025**
Seismological Laboratory
California Institute of Technology
*Supervisor:* Mark Simons

**Affiliate Scientist** **2022 - 2025**
NASA Jet Propulsion Laboratory
*Host:* Ryan Park

**Graduate Research/Teaching Assistant** **2020 - 2022**
Division of Geological and Planetary Sciences
California Institute of Technology

## II. Education

**Ph.D. (Geophysics) at California Institute of Technology** **2020 - present**
*Thesis:* Exploring Different Scales of Crustal Deformation on Enceladus
*Advisor:* Associate Professor Mark Simons

**M.Sc. (Physics) at Oxford University** **2019 - 2020**
*Thesis:* Characterising the Behaviour of an Energy Monitor Device for FLASH Radiation for Cancer Radiotherapy
*Advisor:* Associate Professor Boris Vojnovic

**B.S.M.E. (Mechanical Engineering) at University of Miami** **2015 - 2019**
*Thesis:* An automatic control system for a thermo-electric ice coring drill to recover samples from Greenland's ice sheet.
*Advisor:* Assistant Professor Mason Klein

# III. Research Grants and Fellowships Awarded

Total Amount Awarded as PI or Science PI: $624,758

**2025 - 2028** Lunar Data Analysis Program (LDAP),
*Exploring the Origin of the Lunar Nearside- Farside Asymmetry using Time-Variable Gravity and Topography*
*Science PI:* Alexander Berne
*Total Award:* $474,758

**2022 - 2025** Future Investigators in NASA Earth and Space Sciences (FINESST),
*Exploring Different Scales of Crustal Deformation on Enceladus*
*FI:* Alexander Berne
*Total Award:* $150,000

**2022 - 2024** Geomechanics and Mitigation of Geologic Hazards (GMG),
*Structural Controls on Degassing in Volcanic Systems*
*PI:* Joann Stock
*Role:* Co-Investigator

**2020 - 2021** Resnick Sustainability Institute
*Understanding Feedback between the Biosphere and Volcanic CO2 Emissions*
*PI:* Joann Stock
*Role:* Co-Investigator

# IV. Honors and Awards

Total amount awarded: $12700

**2025** GPS Award for Academic Excellence in Research *Award:* $200
**2024** CIG Research Spotlight: *Modelling Crustal Deformation for Saturn's Moon Enceladus using PyLith*
**2024** Travel Funds: *Adapting Pylith for Machine Learning Applications* *Award:* $700
**2023** Funds for CUBIT Development *Using CUBIT to study the geodynamics of planetary satellites* *Award:* $4000
**2023** Travel Funds: *Adapting Pylith for Multi-Physics Applications in Geophysics* *Award:* $1100
**2022** Travel Funds: *Adapting Pylith for Planetary Geophysics Beyond Earth* *Award:* $700
**2020** Distinction (for Master's Thesis), Oxford University
**2019** Valedictorian of the Mechanical Engineering Program
**2019** Best Senior Design Project in Mechanical Engineering
**2019** Best Student Presentation, Undergraduate Student Research Day, University of Miami
**2019** Einspruch Scholarship Department of Mechanical Engineering, University of Miami *Award:* $3000
**2019** Engineering School Valedictorian, University of Miami
**2015** STEM Career Development Award *Award:* $700
**2015** High School Salutatorian
**2014** National Merit Scholarship *Award:* $2500

# V. Professional Development

Activities related to research including workshops, mission formulation work, etc.

**2021 - Present** *Nightingale Enceladus Geophysical Orbiter, PI: Mark Simons*.
Nightingale is a NASA mission concept currently under development at JPL to study Enceladus's geodynamics and habitability using radar interferometry (InSAR) and other geophysical measurements.
*Role:* Graduate Student Member of the Science Team

**2024-2025** *Keck Institute for Space Studies (KISS) "Digital Twins for Solar System Exploration"*.
An invitation-only, week-long "think-tank" program aimed at developing digital twins of planetary bodies to inform mission design.
Team leads: Mark Simons (Caltech), Eloise Marteau (JPL), Alphan Altinok (JPL), Krista Soderlund (UT Austin).
*Role:* Co-author of report and program participant

**2021** *Keck Institute for Space Studies (KISS) "Next Generation Planetary Geodesy"*.
An invitation-only, week-long "think-tank" program aimed at developing new, innovative, and revolutionary mission concepts for using modern geodetic techniques to constrain processes in the interior of planetary bodies.
Team leads: James Tuttle Keane (JPL), Michael Sori (Purdue), Anton Ermakov (Berkeley).
*Role:* Co-author of report and program participant

**2021 - 2024** *Computational Infrastructure for Geodynamics, Pylith Hackathon and Workshop*
An invitation-only, week-long workshop aimed at presenting work in computational geodynamics using Pylith. An attached hackathon involves adding functionality to the finite-element code Pylith.
Team leads: Brad Aagaard (UC Davis), Matthew Knepley (SUNY), Charles Williams (GNS Science).
*Role:* Participant and Presenter

**2021 - Present** *Pylith: a Finite-Element Code for Simulations of Crustal Deformation*
Development work for a a finite element code capable of simulating frictional mechanics, viscoelastic rheology, and complex geometries. Pylith is principally designed to model terrestrial dynamics, but is being adapted (by me) to model crustal dynamics for bodies beyond Earth.
Team leads: Brad Aagaard (UC Davis), Matthew Knepley (SUNY), Charles Williams (GNS Science).
*Role:* Developer

# VI. Peer-Reviewed Publications

14 total, 6 first or co-first author publications
6 co-author publications, and 2 in review

Bagheri, A., Simons, M., Park, R. S., **Berne, A.**, Vance, S., Daswani, M., Geodetic Exploration of the Interior Structure of Enceladus (In Press, *Planetary Science Journal*)

Meyer, C., Stubblefield, A., Minchew, B., Pegler, S., Buffo, J. J., Tomlinson, T., **Berne, A.**, Implications of shallow-shell models for topographic relaxation on icy satellites (Under Review, *Earth and Planetary Science Letters*) Preprint DOI: 10.48550/arXiv.2504.20095

Rovira-Navarro, M., Matsuyama, I., Dirkx, D., **Berne, A.**, Calliess, D., Fayolle, S., Prospects of Using Tidal Tomography to Constrain Ganymede's Interior. *Geophysical Research Letters*, 52(11): e2025GL114708 (2025). DOI:

10.1029/2025GL114708

Park, R. S., Riedel, J. E., Brandon, E., Harvey, N. E., Manafi, S., Smart, M. C., Towfic, Z. J., **Berne, A.**, Bertiger, W. I., Keane, J. T., Konopliv, A. S., Mastrodemos, N., Simons, M., Vance, S. D., Vaughan, A. T., Gravity Imaging Radio Observer (GIRO) for Planetary Science and Mission Opportunities. *Planetary Science Journal*, 6(5): 127 (2025). DOI: 10.3847/PSJ/adceea

Park, R.S., **Berne, A.**, Konopliv, A.S., Keane, J.T., Matsuyama, I., Nimmo, F., Rovira-Navarro, M., Panning, M., Simons, M., Stevenson, D.J., Weber, R.C.,(2024). Thermal Asymmetry in the Moon's Mantle inferred from Monthly Tidal Response. *Nature* (2025): 1-5. DOI: 10.1038/s41586-025-08949-5

Spitale, J., Tigges, M., **Berne, A.**, Rhoden, A., Hurford, T., and Webster, K., Curtain-Based Maps of Eruptive Activity in Enceladus' South-Polar Terrain at Fifteen Cassini Epochs. *The Planetary Science Journal* 6.3 (2025): 67. DOI: 10.3847/PSJ/adb7d7

Rovira-Navarro, M., Matsuyama, I., and **Berne, A.** A Spectral Method to Compute the Tides of Laterally Heterogeneous Bodies. (2024) *The Planetary Science Journal* 5.5: 129 . DOI: 10.3847/PSJ/ad381f

**Berne, A.**, Simons, M., Keane, J. T., Park, R. S., and Leonard, E. J. (2024). Jet Activity at Enceladus linked to tidally-driven strike slip motion along tiger stripes. *Nature Geoscience* 17.5: 385-391 DOI: 10.1038/s41561-024-01418-0

Nelson, K.M., Jiménez, C., Deering, C.D., de Moor, M.J., Blackstock, J.M., Broccardo, S.P., Schwandner, F.M., Fisher, J.B., Chatterjee, S., Induni, G.A. and Rodriguez, A., ... **Berne, A.**, ... (2024). Total CO2 budget estimate and degassing dynamics for an active stratovolcano: Turrialba Volcano, Costa Rica. *Journal of Volcanology and Geothermal Research*, p.108075. DOI: https://doi.org/10.1016/j.jvolgeores.2024.108075

Park, R. S., Mastrodemos, N., Jacobson, R. A., **Berne, A.**, Vaughan, A. T., Hemingway, D. J., ... and Vance, S. (2024). The global shape, gravity field, and libration of Enceladus. *Journal of Geophysical Research: Planets*, 129(1), e2023JE008054. DOI: https://doi.org/10.1029/2023JE008054

**Berne, A.**, Simons, M., Keane, J. T., and Park, R. S. (2023). Using Tidally-Driven Elastic Strains to Infer Regional Variations in Crustal Thickness at Enceladus. *Geophysical Research Letters*, 50(22), e2023GL106656. DOI: https://doi.org/10.1029/2023GL106656

**Berne, A.**, Simons, M., Keane, J. T., and Park, R. S. (2023). Inferring the mean thickness of the outer ice shell of Enceladus from diurnal crustal deformation. Journal of *Geophysical Research: Planets*, 128(6), e2022JE007712. DOI: 10.1029/2022JE007712

**Berne, A.**, Zhang, T., Shomar, J., Ferrer, A. J., Valdes, A., Ohyama, T., and Klein, M. (2023). Mechanical vibration patterns elicit behavioral transitions and habituation in crawling Drosophila larvae. *Elife*, 12, e69205. DOI: https://doi.org/10.7554/eLife.69205

**Berne, A.**, Petersson, K., Tullis, I. D., Newman, R. G., and Vojnovic, B. (2021). Monitoring electron energies during FLASH irradiations. *Physics in Medicine and Biology*, 66(4), 045015. DOI: 10.1088/1361-6560/abd672

# VII. Invited Presentations, Seminars, and Colloquia

13 invited presentations

**2025** University of Washington: Planetary Science Lunch Seminar, *A Relationship Between Strike-Slip Motion and Jet Activity over the Tiger Stripes*

**2025** California Institute of Technology Seismological Laboratory: Graduate Student Seminar *Thermal Asymmetry in the Moon's Mantle Inferred from Monthly Tidal Response*

**2024** TU Delft: Planetary Science Seminar, *A Relationship Between Strike-Slip Motion and Jet Activity over the Tiger Stripes*

**2024** California Institute of Technology: DIX Planetary Science Seminar, *Enceladus Spills its Guts: A Relationship Between Strike-Slip Motion and Jet Activity over the Tiger Stripes*

**2024** California Institute of Technology Seismological Laboratory: Graduate Student Seminar *Exploring a Relationship Between Fault Motion and Jet Activity over Saturn's moon Enceladus*

**2023** Jet Propulsion Laboratory: Planetary Science Seminar, *Using Multi-Scale Surface Strain and Gravity Measurements to Infer Regional Variations in Crustal Thickness at Enceladus*

**2023** Dartmouth University: Ice + Climate Seminar, *Strike-Slip Motion Along Frictional Tiger Stripes May Regulate Jet Activity at Enceladus*

**2023** California Institute of Technology Seimological Laboratory: Graduate Student Seminar *Exploring Different Scales of Diurnal Crustal Deformation on Enceladus*

**2022** California Institute of Technology: Yuk Yung Lunch Seminar, *Modelling the Spatiotemporal Dependence of Diurnal Tidal Deformation Patterns on Regional Crustal Structure at Enceladus*

**2022** Resnick Sustainability Institute: Weekly Seminar, *$CO_2$ Ground Flux Inversions from Airborne Concentration Data at Rincon de la Vieja Volcano, Costa Rica*

**2022** Pylith Workshop: Invited Presentation, *Modeling Planetary Geodynamics with Pylith*

**2022** California Institute of Technology Seismological Laboratory: Graduate Student Seminar *Exploring a Relationship Between Fault Motion and Jet Activity over Saturn's moon Enceladus*

**2018** University of Iceland: Lunch Seminar *Behavioral pattern transitions and habituation to pulsed mechanical vibration in crawling Drosophila larvae*

# VIII. Conference Presentations

8 first author conference proceedings and 12 co-author conference proceedings

**2025** Martens, H. R., Young, Z. M., Argus, D. F., Swarr, M. J., Gardner, W. P., Lau, N., Borsa, A. A., Hoylman, Z., Cao, Q., Wilson, A. M., Pan, M., Knappe, E., Ralph, F. M., Puel, S., **Berne, A.**, Simons, M., Fu, Y. Geodetic Insights into Water Resources and Drought Dynamics in the Western United States. EGU25 (2025).

**2024** Simons, M., **Berne A.**, Bagheri, A., Puel, S., and Park, R. S. Does Enceladus Have a Global Ocean?. AGU24 (2024).

**2024** Bagheri, A., Simons, M., Vance, S., Park, R. S., **Berne A.**, and Daswani, M. M. Determining the Optimal Measurements Required to Infer the Geophysical Characteristics of Enceladus. AGU24 (2024).

**2024** **Berne A.**, Simons, M., Keane, J. T., Leonard, E. J., and Park, R. S. Jet Activity on Enceladus Linked to Tidally Driven Strike-Slip Motion Along Tiger Stripes. AGU24 (2024).

**2024** Spitale, J., Tigges, M., **Berne A.**, Rhoden, A., Hurford, T., and Webster, K. Curtain-Based Maps of Eruptive Activity in Enceladus' South-Polar Terrain at Fifteen Cassini Epochs. In AAS/Division for Planetary Sciences Meeting Abstracts (Vol. 56, No. 8, pp. 414-04).

**2024** Bagheri, A.B., Vance, D., **Berne A.**, Castillo-Rogez, J.C., Keane, J.T., Leonard, E.J., Mitchell, K., Park, R.S., and Simons, M., 2024. Assessing the Habitability of Enceladus with a Suite of Geophysical Investigations. AbSciCon

**2024** Bagheri, A.B., Journaux, B.J., **Berne A.**, and Simons, M.S., 2024. Tidal Constraints on the Properties of Enceladus's Subsurface Ocean. LPI Contributions, 3040, p.2792.

**2023** **Berne A.**, Simons, M., Keane, J.T. and Park, R.S., 2023. Strike-Slip Motion Along Frictional Tiger Stripes May Modulate Jet Activity at Enceladus. AGU23.

**2023** Simons M, Anderson B, Benedikter A, Bhaskaran S, **Berne A.**, Horst S, Hurst K, Jones D, Keane J, Krieger G, Leonard E. Crustal deformation derived from repeat-pass Interferometric SAR at Enceladus–why and how?. InAAS/Division for Planetary Sciences Meeting Abstracts 2023 Oct (Vol. 55, No. 8, pp. 210-07).

**2023** **Berne A.**, Simons M, Keane J, Park R. Using Tidally Driven Elastic Strains to Infer Regional Crustal Thickness at Enceladus. LPI Contributions. 2023 May;2992:6009.

**2023** Vance S, Castillo-Rogez J, **Berne A.**, Hendrix A, Keane J, Leonard E, Mitchell K, Nimmo F, Park R, Simons M. Does Enceladus Have an Active Core with Hydrothermal Circulation?. InAAS/Division for Planetary Sciences Meeting Abstracts 2023 Oct (Vol. 55, No. 8, pp. 509-08).

**2023** Rovira-Navarro, Marc, Isamu Matsuyama, and **Berne A.**, "Revealing lateral structures in the interiors of planets and moons from tidal observations." AGU23 (2023).

**2023** Tam R, **Berne A.**, Köhne T, Simons M. Inferring Crustal Thickness for Enceladus from Tidal Strain Fields Through Multi-Scale Inversion. AGU23. 2023 Dec 14.

**2022** Keane, J.T., Sori, M.M., Ermakov, A.I., Austin, A., Bapst, J., **Berne A.**, Bierson, C.J., Bills, B.G., Boening, C., Bramson, A.M. and D'Amico, S., 2022, March. Next-Generation Planetary Geodesy: Results from the 2021 Keck Institute for Space Studies Workshops. In 53rd Lunar and Planetary Science Conference (Vol. 2678, p. 1622).

**2022** **Berne A.**, Simons, M., Keane, J. T., and Park, R. S. (2022, December). Modelling the Spatiotemporal Dependence of Diurnal Tidal Deformation Patterns on Regional Crustal Structure at Enceladus. In AGU Fall Meeting Abstracts (Vol. 2022, pp. P32A-05).

**2022** **Berne A.**, Chung, N., Stock, J. M., and Schwandner, F. M. (2022, December). An Inverse Approach to UAV-based Ground Gas Flux Monitoring at Volcanic Systems. In AGU Fall Meeting Abstracts (Vol. 2022, pp. NS24A-06).

**2022** Nelson K, Jiménez C, Deering CD, de Moor MJ, Blackstock JM, Broccardo SP, Schwandner FM, Fisher J, **Berne A.**, Prada Cordero C, Anderson ME. Improving the Total CO2 Budget Estimate for an Active Stratovolcano in Costa Rica. InAGU Fall Meeting Abstracts 2022 Dec (Vol. 2022, pp. EP55B-06).

**2022** **Berne A.**, Simons, M., Keane, J. T., and Park, R. S. (2022). Exploring Different Scales of Crustal Deformation at Enceladus. Outer Planets Assessment Group (OPAG).

**2021** **Berne A.**, Simons, M., Keane, J.T. and Park, R.S., 2021, December. Modelling Tidally-Driven Crustal Dynamics of Enceladus. In AGU Fall Meeting 2021. AGU.

**2019** **Berne A.**, Zhang T, Ferrer A, Shomar J, Oyhama T, Klein M. Behavioral pattern transitions and habituation to pulsed mechanical vibration in crawling Drosophila larvae. InAPS March Meeting Abstracts 2019 (Vol. 2019, pp. A65-009).

# IX. Technical Reports and Other Publications

Sori, M., Keane, J.T. and Ermakov, A. and **Berne, A.**, and Bierson, C., and Bills, B., and Boening, C., and Bramson, A., and D'Amico, S., and Denton, C.A. and Evans, A., and Hemingway, D., and Hernandez, s., and Hostrom, K., and Izquierdo, K., and James, P. and Johnson, B., and Lau, H., and Navarro, T. 2023. Next Generation Planetary Geodesy. *Keck Institute for Space Studies*. https://doi.org/10.7907/y1m4-ek67.

Altinok, A., Simons, M., and Soderlund, K., and Marteau, E., and Abdulah, D., and Aivazis, M., and Bagheri, A., and Batlle, P., and Benedikter, A., and **Berne, A.**, and Blaney, D., and Braverman, A., and Feldman, S., and Fifer, L., and Fu, X., and Hill, T., and Kang, W., and Keane, J., and Leonard, E., and Meyer, C., and Mitchell, K., and Niyogi, D., and Owhadi, H., and Rapaport, E., and Siegler, M., and Singh, M., and Steinbruegge, S., and Thompason, A., and Vance, S. Digital Twins for Solar System Exploration: Enceladus. *Keck Institute for Space Studies* (*in prep*).

# X. Additional Scholarships

Total Amount Awarded: $190,500

**2019 - 2020** Philip and Patricia Frost Scholarship, Oxford University
*Total Award:* $50,000

**2015 - 2019** President's Scholarship, University of Miami
*Total Award:* $140,500

# XI. Selected Press Releases, News Articles, and Podcasts

Press releases, news articles, and podcasts either about my research, outreach, and/or broader engagement

**2025** Why the two sides of the Moon look so different, *The Naked Scientists Podcast*, May 16, 2025
**2025** Gravity study shows why the moon's two sides look so different, Will Dunham, *Reuters*, May 14, 2025
**2025** NASA Studies Reveal Hidden Secrets About Interiors of Moon, Vesta, *NASA/JPL Press release*, May 16, 2025
**2024** NASA-Funded Study Examines Tidal Effects on Planet and Moon Interiors, Aaron Gronstal, *Astrobiology at NASA, Life in the Universe*, November 8, 2024
**2024** How 'tiger stripes' on Saturn's moon Enceladus point to habitability: Study, Leah Sarnoff, *ABC News*, April 30, 2024
**2024** Strike-Slip Faults Could Drive Enceladus's Jets, Kimberly Cartier, *Eos*, April 29, 2024
**2024** 'Tiger stripes' on Saturn's moon Enceladus could reveal if its oceans are habitable, Robert Lea, *Space.com*, April 29, 2024
**2024** Enceladus Spills Its Guts through Strike–Slip Motion, Lori Dajose, *Caltech News*, April 29, 2024
**2019** Student Profile: Alexander Berne, Matthew Perez, *University of Miami COE News*, March 08, 2019
**2019** In Search of Hidden Worlds, Ashley Williams, *News at the U*, March 05, 2019

# XII. Professional Activities and Service

**2025 - present** Co-convener of the session *Planetary Dynamics: Shape, Gravity, Orbit, Tides, and Rotation from Observations and Models* at the European Planetary Science Conference

**2023 - present** Grant Proposal Reviewer: NASA Cassini Data Analysis Program (CDAP), Artemis Participating Scientist Program

**2022 - present** Reviewer for Publications in: *Geophysical Research Letters*, *Journal of Geophysical Research: Planets (JGRE)*, *Global and Planetary Change (GLOPCHA)*, *The Astronomical Journal*, *Atmospheric Environment*, *Petroleum Science and Technology*, *The Planetary Science Journal*

**2024 - present** Jet Propulsion Laboratory Moons, Geology and Geophysics (moons-gg) Meeting: Informal weekly meeting of scientists at JPL to discuss the geodynamics of moons in the solar system.
*Role:* Participant

**2022 - 2025** Caltech Center for Inclusion and Diversity: Organization to enhance the experience of all Caltech community members holistically through education, advocacy, cultural exchange, leadership development, and coalition building.
*Role:* Volunteer

**2022 - 2025** Ocean Worlds Colloquia: Weekly meeting of graduate students and postdocs in Caltech's Division of Geological and Planetary Sciences to discuss ocean world science.
*Role:* Founder

**2023 - 2024** Seismolab Retreat Committee: Committee of students in Caltech's seismological laboratory (i.e., geophysics department) which organize a yearly retreat for the Seimological Laboratory
*Role:* Organizer

**2022 - 2023** Seismolab Seminar Committee: Committee of students in Caltech's seismological laboratory (i.e., geophysics department) which organize the weekly department seminar
*Role:* Organizer

**2022 - 2023** Seismolab Social Hour Committee: Committee of students in Caltech's seismological laboratory (i.e., geophysics department) which organize the weekly social hour (i.e., informal get-together of students).
*Role:* Organizer

## XIII. Professional Affiliations

**2023 - present** American Astronomical Society (AAS), Member
**2023 - present** AAS Division for Planetary Sciences (DPS), Member
**2022 - present** Caltech Geomechanics and Mitigation of Geologic Hazards (GMG), Member
**2021 - present** Keck Institute for Space Studies (KISS), Workshop Participant
**2020 - present** American Geophysical Union (AGU), Member

## XIV. Teaching Experience

**2024** Graduate Mentor (Caltech)
Project: *Concept of Operation for an Orbiting Enceladus InSAR mission*
Role: Supervised Research Project for Eitan Bruck

**2023** Graduate SURF (Summer Undergraduate Research Fellowship) Mentor (Caltech)
Project: *Inferring Crustal Thickness for Enceladus from Strain Fields Through Multi-Scale Inversion*
Role: Supervised Research Project for Riley Tam

**2023** Graduate VURP (Visiting Undergraduate Research Program) Mentor (Caltech)
Project: *Developing High-throughput Gas Measurement Systems for Monitoring Volcanic Activity*
Role: Supervised Research Project for Kayleigh Fischer

**2022** Graduate SURF (Summer Undergraduate Research Fellowship) Mentor (Caltech)
Project: *Developing Cost-Effective $CO_2$ Fluxmeters for Volcanic Gas Monitoring*
Role: Supervised Research Project for Norman Chung

**2021 - 2025** Graduate Teaching Assistant (Caltech)
Ge111b: Applied Geophysics Field Course (Mark Simons)
Ge16: Earthquakes (Joann Stock)

**2017 - 2019** Undergraduate Teaching Assistant (University of Miami)
MAE301: Engineering Materials Science (Ryan Karkkainen)
PHY201: University Physics I for the Sciences (Mason Klein)

## XV. Public Outreach

**2024** NZ Enrichment Trip, Caltech Seismological Laboratory
*Role:* Planned 2024 Enrichment Trip to New Zealand's North Island

**2023 - present** Earthquake (EQ) Fellows Program, Caltech Seismological Laboratory
Summer camp program through Caltech's Siesmolab to engage High School Students in Pasadena with Geosciences.

*Role:* Counselor and Mentor, Occasional Speaker during daily events

**2023 - present** Caltech Center for Inclusion and Diversity
*Role:* Recurring Speaker to Discuss STEM careers with public High School students in Los Angeles

**2023 - present** Universe Today Podcast:
Podcast hosted by Fraser Cain (Based in Vancouver, BC) on Space News and Current Events
*Role:* Recurring Guest

**2022 - present** Pasadena Activities League (PAL) Middle School Tutoring Program
*Role:* Weekly hour-long tutoring of public Middle School students in Math and Physics

**2019 - 2020** University of Oxford Medical Sciences Department
Program at the University of Oxford to develop the Oxford-AstraZeneca vaccine against COVID-19
*Role:* Volunteer lab chemist (i.e., performed routine tasks to free up time for scientists who were *really* developing a COVID vaccine).

**2019** Astronomy Club, University of Miami
*Role:* Planned a trip with 7 participants in 2019 to view a total solar eclipse in Coquimbo, Chile

**2018** Astronomy Club, University of Miami
*Role:* Planned a trip with 14 participants in 2018 to view the Aurora Borealis in Akureyri, Iceland

**2017** Astronomy Club, University of Miami
*Role:* Planned a trip with 5 participants in 2017 to view the total solar eclipse in South Carolina

**2017 - 2019** Scuba Diving Club, University of Miami
*Role:* Participant and Organizer

**2016 - 2019** Astronomy Club, University of Miami
*Role:* Founder, President, and Skywatcher (i.e., trip organizer)

**2016 - 2017** Exoplanet Hunting Society, University of Miami
Club dedicated to detecting exoplanets using amateur telescopes and equipment (i.e., CCID cameras). We successfully measured $\sim$12 transit curves!
*Role:* Founder and President

**2018 - 2019** Frost Science Museum, Miami Florida
With other members of the University of Miami Astronomy club, organized two public "telescope viewing" events for members of the general public.
Real quote from one participant: "Saturn's Rings are much prettier in real life"
*Role:* Organizer

**2018 - 2019** Fox Observatory Amateur Astronomers, Weston Florida
With other members of the University of Miami Astronomy club, organized several public "telescope viewing" using the Fox observatory telescopes in Markham Park, Florida
*Role:* Organizer

**2014** Bishop Gorman Dominican Republic Volunteers
A community service organization based in the Dominican Republic that seeks to work with Haitian refugees to improve their health and well-being
*Role:* Volunteer Translator and Shelter Builder

**2013 - present** Pasadena Radio Club American Radio Relay League
Extra HAM radio operator (KE5VYT), currently involved in emergency response volunteering efforts through the Pasadena Radio Club
*Role:* Volunteer

**2012 - 2013** St. Vincent de Paul Food Bank
A community service organization aimed at delivering food to marginalized communities in Tyler, Texas
*Role:* Volunteer

**2011 - 2013** Tyler Humane Society
A humane shelter in Tyler, Texas for abandoned pets.
*Role:* Volunteer

# XVI. References

Mark Simons

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California Institute of Technology
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Isamu Matsuyama

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James Tuttle Keane

Scientist: NASA Jet Propulsion Laboratory (JPL).
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Ryan Park

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NASA Jet Propulsion Laboratory (JPL).
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