Brynna G. Downey

Graduate Student
Department of Earth & Planetary Sciences
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Research interests
The tidal evolution of satellites in our solar system and the effects on orbits and spin states.
Developing models that are testable by ground-based observations or spacecraft missions.

Education

2018 – present	**University of California, Santa Cruz** Ph.D. candidate in Earth and Planetary Sciences Research topics: Tidal-orbital-spin evolution of Callisto, the Moon, Ganymede, and Titan Expected graduation date: 2024 Advisor: Francis Nimmo
2013-2017	**Massachusetts Institute of Technology** B.S. in Earth, Atmospheric, & Planetary Sciences B.S. in Physics Thesis: "Finding the location of Planet Nine" Advisor: Jack Wisdom

Research positions

2017 – 2018	**Research assistant**, Observatoire de la Cote d'Azur N-body simulations of TNOs to find Planet Nine Advisor: Alessandro Morbidelli
2016	**Undergraduate research assistant**, Laboratoire d'Astrophysique de Marseille Meteor spectroscopy software for FRIPON Advisor: Pierre Vernazza
2015	**Undergraduate research assistant,** Université Catholique de Louvain Modelling sediment transport into the Great Barrier Reef Advisor: Eric Deleersnijder
2014-2016	**Undergraduate research assistant,** Massachusetts Institute of Technology Meteorite and lunar paleomagnetism Advisors: Huapei Wang and Ben Weiss

Awards

2023-2024	Dissertation-year fellowship (UCSC)
2020-2023	National Science Foundation Graduate Research Fellowship Program
2018-2019	Chancellor's fellowship (UCSC)
2017	W.O. Crosby award for sustained excellence (MIT EAPS)
2016	Award for excellence as an undergraduate teaching assistant (MIT EAPS)

Publications

6. **Downey, B. G.,** Nimmo, F., & Matsuyama, I. (2023). The thermal–orbital evolution of the Earth–Moon system with a subsurface magma ocean and fossil figure. *Icarus*, *389*, 115257.
5. Wisdom, J., Dbouk, R., Militzer, B., Hubbard, W. B., Nimmo, F., **Downey, B. G.,** & French, R. G. (2022). Loss of a satellite could explain Saturn's obliquity and young rings. *Science*, *377*(6612), 1285-1289.
4. **Downey, B. G.**, Nimmo, F., & Matsuyama, I. (2020). Inclination damping on Callisto. *Monthly Notices of the Royal Astronomical Society*, *499*(1), 40-51.
3. **Downey, B. G.**, & Morbidelli, A. (2020). An attempt to constrain Planet Nine's orbit and position via resonant confinement of distant TNOs. *Monthly Notices of the Royal Astronomical Society*, *494*(2), 2045-2052.
2. Weiss, B. P., Wang, H., Sharp, T. G., Gattacceca, J., Shuster, D. L., **Downey, B.,** ... & Wang, J. (2017). A nonmagnetic differentiated early planetary body. *Earth and Planetary Science Letters*, *468*, 119-132.
1. Wang, H., Weiss, B. P., Bai, X. N., **Downey, B. G.,** Wang, J., Wang, J., ... & Zucolotto, M. E. (2017). Lifetime of the solar nebula constrained by meteorite paleomagnetism. *Science*, *355*(6325), 623-627.

Conference abstracts

7. An Observational Constraint on Titan's Tidal Dissipation. DDA 54 2023.
6. An Observational Constraint on Titan's Tidal Dissipation. LPSC 54 2023, #2982.
5. Ganymede During a Cassini State Transition. AGU Fall Meeting 2022, P43B-03.
4. Evolution of the Lunar Inclination. LPSC 53 2022, #2508.
3. Dynamical Evolution of the Moon with a Subsurface Magma Ocean. LPSC 52 2021, #2481.
2. Inclination Damping on Callisto. AGU Fall Meeting 2019, P53C-3469.
1. Inclination Damping on Titan and Callisto. LPSC 50 2019, #2195.

Teaching and mentorship

2022 – 2023	Dept. of Earth & Planetary Sciences grad-undergrad mentorship program, UCSC
2022	Facilitator, GEOPATHS, *The Dynamic Earth*, UCSC
2019 – 2021	Facilitator, GEOPATHS, *Mathematical Methods in the Earth Sciences*, UCSC
2019 – 2021	Teaching assistant, *Mathematical Methods in the Earth Sciences*, UCSC

Trainings and education

2023	NASA Planetary Science Summer School, JPL
2022	Other Worlds Laboratory, DEI meetings, UCSC
2022	Advancing IDEA in Planetary Science, virtual conference
2021	Unlearning Racism in Geoscience, virtual program
2020 – 2021	Preparing for Inclusive Teaching, STEM TA training workshop, UCSC
2019	Academic Excellence Program, GEOPATHS facilitator training, UCSC

Service

2021 – 2023	Astrobiology Reading Group, Co-organizer, UCSC
2020 – 2022	University of California Council on Student Fees, UCSC representative
2019 – 2022	Miscellaneous and Course Fees Advisory Committee, Student Representative, UCSC
2019 – 2022	Student Fee Advisory Committee, Chair & Graduate Student Representative, UCSC
2019 – 2020	Grad Lab, Member, UCSC
2019 – 2020	Graduate Student Commons, Treasurer, UCSC
2019	Rates, Recharges, and Fees Committee, Graduate Student Representative, UCSC
2018 – 2020	Committee on Information Technology, Graduate Student Representative, UCSC
2018 – 2020	Graduate Student Association, Earth & Planetary Sciences representative, UCSC

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