

# Brynna G. Downey

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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.

## Education

2018 – present	<b>University of California, Santa Cruz</b> 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	<b>Massachusetts Institute of Technology</b> 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	<b>Research assistant</b> , Observatoire de la Cote d’Azur, Advisor: Alessandro Morbidelli
2016	<b>Undergraduate research assistant</b> , Laboratoire d’Astrophysique de Marseille Advisor: Pierre Vernazza
2015	<b>Undergraduate research assistant</b> , Université Catholique de Louvain Advisor: Eric Deleersnijder
2014-2016	<b>Undergraduate research assistant</b> , Massachusetts Institute of Technology Advisors: Huapei Wang and Ben Weiss

## Awards

2020-2023	National Science Foundation Graduate Research Fellowships 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 experience

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

### Service and leadership experience

2021 – 2023	Astrobiology Reading Group, Co-organizer, UCSC
2019 – 2022	Student Fee Advisory Committee, Chair & Graduate Student Representative, UCSC
2019 – 2022	Miscellaneous and Course Fees Advisory Committee, Student Representative, UCSC
2019 – 2020	Graduate Student Commons, Treasurer, UCSC
2019 – 2020	Grad Lab, 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

### Training and education opportunities

2022	Other Worlds Laboratory, DEI meetings, participant, UCSC
2022	Advancing IDEA in Planetary Science conference, participant, UCSC
2021	Unlearning Racism in Geoscience, pod member, UCSC
2020 – 2021	Preparing for Inclusive Teaching, TA training workshop participant, UCSC
2019	Academic Excellence Program, GEOPATHS facilitator training participant, UCSC

Last updated April 6, 2023