

BENJAMIN IDINI

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RESEARCH INTERESTS

Solar System Exploration · Planetary Interiors and Evolution · Ocean Worlds · Tidal Interactions · Extraterrestrial Seismology · Planet Formation · Gravity Radio Science · Earthquake Mechanics · Earthquake Ground Motion · Tectonic Deformation

EDUCATION

PhD in Planetary Science, Caltech 2022

”Earthquakes and the new paradigm of diluted cores in gas giant planets” (Advisor: David Stevenson)

MS in Geophysics, Caltech 2019

MS in Earthquake Engineering, Universidad de Chile 2016

”Curvas de atenuación para terremotos intraplaca e interplaca en la zona de subducción chilena” (Advisors: Fabián Rojas and Sergio Ruiz)

BS in Structural Engineering, Universidad de Chile 2013

ACADEMIC APPOINTMENTS

Vera Rubin Postdoctoral Fellow, UC Santa Cruz, CA Sep. 2024 — Present

UC President’s Postdoctoral Fellow, UC Santa Cruz, CA Sep. 2022 — August 2024

Graduate R/T Assistant, Caltech, Pasadena, CA June 2017 — August 2022

Research Geophysicist, Universidad de Chile, Santiago, Chile Mar. 2016 — June 2017

MANUSCRIPTS IN PREPARATION

Idini, B. (2025). Stratification of the global oceans of Europa and Ganymede.

Idini, B. (2025). The bimodal extension of Jupiter’s dilute core.

Sun, J. & **Idini, B.** (2025). Episodic heating of Europa driven by Jupiter’s core evolution.

Dallin, N. & **Idini, B.** (2025). Automatic crater identification on icy surfaces via deep learning.

REFEREED PUBLICATIONS

16. Yarza, R., et al., including **Idini, B.** (2025). Evolution of the ZTF SLRN-2020 star-planet merger. [[arXiv:2507.05365](https://arxiv.org/abs/2507.05365)]

15. Park, R. S., et al., including **Idini, B.** (2025). Io’s tidal response precludes a shallow magma ocean. *Nature*. [[10.1038/s41586-024-08442-5](https://doi.org/10.1038/s41586-024-08442-5)]

14. Tulekeyev, A., et al., including **Idini, B.** (2024). Constraints on the long-term existence of dilute cores in giant planets. *The Planetary Science Journal*, 5(8), 190. [[10.3847/PSJ/ad6571](https://doi.org/10.3847/PSJ/ad6571)]

13. Flores-Cuba, J., et al., including **Idini, B.** (2024). Mechanisms and seismological signatures of rupture complexity induced by fault damage zones in fully-dynamic earthquake cycle models. *Geophysical Research Letters*, 51(11), e2024GL108792. [[10.1029/2024GL108792](https://doi.org/10.1029/2024GL108792)]

12. **Idini, B.** & Nimmo, F. (2024). Resonant stratification in Titan’s global ocean. *The Planetary Science Journal*, 5(1), 15. [[10.3847/PSJ/ad11ef](#)]
11. **Idini, B.**, et al. (2024). Double distance dependence in high-frequency ground motion along the plate boundary in Northern Chile. *Journal of South American Earth Sciences*, 133. [[10.1016/j.jsames.2023.104699](#)]
10. Howard, S., et al., including **Idini, B.** (2023). Jupiter’s interior from Juno: Equation-of-state uncertainties and dilute core extent. *Astronomy and Astrophysics*, 672. [[10.1051/0004-6361/202245625](#)]
9. **Idini, B.** & Stevenson D.J. (2022). The gravitational imprint of an interior-orbital resonance in Jupiter-Io. *The Planetary Science Journal*, 3(4), 89. [[10.3847/PSJ/ac6179](#)]
8. **Idini, B.** & Stevenson D.J. (2022). The lost meaning of Jupiter’s high-degree Love numbers. *The Planetary Science Journal*, 3(1), 11. [[10.3847/PSJ/ac4248](#)]
7. **Idini, B.** & Stevenson D.J. (2021). Dynamical tides in Jupiter as revealed by Juno. *The Planetary Science Journal*, 2(2), 69. [[10.3847/PSJ/abe715](#)]
6. **Idini, B.** & Ampuero J.-P. (2020). Fault-zone damage promotes pulse-like rupture and back-propagating fronts via quasi-static effects. *Geophysical Research Letters*, 47(23), e2020GL090736. [[10.1029/2020GL090736](#)]
5. Erickson, B., et al., including **Idini, B.** (2020). The community code verification exercise for simulating sequences of earthquakes and aseismic slip (SEAS). *Seismological Research Letters*, 91(2A), 874-890. [[10.1785/0220190248](#)]
4. Ross, Z., **Idini, B.**, et al. (2019). Hierarchical interlocked orthogonal faulting in the 2019 Ridgecrest earthquake sequence. *Science*, 366, 6463. [[10.1126/science.aaz0109](#)]
3. Gurnis, M., et al., including **Idini, B.** (2019). Incipient subduction at the contact with stretched continental crust: The Puysegur Trench. *Earth and Planetary Science Letters*, 520, 212-219. [[10.1016/j.epsl.2019.05.044](#)]
2. Leyton, F., et al., including **Idini, B.** (2018). Empirical site classification of CSN network using strong-motion records. *Seismological Research Letters*, 89(2A), 512-518. [[10.1785/0220170167](#)]
1. **Idini, B.**, et al. (2017). Ground motion prediction equations for the Chilean subduction zone, *Bulletin of Earthquake Engineering*, 15, 5. [[10.1007/s10518-016-0050-1](#)]

INVITED SEMINARS AND COLLOQUIA

UC Davis, Earth and Planetary Science Department Seminar	April 30, 2025
Cornell University, Planetary Seminar	January 24, 2025
Cornell University, Astronomy Colloquium	January 23, 2025
Southwest Research Institute, Boulder CO Colloquium	October 29, 2024
San Francisco State University, Physics and Astronomy Colloquium	September 30, 2024
Lawrence Livermore National Laboratory, HEDS Seminar Series	September 19, 2024
UC Santa Cruz, Astronomy and Astrophysics Colloquium	May 15, 2024
Stanford University, Geophysics Seminar	May 9, 2024
UC Merced, Physics Colloquium	February 9, 2024
UC Berkeley, Earth and Planetary Science Department Seminar	January 18, 2024
MIT, Earth, Atmospheric, and Planetary Science Department Lecture Series	May 17, 2023
UC Santa Cruz, Geophysical and Astrophysical Fluid Dynamics Seminar	May 12, 2023

UC Davis, Earth and Planetary Science Department Seminar	April 19, 2023
UC Santa Cruz, EPS Department Whole Earth Seminar	April 18, 2023
UC San Diego & San Diego State University, Astrophysics Seminar	March 1, 2023
UC San Diego, Scripps Institution of Oceanography, IGPP Seminar	February 28, 2023
UC Berkeley, Center for Integrative Planetary Science Seminar	February 1, 2023
Rice University, EEPS Department Colloquium	January 19, 2023
UCLA, Earth, Planetary, and Space Sciences Department Colloquium	October 11, 2022
UC Santa Cruz, Astronomy and Astrophysics Planetary Lunch Seminar	November 7, 2022
Universidad de Chile, Department of Geophysics Seminar (virtual)	June 17, 2022
Caltech, DIX Planetary Science Seminar	April 27, 2021
Caltech, DIX Planetary Science Seminar	June 2, 2020

SOFTWARE PUBLICATIONS

2. Idini, B (2023). Interiorize: Simple Models of Planetary Tides

(github.com/bidini/interiorize).

1. Luo, Y., Ampuero, J.P., et al., including **Idini, B.** (2017). QDYN: a Quasi-DYNamic earthquake simulator (v1. 1). Zenodo.(doi: 10.5281/zenodo. 322459).

SELECTED CONFERENCE PRESENTATIONS (O: ORAL, P: POSTER)

16. H-He and the extension of Jupiter's dilute core (invited), Warm Dense Matter Workshop, Santa Fe NM, 2025 (O).

15. Stable stratification in the global oceans of Europa and Ganymede, AGU Fall Meeting, Washington DC, 2024 (O).

14. Resonant stratification in Titan's global ocean and other large ocean worlds, AGU Fall Meeting, San Francisco CA, 2023 (O).

13. The Case for SmallSats: Enhancing the Uranus Mission, LPI Contributions 2808:8158, Uranus Flagship: Investigations and Instruments for Cross-Discipline Science Workshop, Pasadena CA, 2023 (P).

12. Resonant stratification in Titan and other icy satellites with global oceans, DPS-EPSC Annual Meeting, San Antonio TX, 2023 (O).

11. Future investigations of ocean dynamics in ocean worlds using orbiting spacecraft, Bay Area Planetary Science Conference, Santa Cruz CA, 2023 (O).

10. A tale of two planets: dilute cores in Jupiter and Saturn from in-situ spacecraft observations, UC Santa Cruz Postdocs Association Symposium, Santa Cruz CA, 2023 (O).

9. A tale of two planets: dilute cores in Jupiter and Saturn from in-situ spacecraft observations, UC PPFP Annual Meeting, Lake Arrowhead CA, 2023 (O).

8. The gravitational imprint of dynamical tides in Jupiter (invited), AGU Fall Meeting, Chicago IL, 2022 (O).

7. Tidal constraints on the radial extension and static stability of Jupiter's dilute core, AGU Fall Meeting, New Orleans LA, 2021 (P).

6. Dynamical tides in the Jovian System as revealed by Juno, AGU Fall Meeting, remote, 2020 (P).

5. The first three days of the 2019 Ridgecrest earthquake sequence, SCEC Annual meeting, Palm Springs CA, 2019 (P).

4. A Bayesian Image of the 2017 Kermanshah Seismic Sequence in the Northwestern Zagros, AGU Fall Meeting, Washington DC, 2018 (O).
3. Rupture Complexity Promoted by Damaged Fault Zones in Earthquake Cycle Models. In AGU Fall Meeting, New Orleans LA, 2017 (P).
2. Empirical dynamic amplification factors for sites based on seismic noise, 16th World Conference on Earthquake Engineering, Santiago, Chile, 2017 (O).
1. Ground motion prediction equations for the Chilean subduction zone, 2nd Geophysical Signatures of Earthquakes and Volcanoes - 2GSEV, Santiago, Chile, 2016 (P).

STUDENTS SUPERVISED

Jasmine Sun, Brown University (NASA ICONS)	Summer 2025
<i>Europa's orbital voyage and the imprints it left on its ice shell</i>	
Dallin Nelson, Southern Utah University undergraduate (NASA ICONS)	2024 – Present
<i>Dating Europa's terrain with deep learning</i>	
Tyler Yuen, San Jose State University undergraduate (NASA ICONS)	Summer 2024
<i>Tidal modeling of Europa's ocean</i>	
Richard Truong, San Francisco State University undergraduate (Lamat)	2023 — Present
<i>Planet engulfment and stellar structure</i>	
Rafael Cottom, UC Santa Cruz undergraduate	2024 — Present
<i>Thermomechanical modeling of Europa's ice shell</i>	
Diego González, University of Chile undergraduate (co-sup. with F. Rojas)	2016 — 2017
<i>Ground motion spectra of earthquakes in Chile</i>	

PLANETARY EXPLORATION

Inspiring Clipper: Opportunities for Next-generation Scientists, Mentor

NASA	2024 — Present
	United States

Juno Mission, Interior Working Group Cochair

NASA	September 2024 — Present
	United States

Europa Clipper Mission, Science Team Affiliate

NASA	April 2023 — Present
	United States

Juno Mission, Science Team Member

NASA	January 2020 — Present
	United States

Keck Institute for Space Studies Affiliate

Caltech – Jet Propulsion Laboratory	January 2019 — Present
	United States

KISS Report: Determining the Interior Structure of Uranus

Keck Institute for Space Studies – Caltech/JPL	September 11-15, 2023
	Pasadena, CA

Mission Design: Planetary Science Summer School

NASA – Jet Propulsion Laboratory	May 2022 — Aug 2022
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United States

Magnus G. Langseth Transoceanic Research Vessel, Science Crew

Lamont-Doherty Earth Observatory

March 2018

Puysegur Trench, Pacific Ocean

MENTORSHIP, LEADERSHIP, AND OUTREACH

Guide in <i>La Noche de las Estrellas</i> outreach event, Lick Observatory	2025
Primary convener at AGU Fall Meeting, session: The Gas Giants: Atmosphere, Interior, and Evolution of Jupiter and Saturn	2025
Primary convener at DPS-EPSC joint meeting, session: Giant Planet Interiors, Atmospheres, and Evolution	2025
Mentor in <i>Lamat</i> undergraduate research program, UC Santa Cruz	2023 — Present
Speaker in <i>La Noche de las Estrellas</i> outreach event, San Francisco State University	2024
Primary convener at AGU Fall Meeting, session: Giant Planet Interiors	2022 — 2024
Panelist at Europa Clipper's educational event for high school students, Puerto Rico	2023
Guide in <i>La Noche de las Estrellas</i> outreach event, Lick Observatory	2023
Mentor in the Eugene Cota-Robles Fellowship program, UC Santa Cruz	2022 — 2023
Invited speaker at NASA's Hyperwall Exhibition, AGU Fall Meeting, Chicago IL	2022
Invited speaker at Science Journeys, Caltech (youtube.com/user/caltech)	2021 — 2022
Mentor in the EPS/ESCI Undergraduate program, UC Santa Cruz	2022
Speaker in Urban Math Collaborative program, Long Beach Unified School District	2021
Host in Caltech's <i>Astronomía en el Bar</i> (Astronomy on tap hosted in Spanish; youtube.com/c/CaltechAstro)	2021
Mentor in Caltech's International Graduate Student Buddy Program	2020 — 2021
Judge in Caltech's Summer Undergraduate Research poster competition	2020 — 2021
Panelist at Science for March Seismological Laboratory booth, Caltech	2018
Director in Student Federation Board, Universidad de Chile	2014
Director in Engineering Student Council Board, Universidad de Chile	2013

GRANTS, HONORS, AND AWARDS

NASA's Europa Clipper ICONS undergraduate research mentor (\$18,189 USD)	2025
NASA's Juno mission subcontract (\$146,039 USD)	2025
NASA's Juno mission subcontract (\$65,815 USD)	2024
Vera Rubin Postdoctoral Fellowship, UC Santa Cruz (\$55,620 USD)	2024
NASA's Europa Clipper ICONS undergraduate research mentor (\$15,017 USD)	2024
Travel award, EPSC-DPS joint meeting (\$2,000 USD)	2023
Travel award, USRA-LPI Uranus Flagship Workshop (\$2,500 USD)	2023
Travel award, NASA Outer Planets Assessment Group (\$1,000 USD)	2022
UC President's Postdoctoral Fellowship (\$552,760 USD)	2022
AGU Outstanding Student Presentation Award (\$500 USD)	2021
Division of Geological and Planetary Sciences Fellowship, Caltech (\$70,000 USD)	2017
Highest Distinction Major Graduate, Universidad de Chile	2016
CONICYT Master of Science Fellowship, Ministry of Education, Chile (\$17,000 USD)	2014
Bicentenario Scholarship, Ministry of Education, Chile (\$10,000 USD)	2012

TOTAL: \$956,440 USD

TEACHING EXPERIENCE

Instructor of Record

Overview of the Universe, UC Santa Cruz

January 6 — February 7, 2025

Invited Guest Lecturer

Introduction to the Solar System, UC Merced

February 9, 2024

Physics of Planetary Systems, UC Santa Cruz

October 31, 2024

Research Practicum for Astrophysics, UC Santa Cruz

November 5-7, 2024

Research Practicum for Astrophysics, UC Santa Cruz

October 28-30, 2025

Teaching Assistant

Planetary Physics, Caltech

2022

Planetary Structure and Evolution, Caltech

2021

Geodynamics, Caltech

2020

Freshman Seminar: Earthquakes, Caltech

2019

Advanced Structural Dynamics, Universidad de Chile

2015

Seismic Design of Structures, Universidad de Chile

2015

PROFESSIONAL ORGANIZATIONS

American Astronomical Society (AAS)

2023 — Present

Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)

2021 — Present

American Geophysical Union (AGU)

2017 — Present

APPEARANCES IN PRESS AND MEDIA

Podcast episodes

(Cráneo: Ciencia para niños curiosos) [Europa Clipper: Explorando la Luna de Júpiter](#),

Cumbre Kids

November 5, 2024

(El Universo curioso de la NASA) [Un viaje poético a la luna Europa](#), NASA en español

October 1, 2024

Recorded outreach talks

[Viaje al Centro de Júpiter](#), Science Journeys, Caltech

November 4, 2022

[A Journey to Jupiter's Core](#), Science Journeys, Caltech

May 20, 2022

YouTube Live shows

(NASA Europa Clipper Launch Broadcast) [Lanzamiento de Europa Clipper](#), NASA en Español

October 15, 2024

(NASA Science Live) [¿Podría la luna Europa de Júpiter sustentar la vida?](#) NASA en Español

October 3, 2024

(Caltech Astro) [Ciencia con el Telescopio James Webb de la NASA](#), Astronomía en el Bar

November 17, 2021

(Caltech Astro) [Enanas Marrones y Mini Agujeros Negros](#), Astronomía en el Bar

May 11, 2021

Newspapers and magazines

[Io's magma ocean may not exist after all](#), John Wenz, Astronomy

December 23, 2024

No Magma Ocean For Io, Jupiter's Volcano-Covered Moon, Arielle Frommer, Sky & Telescope December 20, 2024

Jupiter's Moon Io Doesn't Have An Ocean Of Lava, Scientists Say, Jamie Carter, Forbes December 15, 2024

Image of 'violent' earthly phenomenon captured on Jupiter, Ariana Bindman, SFGATE June 20, 2023

#SoCaltech: Benjamin Idini, Caltech Magazine August 11, 2022

Universal Languages, Lori Dajose, Caltech Magazine November 29, 2021

The tides of Jupiter can help scientists understand the history of the Solar System, Passant Rabie, Inverse Magazine May 5, 2021

Weird 'boomerang' earthquake detected under the Atlantic Ocean, Maya Wei-Haas, National Geographic August 10, 2020

California: July earthquake caused fault to move for first time on record, Sam Levin, The Guardian October 18, 2019

Unprecedented movement detected on California earthquake fault capable of 8.0 temblor, Rong-Gong Lin II, LA Times October 17, 2019

Se detecta movimiento sin precedentes en una falla sísmica en California capaz de producir un temblor de 8.0, Rong-Gong Lin II, The San Diego Union-Tribune En Español October 17, 2019

Highlights

Tyler Yuen Explores Europa (From a Distance), Cassie Myers, SJSU News Center November 4, 2024

Aliens on 1 of Jupiter's moons? SUU student builds AI model for NASA, Alysha Lundgren, Cedar City News August 13, 2024

Io's raging volcanoes are self-powered, Paul Anderson, EarthSky December 26, 2024

No shallow magma ocean for Jupiter's moon Io, research suggests, Phys.org December 12, 2024

Io Probably Doesn't Have a Global Magma Ocean After All, Kimberly Cartier, Eos December 12, 2024

NASA Selects Students for Europa Clipper Intern Program, Patricia Talbert, NASA News May 02, 2024

Resonant Stratification In Titan's Global Ocean, Keith Cowing, Astrobiology December 11, 2023

Caltech Teams Up With Urban Math Collaborative, Andrew Moseman, Caltech News May 13, 2021

Raising Tides on Jupiter with Its Moons, Susanna Kohler, AAS Nova April 21, 2021

Lessons from Ridgecrest, Robert Perkins, AAAS EurekAlert! October 17, 2019

Caltech, NASA Find Web of Ruptures in Ridgecrest Quake, Anthony Greicius, NASA News Oct 17, 2019