

Benjamín Idini

Pasadena, CA
bidiniza@caltech.edu

Planetary Geophysicist

Website: bidini.github.io
LinkedIn: benja-rodo

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

EDUCATION

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| Doctor of Philosophy in Planetary Science , <i>California Institute of Technology</i> | Sep 2022 (expected) |
| Master of Science in Geophysics , <i>California Institute of Technology</i> | Jun 2019 |
| Master of Science in Earthquake Engineering , <i>Universidad de Chile</i> | Mar 2016 |
| Bachelor of Science in Civil Engineering , <i>Universidad de Chile</i> | Dec 2013 |

RESEARCH EXPERIENCE

Interiors Working Group / NASA's Juno mission Jan 2020 — Present
California Institute of Technology Pasadena, CA

- Interpreted data from the Juno mission to recognize the first direct evidence of dynamical tides in a giant planet.
- Constructed analytic mathematical models of Jupiter's gravitational field, leading to three peer-reviewed publications.

Graduate Research Associate / The 2019 Ridgecrest earthquake Jul 2019 — Dec 2019
California Institute of Technology Pasadena, CA

- Collaborated in the first peer-reviewed publication of the 2019 Ridgecrest earthquake that struck California after 20 years of seismic quiescence.
- Trained a high dimensional fault slip model from spaceborne radar observations using Markov Chain Monte Carlo sampling and High Performance Computing.

Graduate Research Associate / The Earthquake Mechanics of Geological Faults Jun 2017 — Jun 2019
California Institute of Technology Pasadena, CA

- Implemented tectonic fault damage as a new feature in an earthquake simulator to numerically simulate the tectonic activity of a fault model over millions of years, leading to a peer-reviewed publication.
- Provided analytic mathematical models of earthquake propagation under the conditions observed in geological faults.

Science Crew / Marcus G. Langseth Research Vessel Mar 2018
California Institute of Technology Puysegur Trench, New Zealand

- Assisted the deployment of instrumentation and acquisition of seismic, magnetic, and radar data while sailing the Pacific Ocean.

Research Assistant / Chilean Earthquake Ground Motion Mar 2016 — Jun 2017
Universidad de Chile Santiago, Chile

- Trained a linear model of ground motion during destructive earthquakes in Chile using local data, leading to the peer-reviewed publication of a Ground-Motion Prediction Equation frequently used in seismic hazard studies in the area.

PUBLICATIONS

11. **Idini, B.**, Ruiz, S., Ampuero J.-P., Leyton, F., & Rivera, E. (in prep.). High-frequency strong ground motion along the plate boundary in Northern Chile.
10. **Idini, B.** & Stevenson D.J. (in rev). The gravitational imprint of an interior–orbital resonance in Jupiter–Io.
9. **Idini, B.** & Stevenson D.J. (2022). The lost meaning of Jupiter's high-degree Love numbers. *The Planetary Science Journal*, 3(1), 11.
8. **Idini, B.** & Stevenson D.J. (2021). Dynamical tides in Jupiter as revealed by Juno. *The Planetary Science Journal*, 2(2), 69.
7. **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.
6. 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.
5. Ross, Z., **Idini, B.**, et al. (2019). Hierarchical interlocked orthogonal faulting in the 2019 Ridgecrest earthquake sequence. *Science*, 366, 6463.
4. 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.
3. Leyton, F., Pastén, C., Ruiz, S., **Idini, B.**, & Rojas, F. (2018). Empirical site classification of CSN network using strong-motion records. *Seismological Research Letters*, 89(2A), 512–518.
2. Luo, Y., Ampuero, J. P., Galvez, P., Van den Ende, M., & **Idini, B.** (2017). QDYN: a Quasi-DYNamic earthquake simulator (v1. 1). Zenodo.(doi: 10.5281/zenodo. 322459).
1. **Idini, B.**, Rojas, F., Ruiz, S., & Pastén C. (2017). Ground motion prediction equations for the Chilean subduction zone, *Bulletin of Earthquake Engineering*, 15, 5.

OUTREACH AND SERVICE

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| Speaker at the Urban Math Collaborative program, Long Beach Unified School District | 2021 |
| Host in <i>Astronomía en el Bar</i> (Astronomy on tap hosted in Spanish), Los Angeles | 2021 |
| Mentor for Caltech's International Student Buddy Program | 2020 — 2021 |
| Speaker at Caltech's Science Journeys (English and Spanish) | 2020 — 2021 |
| Judge for Caltech's Summer Undergraduate Research Fellow (SURF) poster competition | 2020 — 2021 |
| Caltech's Science for March, Seismological Laboratory booth | 2018 |
| Graduate Student Council Representative, Universidad de Chile | Jan 2013 — Dec 2014 |

HONORS AND AWARDS

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| Affiliate to the Keck Institute for Space Studies | Nov 2019 — Present |
| Division of Geological and Planetary Sciences Fellowship, California Institute of Technology | Jun 2017 — Sep 2018 |
| Highest Distinction Major Graduate, Universidad de Chile | Mar 2016 |
| CONICYT Master of Science Fellowship, Chile | Mar 2014 — Dec 2015 |
| Honored Undergraduate Student, Universidad de Chile | 2011 — 2012 |

CONFERENCE PRESENTATIONS

- (Poster) Tidal constraints on the radial extension and static stability of Jupiter's dilute core, AGU Fall Meeting, New Orleans, 2021.
- (Poster) Dynamical tides in the Jovian System as revealed by Juno, AGU Fall Meeting, Virtual, 2020.
- (Poster) The first few days of the 2019 Ridgecrest earthquake sequence, SCEC Annual Meeting, Palm Springs, 2019.
- (Talk) A Bayesian Image of the 2017 Kermanshah Seismic Sequence in the Northwestern Zagros, AGU Fall Meeting, Washington DC, 2018.
- (Poster) Rupture complexity promoted by damaged fault zones, AGU Fall Meeting, New Orleans, 2017.
- (Talk) Empirical dynamic amplification factors for sites based on seismic noise, 16th World Conference on Earthquake Engineering, Santiago, Chile, 2017.
- (Poster) Ground motion prediction equations for the Chilean subduction zone, 2nd Geophysical Signatures of Earthquakes and Volcanoes - 2GSEV, Santiago, Chile, 2016.

INVITED TALKS AND SEMINARS

- Tides in Jupiter, Report #3, Interiors Working Group, NASA's Juno mission, 2021.
- Journey to the center of Jupiter, Science Journeys, Caltech, 2021.
- The tidal excitation of Jupiter's dilute core, Planetary Science Seminar, Caltech, 2021.
- Dynamical tides in the Jovian System as revealed by Juno, Planetary Science Seminar, Caltech, 2020.
- Tides in Jupiter, Reports #1 & #2, Interiors Working Group, NASA's Juno mission, 2020.
- Simple Estimates for the dynamical contribution to tidal gravity, Interiors Working Group, NASA's Juno mission, 2020.

TEACHING ASSISTANT

California Institute of Technology

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| Planetary Physics (Konstantin Batygin) | 2022 |
| Planetary Structure and Evolution (David Stevenson) | 2021 |
| Geodynamics (Michael Gurnis) | 2020 |
| Freshman Seminar: Earthquakes (Joann Stock) | 2019 |

Universidad de Chile

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| Advanced Structural Dynamics (Ruben Boroscchek) | 2015 |
| Seismic Design of Structures (Ruben Boroscchek) | 2015 |

APPEARANCES IN NEWS ARTICLES

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| The tides of Jupiter can help scientists understand the history of the Solar System, Passant Rabie, Inverse Magazine | May 5, 2021 |
| Raising Tides on Jupiter with Its Moons, Susanna Kohler, AAS Nova | Apr 21, 2021 |
| Lessons from Ridgecrest, Robert Perkins, AAAS EurekAlert! | Oct 17, 2019 |
| Unprecedented movement detected on California earthquake fault capable of 8.0 temblor, Rong-Gong Lin II, LA Times | Oct 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 | Oct 17, 2019 |