

# Dr. Samuel M. Howell

Postdoctoral Scholar (US Citizen)  
NASA Jet Propulsion Laboratory,  
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## EDUCATION

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**University of Hawai'i at Mānoa**  
*Honolulu, Hawai'i*  
PhD Geology and Geophysics 2016  
MS Geology and Geophysics 2013  
*Geodynamic numerical modeling*  
*Statistical analysis of large datasets*  
*Seafloor mapping and analysis*

**Rose-Hulman Institute of Technology**  
*Terre Haute, Indiana*  
B.S. Engineering Physics 2010  
*Minor: Thermal Fluid Mechanics*  
*Concentration: Mech. Engineering*

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## EXPERIENCE

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**NASA Jet Propulsion Laboratory**  
Caltech Postdoctoral Scholar 2017 – Present

**University of Hawai'i at Mānoa**  
Research Assistant 2010 – 2016  
Teaching Assistant 2011

**Research Cruise TN273**, *The tectonics, igneous activity, and mineralization of the southern Mariana Forearc*  
Sonar Tow Pilot, R/V Thomas G. Thompson 2012

**Research Cruise ARGGH2010**, *Aegir Ridge Geology, Geophysics, and Hotspot Interaction*  
Shipboard Scientist, R/V Haakon Mosby 2010

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## AWARDS AND ACTIVITIES

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2017 **Outstanding Postdoctoral Research in Planetary Science and Life Detection**, Jet Propulsion Laboratory

2017 **Keck Institute for Space Studies** workshop participant, *Accessing the Subsurface Oceans of Icy Worlds*

2017 **NASA Planetary Science Summer Seminar**, Principal Investigator

2016 **Popular Mechanics Breakthrough Award** for study on vertical motions of the San Andreas Fault System

2015 **Graduate Achievement Award**, Dept. of Geology and Geophysics/UHM Graduate Division, UH Mānoa

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## PUBLICATIONS

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**Howell, S.**, R.T. Pappalardo (*in review*), *Can Earth-like plate tectonics occur in the outer ice shells of icy satellites?*, *Icarus*

**Howell, S.**, L. Chou, 2017 NPSSS (2018), *Centaur reconnaissance mission concept: Chariklo flyby and impact*, *Planetary and Space Science*, doi:10.1016/j.pss.2018.07.008

### 2017 JPL Outstanding Postdoctoral Research Award Recipient

**Howell, S.**, R.T. Pappalardo (2018), *Band formation and ocean-surface interaction on Europa and Ganymede*, *Geophysical Research Letters*, doi:10.1029/2018GL077594

**Howell, S.**, G. Ito, M. D. Behn, F. Martinez, J.-A. Olive, and J. Escartín (2016), *Magmatic and tectonic extension at the Chile Ridge: Evidence for mantle controls on ridge segmentation*, *Geochem. Geophys. Geosyst.*, doi:10.1002/2016GC006380

### 2016 Popular Mechanics Breakthrough Award Recipient

**Howell, S.**, B. Smith-Konter, N. Frazier, X. Tong, D. Sandwell (2016), *The vertical fingerprint of earthquake cycle loading in Southern California*, *Nature Geoscience*, doi:10.1038/ngeo2741

Olive, J.-A., M. D. Behn, G. Ito, W. R. Buck, J. Escartín, **S. Howell** (2016), *Response to Comment on "Sensitivity of seafloor bathymetry to climate-driven fluctuations in mid-ocean ridge magma supply"*, *Science*, doi:10.1126/science.aaf2021

Olive, J.-A., M. D. Behn, G. Ito, W. R. Buck, J. Escartín, **S. Howell** (2015), *Sensitivity of seafloor bathymetry to climate-driven fluctuations in mid-ocean ridge magma supply*, Science, doi:10.1126/science.aad0715.

**Howell, S.**, G. Ito, A.J. Breivik, A. Rai, R. Mjelde, B. Hanan, K. Sayit, P. Vogt (2014), *The origin of the asymmetry in the Iceland hotspot along the Mid-Atlantic Ridge from continental breakup to present-day*, Earth Planet. Sci. Lett., doi:10.1016/j.epsl.2014.02.020.

### Outreach Publications

B. Boston, **S. Howell**, J. Sleeper, A. Anderson, M. Cameron, T. Sigurdardottir, J. Tree, H. Togia, B. Smith-Konter, G. F. Moore, (2018), *Seafloor Mapping at Your Fingertips: Setting Sail on Sonar Education with an Interactive Exhibit*, The Earth Scientist, 34, 1, 11-15.

B. Boston, **S. Howell**, G. Moore, University of Hawaii Geophysical Society (2014), *A miniature research vessel: A small-scale ocean-exploration demonstration of geophysical methods*, The Leading Edge, SEG, doi:10.1190/tle33121408.1

### Manuscripts in preparation

**Howell, S.**, J-A. Olive, G. Ito, M. D. Behn, J. Escartin, B. Kaus, *Seafloor expression of oceanic detachment faults reflects gradients in mid-ocean ridge magma supply*, in preparation for Earth and Planetary Science Letters

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## **INVITED TALKS**

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**Howell, S.** (2018), *Facilitating ocean-surface exchange through ice shell tectonics*, NASA Astrobiology Institute Icy Worlds Meeting, Monrovia, CA, 15 Feb.

**Howell, S.** (2018), *Can subduction fuel tectonics in the outer ice shells of icy satellites?*, Icy Worlds Collaboration and Exchange (ICE) Seminar, Jet Propulsion Laboratory, Pasadena, CA, 7 Feb.

**Howell, S.** (2018), *Simulating tectonic windows into ocean worlds*, Dix Planetary Science Seminar, California Institute of Technology, Pasadena, CA, 30 Jan.

**Howell, S.** (2018), *Extensional Terrains: Tectonic windows into ocean worlds*, Earth, Planetary, and Space Sciences Colloquium, University of California Los Angeles, Los Angeles, CA, 6 Feb.

**Howell, S.** (2017), *Breaking the ice on Europa and Ganymede: Pull-apart bands and ocean-surface interaction*, TGIF Seminar Series, University of Hawai‘i at Mānoa, Honolulu, 29 Sept.

**Howell, S.** (2017), *Tectonic modeling: You won't believe Europa's one weird trick for ocean-surface interaction!*, Icy Worlds Collaboration and Exchange (ICE) Seminar, NASA Jet Propulsion Laboratory, Pasadena, CA, 23 May.

**Howell, S.** (2015), *Tectonic and magmatic controls on mid-ocean ridge morphology*, Earth Science Seminar, NASA Jet Propulsion Laboratory Science Visitor and Colloquium Program, NASA Jet Propulsion Laboratory, Pasadena, CA, 12 Oct.

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## **ORAL PRESENTATIONS**

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- Howell S.**, R. T. Pappalardo (2018, planned), *Tectonic material transport within the outer ice shells of icy satellites*, COSPAR Scientific Assembly, Pasadena, CA, 14-22 July.
- Howell, S.**, R.T. Pappalardo (2018), *Can Earth-Like Plate Tectonics Occur in the Outer Ice Shells of Icy Satellites?*, abstract 1132, 2018 Lunar and Planetary Science Conference, Houston, TX, 19-23 March.
- Howell, S.**, R.T. Pappalardo (2017), *Extensional terrain formation in icy satellites: Implications for ocean-surface interaction*, abstract P52B-09, 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.
- Howell, S.**, R.T. Pappalardo (2017), *Band Formation and Ocean-Surface Interaction on Europa and Ganymede*, abstract 7002, Europa Deep Dive I: Ice-Shell Exchange Processes, Houston, TX, 1-2 Nov.
- Howell, S.**, R.T. Pappalardo (2017), *Extensional terrain formation in icy satellites: Implications for ocean-surface interaction*, abstract 303956, 2017 Geological Society of America Annual Meeting, Seattle, WA, 22-25 Oct.
- Howell, S.**, R.T. Pappalardo (2017), *Extensional terrain formation in icy satellites*, abstract 2821857, 2017 Fall Meeting, AAS Division for Planetary Sciences, Provo, UT, 15-20 Oct.
- Howell, S.**, R.T. Pappalardo (2017), *Extensional terrain formation in icy satellites: Implications for ocean-surface interaction*, 2017 Postdoc Seminar Series, Jet Propulsion Laboratory, Pasadena, CA, 13 July.
- Howell, S.**, G. Ito, F. Martinez, H. Escartin, M. Behn, J.A. Olive (2015), *Variations in magmatic and tectonic extension at the Chile Ridge*, Abstract V12A-02, 2015 Fall Meeting, AGU, San Francisco, CA, 15-19 Dec.
- Howell, S.**, G. Ito, F. Martinez, J. Escartin, M. Behn, J.A. Olive (2015), *Variations in magmatic and tectonic extension at the Chile Ridge*, Gordon Research Seminar on the Interior of the Earth, South Hadley, MA, 6-7 June.
- Howell, S.**, B. Boston, S. Maher, J. Sleeper, H. Togia, J. Tree, UHGS (2014), *The Smallest R/V: A Small-scale Ocean Exploration Demonstration of Real-time Bathymetric Measurements*, Abstract ED44B-07 presented at 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 Dec.
- Howell, S.**, G. Ito, F. Martinez, M. Behn, J. Escartin, J.A. Olive (2013), *Quantifying the variability in tectonic vs. magmatic extension at the Chile Rise*, Abstract OS41E-03 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.

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## **PROFESSIONAL MEETING ABSTRACTS**

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- L. Montesi, **S. Howell**, R.T. Pappalardo (2018), *Ice thickness, upwelling, and topography in bands on Europa*, abstract 2173, 2018 Lunar and Planetary Science Conference, Houston, TX, 19-23 March.
- M. Bouchard, **S. Howell**, 2017 NPSSS Team (2018), *Flyby and Impact of Chariklo: A New Frontiers Class Centaur Reconnaissance Mission Concept from the 2017 NASA-JPL Planetary Science Summer Seminar*, abstract 2087, 2018 Lunar and Planetary Science Conference, Houston, TX, 19-23 March.
- L. Chou, **S. Howell**, 2017 NPSSS Team (2017), *A Centaur Reconnaissance Mission*, Abstract ED23C-03132017, 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.

- Howell, S.,** R.T. Pappalardo (2017), *The effect of fault localization assumptions on extensional terrain development in icy satellites*, Abstract 303953, 2017 Geological Society of America Annual Meeting, Seattle, WA, 22-25 Oct.
- Howell, S.,** G. Ito, M. D. Behn, J.-A. Olive, B. Kaus, A. Popov, E. Mittelstaedt, T. Morrow (2016), *Exploring tectonomagmatic controls on mid-ocean ridge faulting and morphology with 3-D numerical models*, Abstract T33A-3013, 2016 Fall Meeting, AGU, San Francisco, CA, 12-16 Dec.
- Morrow, T., S.-S. Kim, E. Mittelstaedt, J.-A. Olive, **S. Howell** (2016), *New Bathymetry Reveals Detailed History of Transform Fault Segmentation at the Clarion Fracture Zone*, Abstract T33C-3048, 2016 Fall Meeting, AGU, San Francisco, CA, 12-16 Dec.
- Howell, S.,** B. Boston, J. Sleeper, M. E. Cameron, H. Togia, A. Anderson, T.D. Sigurdardottir, J. Tree, UHGS (2015), *A miniature research vessel: A small-scale ocean-exploration demonstration of geophysical methods*, Abstract ED21A, 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec.
- Howell, S.,** B. Smith-Konter, N. Frazier, X. Tong, D. Sandwell (2015), *The vertical fingerprint of earthquake cycle loading in Southern California*, 2015 EarthScope National Meeting, Stowe, VT, 14-17 June.
- Howell, S.,** G. Ito, F. Martinez, J. Escartin, M. Behn, J.A. Olive (2015), *Variations in magmatic and tectonic extension at the Chile Ridge*, 2015 Gordon Research Conference, Interior of the Earth, South Hadley, MA, 7-12 June.
- Howell, S.,** B. Smith-Konter, N. Frazier, X. Tong, D. Sandwell (2014), *Statistical analysis of GPS vertical uplift rates in southern California*, Abstract T41C-4660, 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 Dec.
- Howell, S.,** B. Smith-Konter, N. Frazier, X. Tong, D. Sandwell (2014), *Statistical analysis of GPS vertical uplift rates in southern California*, Poster 102, 2014 Southern California Earthquake Center Annual Meeting, Palm Springs, CA, 7-10 Sept.
- Rai, A., A.J. Breivik, R. Mjelde, B. Hanan, G. Ito, K. Sayit, **S. Howell**, P. Vogt, R. Pedersen (2012), *Nature of the seismic crust at the Aegir Ridge: A downward continuation approach*, Abstract EGU2013-4811, EGU General Assembly 2013, Vienna, Austria, 7-12 Apr.
- Rai, A., A. Breivik, R. Mjelde, B. Hanan, G. Ito, **S. Howell**, R. Pedersen, P. Vogt (2012), *Analysis of converted S-waves and gravity anomaly along Aegir Ridge: implications for crustal lithology*. Abstract T31B-2587, 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Sayit, K., B. Hanan, G. Ito, **S. Howell**, P. Vogt, A. Breivik, R. Mjelde, R. Pedersen (2012), *The trace and Pb isotope chemistry of the Jan Mayen Fracture Zone and the extinct Aegir Ridge*, Abstract V23E-2880, 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Howell, S.,** G. Ito, A.J. Breivik, B. Hanan, K. Sayit, P. Vogt, R. Mjelde (2012), *Numerical modeling of mantle convection beneath the Aegir Ridge, a shadow in the Iceland Hotspot*, 2012 AGU Chapman conference on Hawaiian Volcanoes: From Source to Surface, Waikoloa, Hawai'i, 20-24 Aug.
- Howell, S.,** G. Ito, A.J. Breivik, B. Hanan, K. Sayit, P. Vogt, R. Mjelde (2011), *Numerical modeling of mantle convection beneath the Aegir Ridge, a shadow in the Iceland Hotspot*, Abstract T51H-2465, 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.