

Dr. Samuel M. Howell
NASA Jet Propulsion Laboratory
Planetary Interiors and Geophysics

EDUCATION

PhD 2016 Geology and Geophysics, University of Hawai'i at Mānoa, Honolulu, Hawai'i
MS 2013 Geology and Geophysics, University of Hawai'i at Mānoa, Honolulu, Hawai'i
BS 2010 Engineering Physics, Rose-Hulman Institute of Technology, Terre Haute, Indiana

PROFESSIONAL POSITIONS

2019 – Pres. Research Scientist, Ocean Worlds Strategic Hire, Planetary Interiors and Geophysics, JPL
2018 – 2019 JPL Postdoctoral Fellow, Ocean Worlds, JPL/Caltech
2016 – 2018 Caltech Postdoctoral Scholar, Planetary Chemistry and Astrobiology, JPL/Caltech

PROFESSIONAL EXPERIENCE

2019 – Pres. Project Staff Scientist, NASA Europa Clipper Mission
2019 – Pres. Deputy Principal Investigator & Concept Scientist, JPL Probe using Radioisotopes for Icy Moon Exploration (PRIME)
2018 – Pres. Steering Committee, Network for Ocean Worlds (NOW), NASA Astrobiology Program
2017 – 2019 Project Science Affiliate, Europa Clipper Science Team

ACTIVE NASA-FUNDED PROJECTS (PI = Principal Investigator, Co-I = Co-Investigator)

PI (2022-2025) *ORCAA: Ocean Worlds Reconnaissance of Astrobiological Analogues*, PSTAR.
PI (2021-2024) *Europa's Icy Tectonics: First-Principles and High-Order Modeling*, Solar System Workings.
Co-I (2021-2024) *Thermal Measurements of Icy European Analog Materials*, Solar System Workings.
Co-I (2021-2023) *Maturation and demonstration of technology to enable through deep-ice communication (CryoComm) on Europa*, Concepts for Ocean worlds Life Detection Technology.
Co-I (2021-2023) *SWIM - Sensing with Independent Microswimmers*, NASA Innovative Advanced Concepts
Co-I (2020-2023) *Did Solid Tides Prevent the Thermodynamic Death of Europa?* Habitable Worlds.
Co-I (2020-2023) *Compositions of Ice Shells on Ocean Worlds*, Solar System Workings.
Co-I (2019-2023) *Search for Life Using Submersible Heated Drill (SLUSH)*, Scientific Exploration Subsurface Access Mechanism for Europa. (Collaborator in COLDTech program).

SELECTED ACTIVITIES

2022 Session Co-chair, Ocean Worlds and Icy Volcanism: The Briny Deep, 53rd LPSC
2022 Primary Convener, The diverse Ocean Worlds, Astrobiology Science Conference (AbSciCon)
2022 Co-convener, Ocean Science for Ocean Worlds, Ocean Sciences Meeting (OSM)
2021 Program Committee, 52nd Lunar and Planetary Science Conference (LPSC)
2021 Primary Convener, Special Session on The Next Two Decades of Ocean Worlds Exploration (LPSC)
2021 Subject Matter Expert, Dynamic Radioisotope Power Systems Mission Study, NASA RPS Program
2020 Co-convener, Icy Satellite Surfaces and Below, AAS Division of Planetary Sciences (DPS) Meeting
2020 Study Scientist, Radioisotope Power Systems for Pressure Vessels, NASA RPS Program
2020 Selected Participant, NASA Principal Investigator Launchpad (Mission-focused). NASA SMD
2019 Study Scientist, Radioisotope Power System Considerations for Ocean Worlds, NASA RPS Program
2017 Subject Matter Expert, Keck Institute for Space Studies: Accessing Subsurf. Oceans of Icy Worlds

AWARDS

2021 JPL Voyager Award for leadership of the Europa Clipper Lecture Series
2021 JPL Team Award for contributions to the Decadal Survey in Planetary Science and Astrobiology
2017 JPL Outstanding Postdoctoral Research in Planetary Science and Life Detection, JPL
2016 *Popular Mechanics* Breakthrough Award for innovative method to study San Andreas Fault motions

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SELECTED PUBLICATIONS

- Howell, S.** (2022). *The likely thickness of Europa's icy shell*, The Planetary Science Journal, doi: 10.3847/PSJ/abfe10.
- Leonard, E.J., S. Howell et al. (2022). *Finding order in chaos: Quantitative predictors of chaos terrain morphology on Europa*. Geophysical Research Letters, doi:10.1029/2021GL097309.
- DiNicola, M., **S. Howell**, et al. (2022, *in press*). *Resurfacing: An Approach to Planetary Protection for Geologically Active Ocean Worlds*. The Planetary Science Journal.
- Lesage, E., H. Massol, **S. Howell**, F. Schmidt. (2022, *in press*). *Viscoelastic deformation of freezing cryomagma reservoirs: Application to Europa*. The Planetary Science Journal.
- Pappalardo et al., *incl. S. Howell* (2022, *in press*). *Ganymede's Geology*, in Ganymede, Cambridge Press.
- Howell, S.**, et al. (2021). *Ocean Worlds Exploration and the Search for Life*, Bulletin of the American Astronomical Society, doi:10.3847/25c2cf8920f9ae.
- Ermakov et al., *incl. S. Howell*, (2021). *A Recipe for the Geophysical Exploration of Enceladus*, The Planetary Science Journal, doi:10.3847/PSJ/ac06d2
- Bairstow, B. Y. Lee, **S. Howell**, B. Donitz, M. Choukroun, S. Perl (2021). *Thermal Analysis of Landers using Radioisotope Power Systems on Ice Worlds*, IEEE, doi:10.1109/AERO50100.2021.9438303.
- Howell, S.**, E. J. Leonard (2021, *in press*). *Ocean Worlds: Interior Processes and Physical Environments*, Handbook of Space Resources, Springer Publishing.
- Howell, S.**, R.T. Pappalardo (2020). *NASA's Europa Clipper—a mission to a potentially habitable ocean world?* Nature Communications, doi:10.1038/s41467-020-15160-9.
- Zacny, K. et al., *incl. S. Howell* (2020). *Extraterrestrial Drilling and Excavation*, in Advances in Terrestrial and Extraterrestrial Drilling: Ground, Ice, and Underwater, CRC Press, ISBN 9781138341500.
- Howell, S.**, R.T. Pappalardo (2019). *Can Earth-like plate tectonics occur in the outer ice shells of icy satellites?* Icarus, doi:10.1016/j.icarus.2019.01.011.
- Howell, S.**, J.-A. Olive, G. Ito, M. D. Behn, J. Escartin, B. Kaus (2019), *Seafloor expression of oceanic detachment faults reflects gradients in mid-ocean ridge magma supply*, Earth and Planetary Science Letters, doi:10.1016/j.epsl.2019.04.001
- Howell, S.**, L. Chou, 18 others (2018). *Centaur reconnaissance mission concept: Chariklo flyby and impact*, Planetary and Space Science, doi:10.1016/j.pss.2018.07.008.
- 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.**, 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.
- 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
- 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