

Dr. Szilárd Gyalay

Research Scientist, SETI/NASA Ames

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RESEARCH INTERESTS

I develop **geophysical models** to infer the history of **planetary interiors** and **surfaces** from spacecraft observations. This includes my search for subsurface oceans within Saturn's icy satellites and my models of the thermal evolution of porous layers in the Martian crust.

EDUCATION

University of California, Santa Cruz (UCSC) Sept 2017 - June 2023
Ph.D. in Earth and Planetary Sciences
Thesis titled, *The Crusts of Mars, Tethys, and Mimas: Geophysical Exploration of Historic Heat Flow*
Advisor: Prof. Francis Nimmo

University of California, Los Angeles (UCLA) Sept 2012 - June 2016
B.S. in Astrophysics, with Departmental Honors
Minor in Geophysics and Planetary Physics
Cum Laude, Phi Beta Kappa

POST-DOCTORAL EMPLOYMENT

Search for ExtraTerrestrial Intelligence (SETI) Institute Oct 2023 - Present
NIRVSS Instrument Scientist
On contract to **National Aeronautics & Space Administration (NASA) Ames Research Center**. Calibration of the Near InfraRed Volatiles Spectrometer System (NIRVSS) instrument manifested aboard upcoming Astrobotic Mission-1 (AB-1) and NASA Volatiles Investigating Polar Exploration Rover (VIPER) lunar missions. Support for data processing pipelines and development of analysis tools. Presentation and publication of NIRVSS results.

UCLA Department of Earth, Planetary, and Space Sciences Aug 2023 - Sept 2023
Staff Research Associate IV
Calibration and Analysis of NASA Lunar Reconnaissance Orbiter Diviner Lunar Radiometer data. Development of calibration parameters and algorithms, verification and testing. Documentation and publication of the results.

PREVIOUS RESEARCH EXPERIENCE

UCSC Department of Earth and Planetary Sciences Sept 2017 - June 2023
Graduate Student Researcher
Advisor: Prof. Francis Nimmo

NASA Ames Research Center Summers 2014 & 2017
Student Intern
Advisor: Dr. Eldar Noe Dobrea

UCLA Department of Earth, Planetary, and Space Sciences Oct 2013 - June 2016
Undergraduate Researcher
Research Associate I
Advisor: Prof. David Paige

Boston University Center for Space Physics June 2015 - Aug 2015
NSF REU Student
Advisors: Prof. Paul Withers & Dr. Marissa Vogt

TEACHING EXPERIENCE	UCSC EART 110C/N: The Dynamic Earth	Spring 2019
	Teaching Assistant for an upper division class introducing geophysical concepts and methods. Ran a laboratory section and assisted with problem sets during office hours.	
	UCSC EART 8: Planetary Discovery	Fall 2017
	Sole Teaching Assistant for a general education class about our Solar System. Reviewed class material and assisted with problem sets during discussion sections and office hours.	
HONORS & AWARDS	Outstanding Student Presentation Award	Feb 2021
	for the talk “Constraints on Thermal History of Mars From Depth of Pore Closure Below InSight” at American Geophysical Union Fall Meeting 2020	
	Hartmann Travel Grant	Aug 2016
	for American Astronomical Society’s 2016 Division of Planetary Sciences Meeting	
INVITED TALKS	S. Gyalay (May 30th, 2023), “Searching for Sub-Surface Seas in Saturnian Satellites.” Solid Earth and Planetary Science Seminar Series, ETH Zürich.	
	S. Gyalay (March 1st, 2023), “Searching for Sub-Surface Seas in Saturnian Satellites.” Planetary Science Seminar Series, Center for Integrative Planetary Science (CIPS), University of California, Berkeley.	
	S. Gyalay , F. Nimmo, A.-C. Plesa, & M. Wieczorek (May 23rd, 2022), “Closing Pores and Cracking: a Window to Martian History from a Seismic Wave Speed Discontinuity in the Crust.” Bay Area Planetary Science Meeting.	
	S. Gyalay , F. Nimmo, & A.-C. Plesa (December 2021), “Update on ‘Constraints on Thermal History of Mars from Depth of Pore Closure Below InSight.’ ” American Geophysical Union Fall Meeting 2021, Abstract 851887	
PROFESSIONAL ACTIVITIES	Peer Reviewer	
	<i>Geophysical Research Letters</i>	1 article since 2021
	<i>Icarus</i>	1 article since 2023
	<i>Journal of Geophysical Research: Planets</i>	1 article since 2021
	Conference Session Moderator	
	Martian Geophysics and Tectonics, at Lunar and Planetary Science Conference	March 2022
	NASA Planetary Science Summer School	Summer 2021
ACTIVITIES & OUTREACH	Graduate Student Representative for UCSC Earth and Planetary Science (EPS) Department Faculty Meetings	Oct 2022 - May 2023
	UCSC EPS Undergraduate Mentorship Program 2 first-year mentees	Sep 2022 - June 2023
	Geoscientists Encouraging Openness and Diversity in Earth Science (GEODES) at UCSC	Oct 2017 - June 2023
	UCSC EPS Graduate Student Curriculum Committee	Fall 2021

Unlearning Racism in Geoscience (URGE)
Made recommendations to UCSC Ocean Sciences Diversity,
Equity, and Inclusion (DEI) Committee

Jan 2021 - May 2021
Aug 2021

PUBLICATIONS

- [9] **S. Gyalay** & F. Nimmo (submitted), “Io’s Long-Wavelength Topography as a Probe for a Subsurface Magma Ocean.” Submitted to *Geophysical Research Journal*.
- [8] **S. Gyalay**, F. Nimmo, & B.G. Downey (submitted), “Effects of Transient Obliquity Tides Within Mimas’ Warm, Icy Interior Preserved as a Frozen Fossil Figure.” Submitted to *Journal of Geophysical Research: Planets*.
- [7] K.M. Seaton, **S. Gyalay**, G. Stucky de Quay, E.R. Burnett, C.A. Denton, B. Doerr, K. Ebadi, S. Eckert, I.T.W. Flynn, C.I. Honniball, S. Hume, C.L. Kling, J.C. Marohnic, J. Milton, C.A. Mondro, R.G. Nuno, C.M. Rooney, B.E. Strauss, A. Nash, & J.E.C. Scully (2023), “Astrobiology eXploration at Enceladus (AXE): A New Frontiers Mission Concept Study.” *Planetary Science Journal* 4(6), 116, doi: [10.3847/PSJ/acd119](https://doi.org/10.3847/PSJ/acd119).
- [6] **S. Gyalay**, & F. Nimmo (2023), “Estimates for Tethys’ Moment of Inertia, Heat Flux Distribution, and Interior Structure from its Long-Wavelength Topography.” *Journal of Geophysical Research: Planets* 128(2), doi: [10.1029/2022JE007550](https://doi.org/10.1029/2022JE007550)
- [5] M. Wiczorek, A. Broquet, S. McLennan, A. Rivoldini, M. Golombek, D. Antonangeli, C. Beghein, D. Giardini, T. Gudkova, **S. Gyalay**, C. Johnson, R. Joshi, D. Kim, S. King, B. Knapmeyer-Endrun, P. Lognonné, C. Michaut, A. Mittelholz, F. Nimmo, J. Ojha, M. Panning, A.-C. Plesa, M.A. Siegler, T. Spohn, & W.B. Banerdt (2022), "InSight Constraints on the Global Character of the Martian Crust." *Journal of Geophysical Research: Planets* 127(5), doi: [10.1029/2022JE007298](https://doi.org/10.1029/2022JE007298)
- [4] **S. Gyalay**, F. Nimmo, A.-C. Plesa, & M. Wiczorek (2020), “Constraints on Thermal History of Mars From Depth of Pore Closure Below InSight.” *Geophysical Research Letters* 47(16), doi: [10.1029/2020GL088653](https://doi.org/10.1029/2020GL088653)
- [3] M.F. Vogt, **S. Gyalay**, E.A. Kronberg, E.J. Bunce, W.S. Kurth, B. Zieger, & C. Tao (2019), “Solar wind interaction with Jupiter’s magnetosphere: A statistical study of Galileo *in situ* data and modeled upstream solar wind conditions.” *Journal of Geophysical Research: Space Physics* 124, doi: [10.1029/2019JA026950](https://doi.org/10.1029/2019JA026950)
- [2] **S. Gyalay**, E. Noe Dobrea, K. Chu, & K. Pitman (2019), “Nonlinear Spectral Mixture Modeling to Estimate Water-Ice Abundance of Martian Regolith.” *Icarus* 329, 79-87, doi: [10.1016/j.icarus.2019.02.033](https://doi.org/10.1016/j.icarus.2019.02.033)
- [1] J.-L. Margot, A.H. Greenberg, P. Pinchuk, A. Shinde Y. Alladi, S. Prasad, M.O. Bowman, C. Fisher, **S. Gyalay**, W. McKibbin, B. Miles, D. Nguyen, C. Power, N. Ramani, R. Raviprasad, J. Santana, and R.S. Lynch (2018), “A Search for Technosignatures from 14 Planetary Systems in the *Kepler* Field with the Green Bank Telescope at 1.15-1.73 GHz.” *Astronomical Journal* 155(5), doi: [10.3847/1538-3881/aabb03](https://doi.org/10.3847/1538-3881/aabb03)

SELECTED CONFERENCE ABSTRACTS

S. Gyalay & F. Nimmo (2023), “Io’s Long-Wavelength Topography as a Probe for a Subsurface Magma Ocean.” Submitted to American Geophysical Union Fall Meeting 2023.

S. Gyalay & F. Nimmo (2023), “That’s No Ocean Moon: Effects of Transient Obliquity Tidal Heating in Mimas’ Warm Icy Interior Preserved as a Cold Fossil Figure.” 54th Lunar and Planetary Science Conference, Abstract 2503.

S. Gyalay, F. Nimmo, A.-C. Plesa, M. Wicczorek, R. Citron, & G. Collins (2023), “The Rise & Fall of Crustal Porosity: InSight on Early Martian History.” 54th Lunar and Planetary Science Conference, Abstract 2938.

C.G. Barcheck, S. Beganskas, C.C. Masteller, A. Pheiffer, D.L. Roth, S. Taylor, C.B. Begeman, V. Yuan, D. Killam, R.E. Maxwell, S.M. White, **S. Gyalay**, Z. Kaufman, J.L. Pensky, E. Schnorr, & A. Serrano. “GEODES: A model for graduate-student led initiatives in diversity, equity, and inclusion.” American Geophysical Union Fall Meeting 2018, Abstract ED13C-0768.

S. Gyalay, M. Aye, & D. Paige (2017), “Recalibrating the Moon’s Thermometer: LRO Diviner Nonlinear Detector Response and Opposition Effect Corrections.” 48th Lunar and Planetary Science Conference, Abstract 2655.