

Samantha K. Trumbo

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Education

- Ph.D. Planetary Science**, California Institute of Technology Spring 2021
Dissertation: “Views of an Ocean World: The Signatures of Internal and External Processes on the Surface of Europa”
Advisor: Prof. Michael Brown
- M.S. Oceanography**, Scripps Institution of Oceanography, UCSD Fall 2015
Thesis: “Marine Export Productivity and the Demise of the Central American Seaway”
Advisor: Prof. Richard Norris
- B.A. Astronomy and Biology (double major)**, Cornell University Spring 2013
Magna Cum Laude, Distinction in All Subjects

First-author Publications

- S.K. Trumbo**, M.E. Brown, and K.P. Hand (2020), “Endogenic and exogenic contributions to visible-wavelength spectra of Europa’s trailing hemisphere”, *The Astronomical Journal*, 160, 282, doi:10.3847/1538-3881/abc34c.
- S.K. Trumbo**, M.E. Brown, and K.P. Hand (2019), “H₂O₂ within chaos terrain on Europa’s leading hemisphere”, *The Astronomical Journal*, 158, 127, doi:10.3847/1538-3881/ab380c.
- S.K. Trumbo**, M.E. Brown, and K.P. Hand (2019), “Sodium chloride on the surface of Europa”, *Science Advances*, 5, 6, doi:10.1126/sciadv.aaw7123.
- S.K. Trumbo**, M.E. Brown, and B.J. Butler (2018), “ALMA thermal observations of Europa”, *The Astronomical Journal*, 156, 161, doi:10.3847/1538-3881/aada87.
- S.K. Trumbo**, M.E. Brown, and B.J. Butler (2017), “ALMA thermal observations of a proposed plume source region on Europa”, *The Astronomical Journal*, 154, 148, doi:10.3847/1538-3881/aa8769.
- S.K. Trumbo**, M.E. Brown, P.D. Fischer, and K.P. Hand (2017), “A new spectral feature on the trailing hemisphere of Europa at 3.78 μm ”, *The Astronomical Journal*, 153, 250, doi:10.3847/1538-3881/aa6d80.

Co-author Publications

- K. de Kleer, B.J. Butler, I. de Pater, M.A. Gurwell, A. Moullet, **S.K. Trumbo**, and J. Spencer (2020), “Thermal properties of Ganymede’s surface from millimeter and infrared emission”, *The Planetary Science Journal*, 2, 5, doi:10.3847/PSJ/abcbf4.
- A.P. Ingersoll, S.P. Ewald, and **S.K. Trumbo** (2019), “Time variability of the Enceladus plumes: Orbital periods, decadal periods, and aperiodic change”, *Icarus*, 344, 113345, doi:10.1016/j.icarus.2019.06.006.
- L.R. Corrales, T.D. Yi, **S.K. Trumbo**, D. Shalloway, J.I. Lunine, and D.A. Usher (2017), “Acetonitrile cluster solvation in a cryogenic ethane-methane-propane liquid: Implications for Titan lake chemistry”, *The Journal of Chemical Physics*, 146, 104308, doi:10.1063/1.4978395.
- P.D. Fischer, M.E. Brown, **S.K. Trumbo**, and K.P. Hand (2017), “Spatially resolved spectroscopy of Europa’s large-scale compositional units at 3–4 μm with Keck NIRSPEC”, *The Astronomical Journal*, 153, 13, doi:10.3847/1538-3881/153/1/13.

Invited Seminars

- UC Berkeley and UCLA**, Joint CIPS and EPSS Seminar, September 30, 2020
CU Boulder, Laboratory for Atmospheric and Space Physics Seminar, September 3, 2020
JPL, Europa Clipper Lecture Series, January 10, 2020
JPL, Icy Worlds Seminar, April 18, 2019
Centre for Star and Planet Formation (STARPLAN), University of Copenhagen, Seminar, September 24, 2018

Conference Talks and Workshop Presentations

- S.K. Trumbo**, M.E. Brown, and K.P. Hand (2020), “Endogenic and exogenic contributions to visible-wavelength spectra of Europa’s trailing hemisphere”, 52nd AAS DPS Meeting (Virtual), 106.03.
- S.K. Trumbo**, M.E. Brown, and K.P. Hand (2020), “H₂O₂ within chaos terrain on Europa”, Keck Science Meeting (Virtual).
- S.K. Trumbo**, M.E. Brown, and K.P. Hand (2019), “H₂O₂ within chaos terrain on Europa’s leading hemisphere”, 51st AAS DPS Meeting/EPSC Meeting, Geneva, Switzerland, EPSC-DPS2019-825.

S.K. Trumbo, M.E. Brown, and K. P. Hand (2018), “A Search for signatures of irradiated chloride salts on the surface of Europa”, 50th AAS DPS Meeting, Knoxville, TN, 407.02.

S.K. Trumbo, M.E. Brown, K. de Kleer, and K. P. Hand (2018), “Observational constraints on the distribution and temperature dependence of H₂O₂ on the surface of Europa”, Europa Deep Dive 2: Composition, Houston, TX, 3020.

S.K. Trumbo, M.E. Brown, K. de Kleer, and K. P. Hand (2018), “Observational constraints on the distribution and temperature dependence of H₂O₂ on the surface of Europa”, European Planetary Science Congress, Berlin, Germany, EPSC2018-203.

S.K. Trumbo, M.E. Brown, and B.J. Butler (2017), “ALMA thermal observations of Europa”, 49th AAS DPS Meeting, Provo, UT, 203.05.

S.K. Trumbo, S.P. Ewald, and A.P. Ingersoll (2016), “The time variability of individual geysers in the plume of Enceladus”, AGU Fall Meeting, San Francisco, CA, P32A-04.

S.K. Trumbo, P.D. Fischer, K.P. Hand, and M.E. Brown (2016), “A new spectral feature on the trailing hemisphere of Europa at 3.78 μm ”, 48th AAS DPS Meeting, Pasadena, CA, 517.01.

S.K. Trumbo, S.L. Palacios, R.C. Zimmerman, and R.M. Kudela (2012), “A mathematical model for estimation of kelp bed productivity: Age dependence and contributions of subsurface kelp”, AGU Fall Meeting, San Francisco, CA, B34D-06.

White Papers

K. de Kleer, M.A. Gurwell, I. de Pater, B.J. Butler, A. Moullet, **S.K. Trumbo**, R.J. Sault, C. Moeckel, J. Tollefson, and S. Milam (2019), “Solar System satellites: Key science enabled by the ngVLA”, Astro2020: Decadal Survey on Astronomy and Astrophysics, *BAAS*, 51, 90.

K. de Kleer, B.J. Butler, M. Cordiner, I. de Pater, M.A. Gurwell, J. Lazio, S. Milam, C. Moeckel, A. Moullet, E. Murphy, R.J. Sault, J. Tollefson, **S.K. Trumbo** (2020), “Mapping satellite surfaces and atmospheres with ground-based interferometry”, submitted to the NASA Planetary Science Decadal Survey.

Fellowships and Awards

Heising-Simons Foundation 51 Pegasi b Fellowship in Planetary Astronomy , Cornell University	2021 – Present
NASA Earth and Space Science Fellowship (NESSF) , Caltech	2017 – 2020
E.W. Scripps Fellowship in the Geosciences , Scripps Institution of Oceanography	2013 – 2014
Outstanding Student Paper Award , American Geophysical Union	2012

Professional Affiliations and Service

NASA Europa Clipper Science Team , Graduate Student Affiliate (Europa-UVS)	2019 – Present
American Geophysical Union (AGU) , Graduate Student Member	2012 – Present
AAS Division of Planetary Sciences (DPS) , Graduate Student Member	2016 – Present
Referee , <i>Geophysical Research Letters</i> , <i>AAS Journals</i>	

Research Positions

51 Pegasi b Postdoctoral Fellow , Department of Astronomy, Cornell University	Starting July 2021
NASA Earth and Space Science Graduate Fellow , Division of Geological and Planetary Sciences, Caltech	2017 – 2020
Graduate Student Researcher , Division of Geological and Planetary Sciences, Caltech	2015 – 2017
Graduate Student Researcher , Scripps Institution of Oceanography, UCSD	2013 – 2015
Undergraduate Researcher , Department of Astronomy, Cornell University	2011 – 2013
Intern , NASA Student Airborne Research Program (SARP)	Summer 2012

Teaching Experience

Teaching Assistant, Caltech	2017 – 2019
Ge108: Applications of Physics to the Earth Sciences	
Ge157c: Remote Sensing	
Ge131: Planetary Interiors	
Teaching Assistant, Scripps Institution of Oceanography	2014 – 2015
SIO 1: The Planets	
SIO 104/255: Paleobiology and the History of Life	
Undergraduate Teaching Assistant, Physics Learning Center, Cornell University	2011

Research Mentorship

Mentor to Sherry Liang, Undergraduate Student, Caltech, *Callisto from Galileo PPR*

Fall 2019

Mentor to Yiluo Li, Visiting Undergraduate Student, Caltech, *Ganymede from Galileo PPR*

Summer 2018

Observing Experience

P.I. programs

Gemini Observatory

S.K. Trumbo, M.E. Brown, and K de Kleer, 2019A, GMOS-S, GS-2019A-FT-109 (1.9 hours)

The Atacama Large Millimeter Array (ALMA)

S.K. Trumbo, M.E. Brown, and B.J. Butler, Cycle 6 (2018-2019), 2018.1.01292.S (2.5 hours)

NASA Infrared Telescope Facility (IRTF)

S.K. Trumbo, M.E. Brown, and K. de Kleer, Fall 2019: 2019B108, SpeX (8.5 hours over 9 nights)

S.K. Trumbo, M.E. Brown, and K. de Kleer, Spring 2018: 2018A099, SpeX (20 hours over 6 nights)

Co-I programs

W.M. Keck Observatory

M.E. Brown and **S.K. Trumbo** (Science P.I.), 2020A, NIRSPEC (3 half-nights)

M.E. Brown and **S.K. Trumbo** (Science P.I.), 2018A, NIRSPEC (4 half-nights)

The Atacama Large Millimeter Array (ALMA)

M.E. Brown, **S.K. Trumbo**, and B.J. Butler, Cycle 5 (2017-2018), 2017.1.01071.S (4 hours)

Hubble Space Telescope (HST)

M.E. Brown, D. Adams, **S.K. Trumbo**, and K de Kleer, Cycle 27 (2019 – 2020), STIS, 15925 (25 orbits)

Selected Press

“**Water on Europa—with a Pinch of Salt**”, Shannon Hall, *Scientific American*, June 2019

“**Table Salt Compound Spotted on Europa**”, Robert Perkins, *Caltech/JPL Press Release*, June 1019

“**The Hidden Ocean Beneath Europa’s Frozen Crust May Contain Basic Table Salt**”, George Dvorsky, *Gizmodo*, June 2019

“**ALMA Maps Europa’s Temperature**”, Charles Blue, *NRAO Press Release*, October 2018

“**How Hot is Europa? There’s a Map for That**”, Kimberly M. S. Cartier, *EOS*, September 2018

“**One of Europa’s Plumes May Not Exist, Making Hunt for Life Hard**”, Shannon Stirone, *New Scientist*, August 2017

Volunteer Work and Science Communication

Mentor, Natural Sciences Mentorship Program, Pasadena City College

2020 – Present

Volunteer Physics Tutor, Pasadena City College

2020 – Present

Volunteer Math Tutor, Caltech Rise Program for Pasadena Unified School District

2020 – Present

Talk to W. M. Keck Observatory Donors, “The Surface of Europa: A Window to the Ocean Below, December 3 2020

Science Magazine Podcast, “Better Hurricane Forecasts and Spotting Salts on Jupiter’s Moon Europa”, June 13 2019

Science Talk to NASA SARP Interns, “ALMA Thermal Observations of a Proposed Plume Source Region on Europa”, Caltech, July 18 2017

Educational Article, “From Geology to Biology: A Serpentine Story of Early Life”, *Small Things Considered*, American Society of Microbiology Blog, March 31 2014

Public Education Volunteer, The Birch Aquarium at Scripps Institution of Oceanography

Summer 2008