

**Timothy David Glotch**  
Department of Geosciences, Stony Brook University  
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**Education**

Ph.D., 2004: Geological Sciences, Arizona State University  
B.A., 1999: Astrogeophysics, Colgate University

**Employment**

2018-present Associate Dean for Operations and Facilities, College of Arts and Sciences, Stony Brook University  
2007-present Assistant (2007-2012), Associate (2012-2018), and Full (2019-present) Professor, Stony Brook University  
2006-2007: Caltech Postdoctoral Scholar at JPL  
2005-2006: Postdoctoral Scholar, California Institute of Technology  
2004-2005: Postdoctoral Research Associate, Arizona State University

**Courses Taught**

GEO 102: The Earth  
GEO 106: Planetary Geology  
GEO 330/530: Geology of Mars  
GEO 604: Geology of the Moon  
GEO 604: Mineralogy and Geochemistry of Mars  
GEO 604: Advanced Spectroscopic Methods  
GEO 604: Geology of Asteroids  
GEO 607: Geology of Saturn's Moons  
SSO 102: Diamonds

**Advising**

Sarah Nicholas	Postdoc	2017-2018
Congcong Che	Postdoc	2012-2017
Mehmet Yesiltas	Postdoc	2015-2016
Yang Liu	Postdoc	2013-2014
Jessica Arnold	Postdoc	2014
Laura Breitenfeld	Ph.D.	current
Allison Zastrow	Ph.D.	current
Jordan Young	Ph.D.	current
Brooke Phillips	Ph.D.	current
Cheng Ye	Ph.D.	current
Carey Leggett IV	Ph.D.	current
Melinda Rucks	Ph.D.	current
Melissa Sims	Ph.D.	2018
Gen Ito	Ph.D.	2018
Katherine Shirley	Ph.D.	2018
Steven Jaret	Ph.D.	2017
Lonia Friedlander	Ph.D.	2014

Elizabeth Sklute	Ph.D.	2014
Jessica Arnold	Ph.D.	2014
Congcong Che	Ph.D.	2012
Hedi Jensen	M. S.	2011

### **Honors and Awards**

2018: SUNY Leadership Academy Fellow  
2015: NASA Group Achievement Award for Diviner Lunar Radiometer Experiment  
2013: NASA Group Achievement Award for Diviner Lunar Radiometer Experiment  
2012: NSF CAREER Award  
2004: NASA Group Achievement Award for Mars Exploration Rovers  
2003: NASA Group Achievement Award for 2001 Odyssey THEMIS  
2001-2004: NASA Graduate Student Researcher Program Fellow  
1999: Founders Award, Colgate University Department of Physics and Astronomy

### **University Service**

Fall 2017: Panelist for CAS “College and Careers: How to Choose a Major” event at Ward Melville High School  
Fall 2017: Organized Department of Geosciences table for 1<sup>st</sup> Annual CommUniversity Day.  
Summer 2017: Participant in CAS Pre-College Institute Quiz Bowl  
Summer 2017: Chair of search committee for Director of the Office of Sponsored Programs  
Spring 2017: Organized Geosciences table at annual Port Jefferson Mini-Maker Faire  
Spring 2017: Moderator and panelist for OVPR NSF CAREER Award Workshop  
Spring 2016-Fall 2017: Member of search committee for Dean of SOMAS  
Spring 2016-Panelist for OVPR NSF CAREER Award Workshop  
Spring 2016: Organized Geosciences table at annual Port Jefferson Mini-Maker Faire  
Spring 2015: Organized Geosciences table at annual Port Jefferson Mini-Maker Faire  
Fall 2014: Stony Brook University Astronomy Open Night lecture and observing for International Observe the Moon Night  
Fall 2012-Spring 2018: Served on Undergraduate Recognition Awards selection committee.

### **Departmental Service**

Fall 2014-present: Graduate Program Director  
Spring 2008-Spring 2013: GEO Major Advisor  
Fall 2007-Spring 2013: Undergraduate Committee  
Fall 2009-Fall 2012: Library Liason

### **Professional Service**

Associate Editor, *Journal of Geophysical Research—Planets*, 2012-present  
External reviewer for NSF EAR Petrology and Geochemistry program  
External reviewer for NSF Major Research Instrumentation program  
External reviewer for NASA MDAP, MFRP, and NLSI programs  
Panel member for NASA MFRP, MDAP, PIDDP, MIDP, MMAMA, SALMON, Mission Participating Scientist, and Discovery Step 2 review panels  
Panel chief for NASA LASER, LDAP, and SSW review panels

Reviewer for journals *JGR-Planets*, *Icarus*, *Geology*, *American Mineralogist*, *Earth and Planetary Science Letters*, *Meteoritics and Planetary Science*, *Spectroscopy Letters*, *Nature Communications*, *Nature Geoscience*

Convener, *Workshop on Space Weathering of Airless Bodies*, Nov. 2-4, 2015.

1999-Present: Numerous public outreach and education presentations

### **Professional Membership**

American Association for the Advancement of Sciences

American Astronomical Society Division of Planetary Sciences

American Geophysical Union

Geological Society of America

Mineralogical Society of America

New York Academy of Sciences

### **Invited Talks:**

Colgate University—October, 2016

International Symposium on Lunar and Planetary Science, Wuhan, China—June, 2016

Lafayette College—February, 2016

University of Pittsburgh—November, 2015

University of Western Ontario—October, 2015

NASA Headquarters Seminar—October, 2014

3D Raman Imaging and Correlative Scanning Microscopy Techniques Workshop, Harvard University—August, 2014

Lunar and Planetary Institute—July, 2012

University of Toronto—October, 2010

American Museum of Natural History—April 2009

Stony Brook University—March, 2007

Dartmouth College—February, 2007

Brown University—April, 2006

Colgate University—September, 2005

### **Funded Research**

NASA SSERVI: Remote, In Situ, and Synchrotron Studies for Science and Exploration (RIS<sup>4</sup>E), PI, 2014-2019, Total Budget: \$5.48M.

NASA MDAP: Geologic and quantitative spectral characterization of carbonate-bearing lithologies on Mars, PI, 2018-2020, Total Budget: \$305.9k

NASA OSIRIS-REx Participating Scientist Program: Radiative Transfer and partial least squares modeling of OTEs and OVIRS spectra in support of the asteroid operational phase of the OSIRIS-REx mission, PI, 2018-2020, Total Budget: \$456k.

NASA PDART: Ultraviolet through mid-infrared optical constants of minerals and glasses relevant to planetary spectroscopic analyses, PI, 2018, Total Budget: \$51.4k.

NASA Diviner Lunar Radiometer Science Mission, Co-I with PI David Paige, UCLA, 2011-present, Total Budget for Glotch: \$356.5k

NASA SSW: Spectroscopy of salt-bearing mineral assemblages, PI, 2015-2018, Total Budget: \$281.5k

NASA LASER: Reflectance and Emission Spectroscopy (0.35-100  $\mu\text{m}$ ) in a Simulated Lunar Environment, PI, 2013-2017, Total Budget: \$456k.

NASA PG&G: Spectroscopy of nanophase materials, PI, 2014-2017, Total Budget: \$358k.

NASA PG&G: Spectral and petrologic analyses of minerals and rocks subjected to high pressures, CO-I with PI Jeffrey Johnson, APL, 2014-2017, Total Budget: \$312k (117.3k for Glotch)

NASA MFRP: Infrared and Raman spectroscopic study of biosignature preservation in terrestrial clay-rich sediments: Implications for Martian astrobiological exploration, PI, 2014-2017, Total Budget: \$233k

NASA MDAP: Spectroscopic and geologic analyses of chloride salt deposits on Mars, PI, 2014-2016, Total Budget: \$187k

NASA PG&G: Pyroxene Spectroscopy: Composition, Structure and Thermal History, Co-I with PI Rachel Klima, APL, 2013-2016. Total budget: \$347k (\$58.7k for Glotch).

NSF CAREER: CAREER: Fundamental Measurements of Mineral Optical Properties and Theoretical Treatment of Light Scattering at Infrared Wavelengths, PI, 2012-2017, Total Budget: \$494k.

NASA LASER: Understanding the Formation and Evolution of Mixed-Origin Terrains in the Copernicus Lunar Quadrangle (LQ10), Co-I with PI Justin Hagerty, USGS, 2012-2015, Total Budget: \$345K (\$26.5k for Glotch)

NASA MDAP: Dehydrated and dehydroxylated clays on Mars: Assessment of post-depositional alteration of Martian sedimentary deposits, PI, 2012-2015, Total Budget: \$318k.

NASA PG&G: Integrated spectroscopy of pyroxenes: composition, structure, and thermal history, Co-I with PI Rachel Klima, APL, 2011-2012, Total Budget: \$100k (\$25k for Glotch).

NASA MFRP: Effects of shock metamorphism on phyllosilicate spectroscopy, Co-I with PI Joseph Michalski, PSI, 2010-2013, Total Budget: \$453k (\$84.6k for Glotch).

NASA MMAMA: Evaluating new instrument technologies and operational procedures critical for maximizing science during field studies of basaltic terrains on the Earth, Moon, and Mars, Co-I with PI Jacob Bleacher, NASA Goddard, 2009-2013, Total Budget: \$287k (\$0k for Glotch).

NSF MRI: MRI: Acquisition of Imaging Micro-FTIR and Micro-Raman Spectrometers in Support of Research at Stony Brook University, PI, 2009-2010, Total Budget: \$340k.

NASA MFRP: Infrared, NMR, and X-ray Characterization of Dehydration and Dehydroxylation of Clay Minerals, PI, 2008-2012, Total Budget: \$297k.

NASA MDAP: Geologic Characterization of Likely Chloride Salt Deposits on Mars, PI, 2008-2012, Total Budget: \$260k.

NASA LRO PS: Compositional Variability of the Lunar Surface from the Diviner Lunar Radiometer Experiment and the Lunar Reconnaissance Orbiter Camera, PI, 2008-2011, Total Budget: \$347k.

NASA MDAP: Analysis of Layered Terrains near Mawrth Vallis: Comparisons with Meridiani Planum, Co-I with PI William Farrand, SSI, 2006-2009, Total Budget: \$205K (\$32.9k for Glotch).

### **Book Chapters**

[8] Elardo, S. M., C. M. Pieters, D. Dhingra, K. L. Donaldson Hanna, **T. D. Glotch**, B. T. Greenhagen, J. Gross, J. W. Head, B. L. Jolliff, R. L. Klima, T. Magna, F. M. McCubbin, and M. Ohtake (2018), The Evolution of the Lunar Crust, in *New Views of the Moon 2*, submitted.

[7] Shearer, C., C. Neal, **T. D. Glotch**, T. Prissel, A. S. Bell, V. A. Fernandes, L. R. Gaddis, B. Jolliff, M. Laneuville, T. Magna, J. Simon, and G. J. Taylor (2018), Magmatic Evolution 2: A New View of Post-Differentiation Magmatism, in *New Views of the Moon 2*, submitted.

[6] Denevi, B. W., S. K. Noble, D. T. Blewett, R. Christoffersen, I. Garrick-Bethell, J. J. Gillis-Davis, **T. D. Glotch**, B. T. Greenhagen, A. R. Hendrix, D. M. Hurley, L. P. Keller, G. Y. Kramer, M. S. Thompson, and D. Trang (2018), Space Weathering and Exosphere-Surface Interactions, in *New Views of the Moon 2*, submitted.

[5] Ruff, S. W., J. L. Bandfield, P. R. Christensen, **T. D. Glotch**, V. E. Hamilton, and A. D. Rogers (2017), Rover-based Thermal Infrared Remote Sensing of Mars Using the Mini-TES Instrument, In: J. Bishop, J. Moersch, and J. F. Bell III (Eds.) Remote Compositional Analysis, Cambridge University Press, Cambridge, accepted.

[4] Mustard, J. F. and **T. D. Glotch** (2017), Theory of Reflectance and Emittance Spectroscopy of Geologic Materials in the Visible and Infrared Regions, In: J. Bishop, J. Moersch, and J. F. Bell III (Eds.) Remote Compositional Analysis, Cambridge University Press, Cambridge, accepted.

[3] Bell, J. F. III, **T. D. Glotch**, V. Hamilton, T. McConnochie, A. McEwen, and P. Christensen (2008), Visible to Near-IR Multispectral Orbital Observations of Mars, In: J. F. Bell, III (Ed.) The Martian Surface: Composition, Mineralogy, and Physical Properties, 636 pp., Cambridge University Press, Cambridge.

[2]Christensen, P. R., J. L. Bandfield, D. Rogers, **T. D. Glotch**, V. E. Hamilton, M. B. Wyatt, and R. Clark (2008), Global Mineralogy Mapped from the Mars Global Surveyor Thermal Emission Spectrometer, In: J. F. Bell, III (Ed.) *The Martian Surface: Composition, Mineralogy, and Physical Properties*, 636 pp., Cambridge University Press, Cambridge.

[1]Ruff, S. W., P. R. Christensen, **T. D. Glotch**, D. L. Blaney, J. E. Moersch, and M. B. Wyatt (2008), The Mineralogy of Gusev Crater and Meridiani Planum Derived from the Miniature Thermal Emission Spectrometers on the Spirit and Opportunity Rovers, In: J. F. Bell, III (Ed.) *The Martian Surface: Composition, Mineralogy, and Physical Properties*, 636 pp., Cambridge University Press, Cambridge.

**Publications** \* denotes student author

[88]Sims, M.\*, S. J. Jaret, J. R. Johnson, M. Whitaker, and **T. D. Glotch** (2019) Raman spectroscopic study of the effects of strain-rate, peak pressure, and kinetics on pressure-induced deformation in plagioclase feldspars, *J. Geophys. Res.*, manuscript in preparation.

[87]Yesiltas, M., **T. D. Glotch**, S. J. Jaret, S. Verchovsky, and R. C. Greenwood (2019), Carbon in the Saricek meteorite, *Met. Planet. Sci.*, in review.

[86]Sims, M.\*, A. Chen, S. J. Jaret, B. Rhymer\*, J. Smith, H.-P. Liermann, **T. D. Glotch**, and L. Ehm (2019), Pressure-induced amorphization in anorthite: pre-heated experiments in an externally heated diamond anvil cell, *J. Geophys. Res.*, in review.

[85]Shirley, K. A.\*, and **T. D. Glotch** (2019), Mid-IR spectra of lunar analog materials in a simulated lunar environment, *J. Geophys. Res.*, accepted.

[84]Unsalan, O. and 78 others, including **T. D. Glotch** (2019), Howardite fall in Turkey: Source crater of HED meteorites on Vesta and impact risk of Vestoids, *Met. Planet. Sci.*, accepted.

[83]Ye, C.\*, and **T. D. Glotch** (2019), Spectral properties of chloride salt-bearing assemblages: Implications for detection limits of minor phases in chloride-bearing deposits on Mars, *J. Geophys. Res.*, in press.

[82]Michalski, J. R., **T. D. Glotch**, A. D. Rogers, P. B. Niles, J. Cuadros, J. W. Ashley, and S. S. Johnson (2019), The geology and astrobiology of McLaughlin Crater, Mars: an ancient lacustrine basin containing turbidites, mudstones and serpentinites, *J. Geophys. Res.*, in press.

[81]Lindsley, D. H., H. Nekvasil, and **T. D. Glotch** (2019), Synthesis of pigeonites for spectroscopic studies, *Am. Miner.*, in press.

- [80]Sims, M.\*, S. J. Jaret\*, E.-R. Carl, B. Rhymer\*, N. Schrodt, V. Mohrholz, J. Smith, Z. Knopkova, H.-P. Liermann, **T. D. Glotch**, and L. Ehm (2019), Pressure-induced amorphization in plagioclase feldspars: A time-resolved powder diffraction study during rapid compression, *Earth Planet. Sci. Lett.*, 507, 166-174.
- [79]Vu, T., S. Piqueux, M. Choukroun, C. Edwards, P. Christensen, and **T. Glotch** (2019), Low-temperature specific heat capacity measurements and application to Mars thermal modeling, *Icarus*, 321, 824-840.
- [78]Ito, G.\*, A. D. Rogers, K. E. Young, J. E. Bleacher, C. S. Edwards, J. Hinrichs, C. I. Honniball\*, P. G. Lucey, D. Piquero, B. Wolfe, and **T. D. Glotch** (2018), Incorporation of portable infrared spectral imaging into planetary geological field work: Analog studies at Kilauea Volcano, Hawaii, and Potrillo Volcanic Field, New Mexico, *Earth Space Sci.*, 5, 676-696.
- [77]Young, K. E., J. E. Bleacher, A. D. Rogers, A. McAdam, W. B. Garry, P. Whelley, S. Scheidt, G. Ito\*, C. Knudsen, L. Bleacher, N. Whelley, T. Graff, C. Evans, and **T. D. Glotch** (2018), The incorporation of field portable instrumentation into crewed planetary surface exploration, *Earth Space Sci.*, 5, 697-720, doi:10.1029/2018EA000378.
- [76]Boyce, J. M., T. Giguere, P. Mouginis-Mark, **T. D. Glotch**, and G. J. Taylor (2018), Geology of the Mairan middle dome: Implications for silicic volcanism on the Moon, *Planet. Space Sci.*, 162, 62-72.
- [75]**Glotch, T. D.**, C. S. Edwards, M. Yesiltas, K. A. Shirley\*, D. S. McDougall\*, A. M. Kling\*, J. L. Bandfield, and C. D. K. Herd (2018), MGS-TES spectra suggest a basaltic component in the regolith of Phobos, *J. Geophys. Res.*, 123, <https://doi.org/10.1029/2018JE005647>.
- [74]Yesiltas, M., S. J. Jaret, J. Young\*, S. P. Wright, and **T. D. Glotch** (2018), Three dimensional Raman tomographic microspectroscopy: A novel imaging technique, *Earth Space Sci.*, 5, 380-392.
- [73]Jaret, S. J.\*, S. R. Hemming, E. T. Rasbury, L. M. Thompson, **T. D. Glotch**, J. Ramezani, and J. G. Spray (2018), Context matters: Ar-Ar results from in and around the Manicouagan Impact Structure, Canada and implications for martian meteorite chronology, *Earth Planet. Sci. Lett.*, 501, 78-89.
- [72]Jaret, S. J., M. Sims\*, J. R. Johnson, and **T. D. Glotch** (2018), Microspectroscopic and petrographic comparison of experimentally shocked albite, andesine, and bytownite, *J. Geophys. Res.*, 123, 1701-1722.
- [71]Rucks, M.\*, M. L. Whitaker, **T. D. Glotch**, J. B. Parise, T. Catalano\*, M. D. Dyar, and S. J. Jaret (2018), Making tissintite: Mimicking meteorites in the multi-anvil, *Am. Miner.*, 103, 1516-1519.

- [70]Ito, G.\* , M. I. Mishchenko, and **T. D. Glotch** (2018), Radiative-transfer modeling of spectra of planetary regoliths using cluster-based dense packing modifications, *J. Geophys. Res.*, 123, 1203-1220, doi:10.1029/2018JE005532.
- [69]Farrand, W. H., S. W. Wright, **T. D. Glotch**, C. Schroder, E. C. Sklute, and M. D. Dyar (2018), Spectroscopic examinations of hydro- and glaciovolcanic basaltic tuffs: Modes of alteration and relevance for Mars, *Icarus*, 309, 241-259.
- [68]Huang, H., E. C. Sklute, K. A. Lehuta, K. R. Kittilstved, **T. D. Glotch**, M. Liu, and P. G. Khalifah (2017), Influence of thermal annealing on free carrier concentration in  $(\text{GaN})_{1-x}(\text{ZnO})_x$  semiconductors, *J. Phys. Chem. C*, 42, 23,249-23,258.
- [67]Lucey, P. G., D. Trang, J. R. Johnson, and **T. D. Glotch** (2017), Derivation of optical constants for nanophase hematite and application to modeled abundances from in situ martian reflectance spectra, *Icarus*, 300, 167-173.
- [66]Michalski, J. R., **T. D. Glotch**, L. Friedlander, M. D. Dyar, D. L. Bish, and T. G. Sharp (2017), Shock metamorphism of clay minerals on Mars by meteor impact, *Geophys. Res. Lett.*, 44, 6562-6569.
- [65]Zhao, J.\* , L. Xiao, L. Qiao, **T. D. Glotch**, and Q. Huang (2017), The Mons Rumker Volcanic Complex of the Moon: A candidate landing site for the Chang'E-5 mission, *J. Geophys. Res.*, 122, 1419-1442, doi:10.1002/2016JE005247.
- [64]Huang, H., D. M. Colabello, E. C. Sklute, **T. D. Glotch**, and P. G. Khalifah (2017), Self-referenced method for estimating refractive index and absolute absorption of loose semiconductor powders, *Chem. Mat.*, 29, 4632-4640, doi:10.1021/acs.chemmater.6b04463.
- [63]Ito, G.\* , J. A. Arnold, and **T. D. Glotch** (2017), T-Matrix and radiative transfer hybrid models for densely packed particulates at mid-infrared wavelengths, *J. Geophys. Res.*, 122, 822-238, doi:10.1002/2017JE005271.
- [62]Jones, A. J., L. Bleacher, J. Bleacher, **T. Glotch**, K. Young, B. Selvin, and R. Firstman (2016), Connecting the next generation of science journalists with scientists in action, *GSA Today*, 27, 44-45, doi:10.1130/GSATG294GW.1.
- [61]Jaret, S. J.\* , B. L. Phillips, D. T. King Jr., **T. D. Glotch**, Z. Rahman, and S. P. Wright (2017), An unusual occurrence of coesite at the Lonar Crater, India, *Met. Planet. Sci.*, 52, 147-163, doi:10.1111/maps.12745.
- [60]Donaldson Hanna, K. L., B. T. Greenhagen, W. M. Patterson III, C. M. Pieters, J. F. Mustard, N. E. Bowles, D. A. Paige, **T. D. Glotch**, and C. Thompson (2017), Effects of varying environmental conditions on emissivity spectra of bulk lunar soils:



Application to Diviner thermal infrared observations of the Moon, *Icarus*, 283, 326-342.

- [59]Lucey, P. G., B. T. Greenhagen, E. Song, J. A. Arnold, M. Lemelin, K. Donaldson Hanna, N. Bowles, **T. D. Glotch**, and D. A. Paige (2017), Space weathering effects in Diviner Radiometer measurements of the lunar Christiansen Feature: Characteristics and mitigation, *Icarus*, 283, 343-351.
- [58]Liu, Y., **T. D. Glotch**, N. Scudder\*, M. Kraner\*, T. Conduz\*, R. Arvidson, E. Guinness, M. Wolff, and M. Smith (2016), End member identification and spectral mixture analysis of CRISM hyperspectral data: A case study on southwest Melas Chasma, Mars, *J. Geophys. Res.*, 121, 2004-2036.
- [57]Friedlander, L.\*, **T. D. Glotch**, B. Phillips, J. Vaughn\*, and J. R. Michalski (2016), Examining structural and related spectral change in Mars-relevant phyllosilicates after experimental impacts between 10-40 GPa, *Clay. Clay Min.*, 64, 189-209.
- [56]Arnold, J. A.\*, **T. D. Glotch**, P. G. Lucey, E. Song, I. R. Thomas, and N. E. Bowles (2016), Lunar olivine as seen by Diviner and M<sup>3</sup>: A Comparison of MIR and VNIR spectral data, *J. Geophys. Res.*, 121, 1342-1361, doi:10.1002/2015JE004874.
- [55]Farrand, W. H., S. P. Wright, A. D. Rogers, and **T. D. Glotch** (2016), Basaltic glass formed from hydrovolcanic and impact processes: Characterization and clues for detection of mode of origin from VNIR through TIR reflectance spectroscopy, *Icarus*, 275, 16-28.
- [54]Sutter, B., R. C. Quinn, P. D. Archer, D. P. Glavin, **T. D. Glotch**, S. Kounaves, M. M. Osterloo, E. Rampe, and D. W. Ming (2016), Oxychlorine species on Mars, *Int. J. Astrobio.*, accepted.
- [53]Ashley, J. W., M. S. Robinson, J. D. Stopar, **T. D. Glotch**, B. R. Hawke, S. J. Lawrence, B. L. Jolliff, H. Hiesinger, C. H. van der Bogert, B. T. Greenhagen, and D. A. Paige (2016), The Lassell Massif - a silicic lunar volcano, *Icarus*, 273, 248-261.
- [52]Hardgrove, C. J., A. D. Rogers, **T. D. Glotch**, and J. A. Arnold\* (2016), Thermal emission spectroscopy of microcrystalline sedimentary phases: Effects of natural surface roughness on spectral feature shape, *J. Geophys. Res.*, 121, 542-555.
- [51]**Glotch, T. D.**, J. L. Bandfield, J. A. Arnold\*, M. J. Wolff, and C. Che (2016), Constraining the composition and grain size of salt-bearing deposits on Mars, *J. Geophys. Res.*, 121, 454-471.
- [50]Cloutis, E. A., P. Mann, M. R. M. Izawa, D. M. Applin, C. Samson, R. Kruzelecky, **T. D. Glotch**, S. Mertzman, K. R. Mertzman, T. W. Haltigin, and C. Fry (2015) The Canadian Space Agency planetary analogue materials suite, *Planet. Space. Sci.*, 119, 155-172.

- [49]Friedlander, L. R.\*, **T. D. Glotch**, D. L. Bish, M. D. Dyar, T. G. Sharp, E. C. Sklute, and J. R. Michalski (2015), Structural and spectroscopic changes to natural nontronite induced by experimental impacts between 10 and 40 GPa, *J. Geophys. Res.*, 120, doi:10.1002/2014JE004638.
- [48]Sklute, E. C.\*, **T. D. Glotch**, J. Piatek, W. Woerner\*, A. Martone\*, and M. Kraner\* (2015), Optical constants of synthetic potassium, sodium, and hydronium jarosite, *Am. Miner.*, 100,1110-1122.
- [47]Jaret, S. J.\*, W. R. Woerner\*, B. L. Phillips, L. Ehm, H. Nekvasil, S. P. Wright, and **T. D. Glotch** (2015), Maskelynite formation via solid-state transformation: Evidence of infrared and X-ray anisotropy, *J. Geophys. Res.*,120, 570-587, doi:10.1002/2014JE004764.
- [46]**Glotch, T. D.**, J. L. Bandfield, P. G. Lucey, P. O. Hayne, B. T. Greenhagen, R. R. Ghent, J. A. Arnold\*, and D. A. Paige (2015), Formation of lunar swirls by magnetic field standoff of the solar wind, *Nature Communications*, 6, 6189, doi:10.1038/ncomms7189.
- [45] Arnold, J. A.\*, **T. D. Glotch**, and A. M. Plonka\* (2014), Mid-infrared optical constants of clinopyroxene and orthoclase derived from oriented single-crystal reflectance spectra, *Am. Miner.*, 99, 1942-1955.
- [44] Farrand, W. H., **T. D. Glotch**, and B. Horgan (2014), Detection of Copiapite in the northern Mawrth Vallis Region of Mars: Evidence of acid sulfate alteration, *Icarus*, 241, 346-357.
- [43]Che, C., and **T. D. Glotch** (2014), Thermal alteration: A possible reason for the inconsistency between OMEGA/CRISM and TES detections of phyllosilicates on Mars?, *Geophys. Res. Lett.*, 41, 321-327, doi:10.1002/2013GL058649.
- [42]Lawrence, S. J., J. D. Stopar, B. R. Hawke, B. T. Greenhagen, J. T. S. Cahill, J. L. Bandfield, B. L. Jolliff, B. W. Denevi, M. S. Robinson, **T. D. Glotch**, D. B. J. Bussey, P. D. Spudis, T. A. Giguere, and W. B. Garry (2013), Morphology and surface roughness of volcanic constructs in the Marius Hills, *J. Geophys. Res.*, *J. Geophys. Res.*, 118, 615-634.
- [41]**Glotch, T. D.** and A. D. Rogers (2013), Evidence for magma-carbonate interaction beneath Syrtis Major, Mars, *J. Geophys. Res.*, 118, 1-12, doi:10.1029/2012JE004230.
- [40]Yang, B., P. Lucey, and **T. D. Glotch** (2013), Are large Trojan asteroids salty? An observational, theoretical, and experimental study, *Icarus*, 223, 359-366.
- [39]Wilson, J. H.\*, S. M. McLennan, **T. D. Glotch**, and E. T. Rasbury (2012), Pedogenic hematitic concretions from the Mesozoic New Haven Arkose, Connecticut:

Implications for understanding Martian diagenetic processes, *Chem. Geol.*, 312-313, 195-208.

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