Curriculum Vitae of Alexander Gerard Hayes

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LAST UPDATED: FEBRUARY 2021

CURRENT AFFILIATION

Astronomy Department, Cornell University

PERSONAL INFORMATON

Born: May 1981
Married: 4 Children

EDUCATION

Ph.D.	Planetary Science (Minors: Geology / Remote Sensing)	*California Institute of Technology*	April 2011
M.S.	Planetary Science	*California Institute of Technology*	June 2008
M.Eng.	Applied & Engineering Physics	*Cornell University*	Dec. 2003
B.A.	Astronomy / Physics, *Summa Cum Laude*	*Cornell University*	May 2003
B.A.	College Scholar (Astrobiology), *Summa Cum Laude*	*Cornell University*	May 2003

ACADEMIC AWARDS AND FELLOWSHIPS

Feinberg Faculty Fellowship, Weizmann Institute (2019)
Provost Research Innovation Award, Cornell (2018)
Young Scientist Award, World Economic Forum (2017)
Zeldovich Medal, COSPAR / RAS (2016)
Kavli Fellow, National Academy of Sciences (2014)
NASA Early Career Fellowship (2013)
Ronald Greeley Early Career Award, AGU (2012)
Miller Research Fellowship (2011-2012)
USGS Shoemaker Fellowship (2011, *Declined*)
AGU Outstanding Student Paper Award (2008, 2010)
Sigma Xi Young Scholar Procter Prize (2008)
NASA Graduate Research Fellowship (2008-2011)
Henshaw Fellow, Caltech (2006-2007)
David Delano Clark Award, Cornell A&EP (2004)
Summa Cum Laude in Astronomy, Cornell (2003)
Summa Cum Laude in Astrobiology, Cornell (2003)
Distinction in all Subjects - Cornell University (2003)
Cornell University College Scholar (2000-2003)
Cornell University Dean's List (1999-2003)
NASA Group Awards (MER/MSL/Cassini)

TEACHING EXPERIENCE

Cornell University; *Teaching Assistant*
- A102/104, "Our Solar System" (Spring 2003)
- A194: "Observational Astronomy" (Fall 2004)
- A211: Stars, Galaxies and Cosmology" (Fall 2004)

California Institute of Technology; *Teaching Assistant*
- Ge103: "Planetary Science" (Spring 2008)
- Ge214: "Spectroscopy of Minerals" (Spring 2009)
- Ge151: "Planetary Surfaces" (Spring 2010)

Glendale Community College; *Guest Lecturer; Astronomy* (2008-2011)
University of California, Berkeley; *Guest Lecturer; Earth & Planetary Science* and *Astronomy* (2011-2013)

Cornell University; *Assistant/Associate Professor*
- A4410: "Experimental Astronomy" (Fall 2013)
- A2202: "Our Home in the Solar System" (Spring 2014, Fall 2014)
- A2202: "A Spacecraft Tour of the Solar System: Science, Exploration, and Policy" (Fall 2015-2020)
- A6577: "Planetary Surface Processes" (Spring 2015, 2017, 2020)
- A3310: "Planetary Image Processing" (Fall 2015)
- A6500: "Scientific Issues in Landing Site Selection Activities for the Mars2020 Rover" (Spring 2016)
- A6500: "Mars 2020 Perseverance Rover: Science Objectives and Instrument Descriptions" (Fall 2020)
- A1102: "Our Solar System" (Spring 2017, 2018)
- A3150: "Geomorphology" (Spring 2019)

PROFESSIONAL APPOINTMENTS

- **Astronomy Department, Cornell University**; Ithaca, NY
  - Associate Professor, *July 2018-Present*
  - Assistant Professor; *January 2013-July 2018*
  - Director, Cornell Center for Astrophysics and Planetary Science, *July 2019-Present*
  - Director, Spacecraft Planetary Imaging Facility (NASA RPIF); *January 2013-Present*

- Graduate Field Member; Earth and Atmospheric Sciences; *September 2013-Present*
- Graduate Field Member; Astronomy and Space Sciences; *July 2011-Present*
- *Specialization: Planetary Science, Comparative Planetology, Solar System Exploration, Spacecraft Instrumentation, Mission Development*

- **Miller Institute for Basic Research in Science, University of California at Berkeley**; Berkeley, CA
  - Miller Research Fellow; *July 2011-December 2012*
  - *Department Affiliations: Astronomy; Earth and Planetary Science*
  - *Faculty Hosts: William Dietrich, Michael Manga, and Imke de Pater*

- **Division of Geological and Planetary Sciences, California Institute of Technology**; Pasadena, CA
  - Post-Doctoral Scholar; *April 2011-July 2011*
  - Graduate Student; *September 2006-March 2011*
  - *Specialization: Remote Sensing and Modeling of Planetary Surfaces (Visible, Infrared, & Radar) and Spacecraft Instrumentation*

- **Lincoln Laboratory, Massachusetts Institute of Technology;** Lexington, MA
  - Consultant; *September 2006- September 2010 (DOD Secret Clearance)*
  - Associate Staff; *May 2004-September 2006 (DOD Secret Clearance)*
  - *Specialization: Laboratory Experiments and Management; IR Remote Sensing, Instrument Design, Instrument Characterization, and Algorithm Development supporting Ballistic Missile Defense and Tactical Air Defense Programs*

- **School of Earth and Space Exploration, Arizona State University;** Tempe, AZ
  - Remote Software Consultant; *May 2004-September 2006*
  - *Specialization: Planning and Analysis Tools for Tactical Operation of Spacecraft Infrared Spectrometer (Mini-TES Instrument on MER Rovers)*

- **Jet Propulsion Laboratory, California Institute of Technology;** Pasadena, CA
  - Mars Exploration Rover Science Team Affiliate; *January 2004 – May 2004 (employed by Cornell University during primary mission)*
  - *Specialization: Science Payload Operation (Uplink and Downlink of Science and Engineering Cameras)*

- **Center for Radiophysics and Space Research, Cornell University**; Ithaca, NY
  - Student Researcher; *August 1999-December 2003*
  - *Specialization: Instrument Co-Registration, Data-Fusion, and Camera Calibration (Visible and Infrared)*
  - Internships:
    - Summer 2000: *Awarded NASA Space Grant to support XRGS team of the NEAR mission*
    - Summer 2001: *Funded by MER to build and operate student camera laboratory*
    - Summer 2002: *Funded by MER to calibrate visible flight cameras at JPL*
    - Summer 2003: *Funded by MER to create software to visualize spectrometer footprints in visible cameras for spacecraft operations*

BOOKS AND BOOK CHAPTERS

[3] R. D. Lorenz and **A. G. Hayes**. The Seas of Titan: A Guide to the Extraterrestrial Oceanography of Cryogenic Hydrocarbon Liquid on Saturn's Giant Moon (*under contract*), Cambridge University Press, Cambridge.

[2] O. Aharonson, **A. G. Hayes**, R. M. C. Lopes, A. Lucas, P. Hayne, T. Perron, and L. A. Soderblom . Titan's Surface Geology (2013), In: I. Mueller-Wodarg (Ed) Titan: Surface, Atmosphere, and Magnetosphere. 646pp., Cambridge Planetary Science Series, Cambridge University Press, Cambridge.

[1] J. Grotzinger, **A. G. Hayes**, M. O. Lamb, S. M. McLennan. Sedimentary Processes on the Earth, Mars, Titan, and Venus (2013), In: M. Bullock and M. Mackwell (Eds) Comparative Climatology of Terrestrial Planets. 600pp., University of Arizona Press Space Science Series, University of Arizona Press, Tucson.

JOURNAL PUBLICATIONS (* INDICATES PAPER LED BY STUDENT OR POSTDOC ADVISEE)

***h*-INDEX: 53 *m*-INDEX: 3 *i10*-INDEX: 124 CITATIONS: 12000 (GOOGLE SCHOLAR)**

RESEARCHER ID: P-2024-2014 http://www.researcherid.com/rid/P-2024-2014

[134] J. W. Barnes, S. M. MacKenzie, E. F. Young, J. M. Soderblom **A. G. Hayes,** and C. Sotin. Diffraction-limited Titan Surface Imaging from Orbit Using Near-Infrared Atmospheric Windows. *The Planetary Science Journal (2021)*

[133] K.P. Hand, C. Sotin, **A. G. Hayes,** A. Coustenis. On the habitability and future exploration of Ocean Worlds *Space Science Reviews 216 (2021)*

[132] J.F. Bell, J. N. Maki, G. L. Mehall, M. A. Ravine, M. A. Caplinger, Z. J. Bailey, **A. G. Hayes**, et al. The Mars 2020 Perserverance Rover Mast Camera Zoom (Mastcam-Z) Multispectral, Stereoscope Imaging Investiation *Space Science Reviews (2021)*

[131] K. M. Kinch, M. B. Madsen, J.F. Bell, J. N. Maki,, Z. J. Bailey, **A. G. Hayes**, et al. Radiometric Calibration Targets for the Mastcam-Z Camera on the Mars 2020 Rover MIssion *Space Science Reviews (2021)*

[130] J.R. Johnson, W. M. Grundy, M. T. Lemmon, W. Liang, J. F. Bell, **A. G. Hayes**. Spectrophotometric properties of materials observed by Pancam on the Mars Exploration Rovers: 4. Final Mission Observations *Icarus (2021)*

[129] **A. G. Hayes,** and 41 co-authors. Pre-Flight Calibration of the Mars 2020 Rover Mastcam Zoom (Mastcam-Z) Multispectral, Stereoscopic Imager. *Space Science Reviews (2021)*

[128] N. W. Kutsop***, A. G. Hayes,** B. J. Buratti, P. M. Corlies, K. Ennico, S. Fan, R. Gladstone, P. Helfenstein, J. D. Hofgartner, M. Hicks, M. Lemmon, J. I. Lunine, J. Moore, P. Nicholson, C. B. Olkin, A. H. Parker, S. A. Stern, H. A. Weaver, L. A. Young. Pluto's haze abundance and size distribution from limb scattering observations by MVIC. *Planetary Science Journal (2021)*

[127] V. Poggiali*, **A. G. Hayes,** M. Mastrogiuseppe, A. Le Gall, S. P. D. Birch. The Bathymetry of Moray Sinus at Titan. *Icarus (2021)*

[126] D. E. Lalich*, **A. G. Hayes,** V. Poggiali, Explaining Bright Radar Reflections Below the south polar oMars without Liquid Water. *Nature Geosciences* (*submitted).*

[125] D. E. Lalich*, **A. G. Hayes,** V. Poggiali, M. Mastrogiuseppe, M. J. Malaska, L. R. Schurmeier. Diverse Evolution of Mountains and Hummocks on Titan as Observed by the Cassini Radar Altimeter. *Icarus* (*2021).*

[124] P. Corlies*, **A. G. Hayes,** P. Rojo, M. Adamkovics, E. P. Turtle, S. Rodriguez, J. Lunine. Monitoring of Titan's meterology over the past decade from Earth, *Icarus* (*submitted).*

[123] P. Corlies*, **A. G. Hayes**, J. L. Mitchell, J. Lora, P. Rojo, M. Adamkovics, E. P. Turtle, S. Rodriguez, J. Lunine . Stormy Seas: Reoccurring clouds at Titan's northern mid-latitudes, *Nature Astronomy* (*submitted).*

[122] F. Nicols-Fleming*, P. Corlies*, **A. G. Hayes,** M. Adamkovics, Tracking seasonal variations in the haze distribution of Titan's atmosphere with SINFONI VLT, *Planetary Science Journal* (*submitted).*

[121] P. Corlies*, **A. G. Hayes,** S. Rodriguez, E. P. Turtle, J. Kelland, M. Adamkovics, J. M. Lora, C. Newmann, J. L. Mitchell. A complete analysis of clouds in the Cassini VIMS dataset, *Icarus* (*submitted).*

[120] P. Corlies*, **A. G. Hayes,** J. A. Kelland*, S. Rodriguez, E. P. Turtle, J. Barbara, M. Adamkovics, J. M. Lora, C. Newmann, J. L. Mitchell. Measurements of Titan's wind profiles using cloud tracking in Cassini VIMS, *GRL* (*submitted).*

[119] P. M. Corlies*, **A. G. Hayes**, M. Adamkovics. Observed topographic influencing of clouds on Titan *Planetary Science Journal (submitted)*.

[118] J. Hofgartner*, **A. G. Hayes**, D. B. Campbell, J. I. Lunine, G. J. Black, S. M. MacKenzie, S. P. D. Birch, S. D.. Wall. The Root of Specular Reflections from Solid Surfaces on Saturn's moon Titan, *Nature Communications (Accepted)*

[117] M. J. Malaska, J. Radebaugh, R. Lopes, K. L. Mitchell, T. Verlander, A. M. Schoenfeld, M. M. Florence, A. L. Le Gall, A. Solomonidou, **A.G. Hayes**, S. P. D. Birch, M. A. Janssen, L. Schurmeier, T. Cornet, C. Ahrens. Labryrinth Terrain on Titan, *Icarus (Accepted)*

[116] W. Liang*, J. R. Johnson, **A. G. Hayes**. M. Lemmon, J. F. Bell, W. G. Grundy, and R. G. Deen, Spectrophotometry from Mars Hand Lens Imager Goiniometer Measurements, *Icarus 2020*

[115] P. Corlies*, G. D. McDonald, **A. G. Hayes**, J. J. Wray, M. Adamkovics, M. J. Malaska, M. L. Cable, J. D. Hofgartner, S. Horst, L. R. Liuzzo, J. J. Buffo, R. D. Lorenz, E. P. Turtle. Transmission windows in Titan's Lower Troposphere: Implications for infrared spectrometers aboard future aerial and surface missions. *Icarus 2020*

[114] A. R. Hendrix, T. A. Hurford, L. M. Barge, M.T. Bland, J.S. Bowman, W. Brinckerhoff, B.J. Buratti, M. L. Cable, J. Castillo-Rogez, G.C. Collins, S. Diniega, C.R. German, **A. G.** Hayes, T. Hoehler, S. Hosseini, C.J.A Howett, A.S. McEwen, C. D, Neish, M. Neveu, T. A., Nordheim, G. W, Patterson, D. A. Patthoff, C. Phillips, A. Rhoden, B. E, Schmidt, K. N. Singer, J. M. Soderblom, S. D, Vance. The NASA Roadmap to Ocean Worlds. *Astrobiology 2019*

[113] R. Lopes, M. J. Malaska,, A. M. Schoenfeld, A. Solomonidou, S. P. D. Birch, M. Florence, **A.G. Hayes**, D. A. Williams, J. Radebaugh, T. Verlander, E. P. Turtle, A. Le Gall, S. Wall. A Global Geologic Map of Saturn's Moon Titan, *Nature Astronomy 2019*

[112] M. Mastrogiuseppe, V. Poggiali*, **A.G. Hayes**, J. Lunine, J., R.Seu, G. Mitr, anid R. Lorenz. Lakes on Titan are Deep and Methane-Rich, *Nature Astronomy 2019*

[111] S. P. D. Birch***, A. G. Hayes**, O. Umurhan, Y. Tang, J-B. Vincent, N. Oklay, D. Bodewits, B. Davidson, R. Marschall, J. M. Moore, S. W. Squyres, J. M. Soderblom, R. L. Kirk, and H. Sierks, Migrating Scarps as a Significant Driver for Cometary Mass Loss, *GRL 2019*

[110] Y. Tang*, S. P. D. Birch***, A. G. Hayes**, R. Kirk, N. Kutsop, J-B. Vincent, S. Squryes, Generation of Photoclinometric DTMs for Application to Transent Changes on the surface of 67P/Churyumov-Gerasimeno, *GRL 2019*

[109] M. Hofstadter, A. Simon, S. Atreya, D. Banfield, J. Fortney, **A. G. Hayes**, M. Hedman, G. Hospodarsky, A. Masters, K. Mandt, M. Showalter, K. Soderlund, D. Turrini, E. Turtle. Uranus and Neptune Missions, a Study in Advance of the Next Decadal Survey. *Planetary and Space Science, 2019*

[108] S. P. D. Birch***, A. G. Hayes**, V. Poggiali, J. D. Hofgartner, J. I. Lunine, M. J. Malaska, S. Wall, R. M. C. Lopes, and O. White. Raised Rims around Titan's Sharp-Edged Depressions, *GRL 2019*

[107] V. Poggiali*, **A.G. Hayes**, M. Mastrogiuseppe, R.Seu, J. Mullen, and M. C. Raguso. Delay-Doppler algorithm applied to the Cassini RADAR Altimeter, *IEEE TGRS 2019*

[106] A. Coustenis, G. Kminek, N. Hedman, Cospar Panel on Planetary Protection (Including **A.G. Hayes**). The COSPAR Panel on Planetary Protection Role, Structure, and Activites. *Space Research Today 2019*

[105] A. Solomonidou, A. Le Gall, M. J. Malaska,, S. P. D. Birch, R.M.C. Lopes, A. Coustenis, S. Rodriguez., S. D. Wall, R. J. Michaelides, M. R. Naser, C. Elachi, **A.G. Hayes**, J. M. Soderblom, A. M. Schonfeld, C.

Matsoukas, P. Drossart, M.A. Jansse, K.J. Lawrence, O. Witasse, J. Yates, and J. Radebaugh. Spectral and emissivity analysis of the raised ramparts around Titan's northern lakes, *Icarus 2019*

[104] **A. G. Hayes**. Dunes across the Solar System: A tale of Pluto and patterns. *Science 2018*

[103] M. Mastrogiuseppe*, V. Poggiali*, **A.G. Hayes**, J. Lunine, J., R.Seu, G. Di Achille, and R. Lorenz. Cassini Radar Observations of Punga Mare and Environs: Bathymetry and Composition, *EPSL 2018*

[102] **A. G. Hayes**, J. I. Lunine, R. D. Lorenz. Titan's Hydrologic Cycle: A Post-Cassini View. *Nat. Geo. 2018*

[101] C. A. Nixon, R. D. Lorenz, R. K. Achterberg, A. Buch, P. Coll, R. N. Clark, R. Courtin, **A. G. Hayes**, L. Iess, R. E. Johnson, R. M. C. Lopes, M. Mastrogiuseppe, K. Mandt, D. G. Mitchell, F. Raulin, A. M. Rymer, H. Todd Smith, A. Solomonidou, C. Sotin, D. Strobel, E. P. Turtle, V. Vuitton, R. A. West, R. V. Yelle. Titan's Cold Case Files – Outstanding Questions After Cassini-Huygens. *Planetary and Space Science 2018*

[100] S. P. D. Birch***, A. G. Hayes**, P. M. Corlies, E. R. Stofan, J. D. Hofgartner, R. M. C. Lopes, J. I. Lunine, S. M. MacKenzie, M. J. Malaska, C. A. Wood, and the Cassini RADAR Team. Morphological Evidence that Titan's Southern Hemisphere Basins are Paleoseas. *Icarus 2017*

[99] P. M. Corlies*, **A. G. Hayes**, S. P. D. Birch, R. L. Kirk, B. Stiles, L. Iess. Titan's Global Topography at the End of the Cassini Mission. *GRL 2017*

[98] **A. G. Hayes**, W. Dietrich, A. D. Howard, R. L. Kirk, E. P. Turtle J. W. Barnes, A. Lucas, K. L. Mitchell. Topographic constraints on the evolution and hydrology of Titan's north polar landscape. *GRL 2017*

[97] M. Hofstadter, A. Simon, S. Atreya, D. Banfield, J. Fortney, **A. G. Hayes**, M. Hedman, G. Hospodarsky, A. Masters, K. Mandt, M. Showalter, K. Soderlund, D. Turrini, E. Turtle, and the Mission Study Team (2017): Ice Giants Pre-Decadal Study Final Report. Posted June, 2017 (JPL-D-100520).

[96] G. Mitri, F. Postberg, J. M. Soderblom, P. Wurz, P. Tortora, B. Abel, J. W. Barnes, M. Berga, N. Carrasco, A. Coustenis, J. P. de Vera, A. D'Ottavio, F. Ferri, **A. G. Hayes**, P. O. Hayne, J. K. Hillier, S. Kempf, J.P. Lebreton, R. D. Lorenz, A. Martelli, R. Orosei, A. E. Petropoulos, K. Reh, J. Schmidt, C. Sotin, R. Srama, G. Tobie, A. Vorburger, V. Vuitton, A. Wong, M. Zonnoni, Explorer of Enceladus and Titan (E^2T): Investigating Ocean Worlds' Evolution and Habitability in the Solar System, *Planetary and Space Science*, 2017

[95] K. P. Hand, A.E. Murray, J. B. Garbin, W. B. Brinkerhoff, B.C. Christner, K.S. Edgett, B.L. Ehlmann, C.R. German, **A. G.** Hayes, T.M. Hoehler, S.M. Horst, J.I. Lunine, K.H. Nealson, C. Paranicas, B.E. Schmidt, D.E. Smith, A.R. Rhoden, M.J. Russell, A.S. Templeton, P.A. Willis, R.A. Yingst, C.B. Phillips, M.L. Cable, K.L. Craft, A.E. Hofmann, T.A. Nordheim, R.P. Pappalardo, and the Project Engineering Team (2017): Report of the Europa Lander Science Definition Team. Posted February, 2017 (JPL-D-97667).

[94] Z. Zhang*, **A. G. Hayes**, I. de Pater, D. E. Dunn, M. A. Janssen, P. D. Nicholson, J. N. Cuzzi, B. J. Butler, R. J. Sault, S. Chatterjee, VLA multi-wavelength microwave observations of Saturn's C and B rings, *Icarus*, 2017

[93] S. P. D. Birch*, Y. Tang*, **A. G. Hayes**, R. de Freitas Bart, S. Squyres, J. Soderblom, R. Kirk, Geomorphology of Comet 67P/Churyumov-Gerasimenko, *MNRAS,* 2017

[92] A . Le Gall, C. Leyrat, M. A. Janssen, G. Choblet, G. Tobie, O. Bourgeois, C. Sotin, A. Lucas, C. Howett, R. Krik, R. D. West, R. D. Lorenz, A. Stolzenbach, **A. G. Hayes**, L. Bonnefoy, G. Veyssiere, New thermal anomalies in the subsurface of Enceladus' South Polar Terrain, *Nature Astronomy*, 2017

[91] Z. Zhang*, **A. G. Hayes**, M. A. Janssen, P. D. Nicholson, J. N. Cuzzi, I. de Pater, D. E. Dunn, Origin of Saturn's A and B Rings, and the Cassini Division as Suggested by Their Non-Icy Material Content, *Icarus*, 2017.

[90] J. S. Mendez Harper, G. D. McDonald, J. Dufek, M. J. Malaska, **A. G. Hayes**, J. McAdams, A. Stockston, J. J. Wray, The Electrified Dunes of Titan, , *Nature Geosciences*, 2017.

[89] M. Mastrogiuseppe*, **A.G. Hayes**, V. Poggiali, J. Lunine, J., R. Lorenz, R.Seu, A. Le Gall, K. Mitchell, **A. G. Hayes,** S. P. D. Birch. Bathymetry and Composition of Titan's Ontario Lacus derived from Monte Carlo-based waveform inversion of Cassini RADAR altimetry data, *Icarus,* 2017

[88] M. J. Malaska, R, Hodyss, J. I. Lunine, **A. G. Hayes**, J. Hofgartner, G. Hollyday, Laboratory Measurements of Nitrogen Dissolution in Titan Lake Fluids, *Icarus*, 2017

[87] C. Grima, M. Mastrogiuseppe, **A. G. Hayes**, S. D. Wall, B. Stiles, C. Elachi, Surface Gourhness of Titan's Hydrocarbon Seas, *Icarus*, 2016.

[86] B.L. Ehlmann, F.S. Anderson, J. Andrews-Hanna, Carter, D. C. Catling, Christiansen, B.A. Cohen, C.D. Dressing, C.S. Edwards, L.T. Elkins-Tanton, K.A. Farley, C.I. Fassett, W.W. Fischer, A.A. Fraeman, M. P. Golombek, V.E. Hamilton, **A. G. Hayes**, C. D. K. Herd, B. Horgan, R. Hu, B.M. Jakosky, J.R. Johnson, J. F. Kasting, Kerber, E.S. Kite, H.A. Knutson, J. I. Lunine, P. R. Mahaffy, N. Mangold, McCubbin, J.F. Mustard, Niles, C. Quantin-Nataf, M. S. Rice, K.M. Stack, D. J.Stevenson, S.T. Stewart, M. J. Toplis, T. Usui, B.P. Weiss, S.C. Werner, R.D. Wordsworth, J.J. Wray, R.A. Yingst, Y.L. Yung, K.J. Zahnle, The Sustainability of Habitability on Terrestrial Planets: Insights, Questions, and Needed Measurements from Mars for Understanding the Evolution of Earth-like Worlds**,** *JGR Planets,* 2016

[85] V. Poggiai*, M. Mastrogiuseppe*, **A.G. Hayes**, R.Seu, Liquid Filled Canyons on Titan, *GRL,* 2016

[84] B. G. Bills, B. W. Styles, R. L. Kirk, **A. G. Hayes,** S. P. D. Birch. A Dynamic Model of Titan's Rotation Constrained by Cassini RADAR Data, *Icarus,* 2016 (Submitted)

[83] D. Vincent, O. Karatekin, V. Vallaeys, **A. G. Hayes,** M. Mastrogiuseppe, C. Notarnicola, V. Dehant, E. Deleersnijder. Numerical study of tides in Ontario Lacus, a hydrocarbon lake on the Surface of the Saturnian moon Titan, *Icarus,* 2016

[82] C. A. Nixon, R. K. Achterbery, M. Adamkovics, B. Bezard, G .L. Bjoraker, T. Cornet, **A. G. Hayes**, M. T. Lemmin, M. Lopez-Puertas, S. Rodriguez, C. Sotin, N.A Teanby, R. A. West, E. P. Turtle, S. N. Milam. Titan Science with the James Webb Space Telescope (JWST), *Publications of the Astronomy Society of the Pacific (PASP)*, MS #35133R1, 2016.

[81] J. D. Hofgartner*, **A. G. Hayes,** J. I. Lunine. Titan's Magic Island: Transient Feature in a Hydrocarbon Sea, *Icarus,* 2016

[80] **A. G. Hayes,** Titan's Lakes and Seas, *Annual Reviews of Earth and Space Science,* 2016

[79] M.C. Palucis, W. E. Dietrich, R. E. Williams, **A. G. Hayes**, T. Parker, D. Y. Sumner, N. Mangold, K. Lewis, H. Newsom. Sequence and relative timing of large lakes in Gale crater (Mars) after the formation of Mt. Sharp. *JGR Planets* 2016.

[78] A. Le Gall, M. J. Malaska, R. D. Lorenz, M. A. Janssen, T. Tokano, **A. G. Hayes**, M. Mastrogiuseppe, G. Veyssiere. Composition, seasonal change and bathymetry of Ligeia Mare, Titan, derived from its microwave thermal emission, *JGR Planets* 2016.

[77] J. Radebaugh, D. Ventra, R. Lorenz, T. Farr, R. Kirk, **A. G. Hayes**, M. Malaska, S. Birch, Z. Liu, J. Lunine, J. Barnes, A. Le Gall, R. M. C. Lopes, E. Stofan, S. D. Wall, and P. Paillou. Alluvial and Fluvial Fans on Saturn's Moon Titan Reveal Processes, Materials, and Regional Geology. *Geology and Geomorphology of Alluvial and Fluvial Fans: From Terrestrial to Planetary Perspectives*, Geological Society Publishing House 2016

[76] G. D. McDonald*, **A. G. Hayes**, R. C. Ewing, J. M. Lora, C. E. Newman, T. Tokano, A. Soto, G. Chen, A. Lucas. Variations in Titan's dune orientations as a result of orbital forcing. *Icarus* 2016

[75] S. P. D. Birch*, **A. G. Hayes**, W. E. Dietrich, J. Moore, M. Mastrogiuseppe, O. White, A. D. Howard, M. J. Malaska, R. Kirk, E. Turtle, and J. Barnes. Geomorphology of Titan's polar terrains: Using landscape form to understand surface process. *Icarus* 2016

[74] S. P. D. Birch*, **A. G. Hayes**, A. D. Howard, J. Moore, and J. Radebaugh. Alluvial Fan Morphology, Distribution, and Formation on Titan. *Icarus* 2016

[73] M. Malaska, R. L. Lopes D. A. Williams, **A. G. Hayes**, A. M. Shoenfield, M. A. Janssen, A. Le Gall, A. Solomindou, J. Radebaugh, C. D. Neish, S. P. D. Birch, J. Soderblom, T. G. Farr, E. P. Turtle. Geomorphological map of the Afekan Crater Region, Titan: Terrain Relationships in Titan's Equatorial and Mid-Latitudes. *Icarus* 2016

[72] M. A. Janssen, A. Le Gall, R. M. Lopes, R. D. Lorenz, M. Malaska, **A. G. Hayes**, C. D. Neish, A. Solomonidou, K. L. Mitchell, J. Radebaugh, S. J. Keihm, M. Choukroun, C. Leyrat, P. J. Encrenaz, and M. Mastrogiuseppe. Titan's Surface at 2.18-cm Wavelength Imaged by the Cassini RADAR Radiometer Results and Interpretations through the First Ten Years of Observation. *Icarus* 2016

[71] R. M. Lopes, M. Malaska, A. Solomonidou, A. Le Gall, M. A. Janssen, C. D. Neish, E. P. Turtle, S. P. D. Birch, **A. G. Hayes**, J. Radebaugh, A. Coustenis, B. W. Stiles, R. L. Kirk, K. L. Mitchell, E. R. Stofan, K. J. Lawrence. Nature, Distribution, and Origin of Titan's Undifferentiated Plains. *Icarus* 2016

[70] L. E. Bonnefoy*, **A. G. Hayes**, P. O. Hayne, M. J. Malaska. Constraining the spectral properties of Titan's dunes and interdunes through a combined analysis of Cassini RADAR and VIMS. *Icarus* 2016

[69] R. J. Michaelides*, **A. G. Hayes**, M. Mastrogiuseppe, H. A. Zebker, T. G. Farr, M. J. Malaska, V. Poggiali. Constraining the physical properties of Titan's empty lake basins from nadir and off-nadir radar backscatter. *Icarus* 2016

[68] M. Malaska, R. L. Lopes **A. G. Hayes**, J. Radebaugh, J. W. Barnes, R. D. Lorenz, E. Turtle. Material flux map of Titan: the fate of dunes. *Icarus* 2016

[67] M. Mastrogiuseppe*, **A. G. Hayes**, V. Poggiali, R. D. Lorenz, L.I. Lunine, G. Picardi, R. Sue, E. Flamini, G. Mitri, C. Notarnicola, P. Paillou, and H. Zebker. A Bayesian Method for Recovering the Depth and Composition of Titan's Lakes/Seas using the Cassini RADAR, *IEEE* 2016.

[66] Z. Zhang*, **A. G. Hayes** , M. Janssen, P. D. Nicholson, D. Dunn, and I. dePater, and J. Cuzzi. Clues to the Origin and Composition of Saturn's C-Ring from Passive Microwave Observations by Cassini, *Icarus* 2016

[65] O. Mousis, J. I. Lunine, **A. G. Hayes**, J. D. Hofgartner. The Fate of Ethane in Titan's Hydrocarbon Lakes and Seas, *Icarus* 2016.

[64] M. Adamkovics, J. L. Mitchell, **A. G. Hayes**, P. Rojo, P. Corlies, and J. W. Barnes. Meridional variation in tropospheric methane on Titan observed with AO spectroscopy at Keck and VLT, *Icarus* 2016.

[63] J. Radebaugh, J.W. Barnes, R. D. Lorenz, **A. G. Hayes,** K. Arnold, C. Chandler. Alluvial Plains on Titan, *Planetary Science* 2015

[62] J.W. Barnes, R. D. Lorenz, J. Radebaugh, **A. G. Hayes,** K. Arnold, C. Chandler. Production and Global Transport of Titan's Sand Particles, *Planetary Science* 2015

[61] R. C. Ewing, G. McDonald, **A. G. Hayes**, Multi-Spatial Analysis of Aeolian Dune Field Patterns, *Geomorphology*, *BGS Special Issue* 2015

[60] R. C. Ewing, **A. G. Hayes**, A. Lucas. Sand Dune Patterns on Titan controlled by long-term climate cycles, *Nature Geosciences,* 2015

[59] A. Lucas, R. Rodriguez, C. Narteua, B. Charnay, T. Tokano, A. Garcia,, M. Thiriet, S. Courrech, **A. G. Hayes**, R. Lorenz, O. Aharonson. C. Ewing, G. McDonald, **A. G. Hayes**, Insight on growth mechanisms and dune orientation on Titan, *GRL* 2014

[58] J. D. Hofgartner*, **A. G. Hayes**, J. I. Lunine, H. Zebker, B. Stiles, C. Sotin, J. W. Barnes, B. H. Brown, P. Encrenaz, R. D. Kirk, A. Le Gall, R. M. Lopes, R .D. Lorenz, M. Malaska, K. L. Mitchell, P. Paillou, J. Radebaugh, E. Turtle, S. Wall, C. Wood, and the Cassini RADAR Team, Discovery of Transient Features in a Titan Sea, *Nature Geosciences*, 2014

[57] J. M. Lora, J. I. Lunine, J. L. Russell, **A. G. Hayes**, Simulations of Titan's Paleoclimate, *Icarus* 2014

[56] J. W. Barnes, C. S. Sotin, J. M. Soderblom, **A. G. Hayes**, M. Donelan, S. Rodriguez, S. L. Mouelic, K. H. Baines, T. B. McCord, Cassini/VIMS Observes Rough Surface on Titan's Punga Mare in Specular Reflection, *Planetary Science* 2014

[55] R. D. Lorenz, R.L. Kirk, **A. G. Hayes**, Y. Z. Anderson, J. I. Lunine, A RADAR Map of Titan's Seas: Application to Mission Studies and Oceanographic Studies. *Icarus* 2014

[54] G. Mitri, R. Orosei, **A. G. Hayes**, A. Coustenis, G. Fanchini, K. Khurana, J. P. Lebreton, R. Lopes, R. D. Lorenz, L. Iess, R. Meriggiola, M. L. Moriconi, C. Sotin, E. Stofan, T. Tokano, F. Tosi. The Exploration of Titan with an Orbiter and a Lake-Probe, *Planetary and Space Science* 2014

[53] H. Zebker, **A. G. Hayes**, M. Janssen, A. Le Gall, R. D. Lorenz, L. Wye. Surface of Ligeia Mare, Titan, from Cassini Altimeter and Radiometer Analysis, *GRL* 2014

[52] M. Mastrogiuseppe*, V. Poggiali, **A. G. Hayes**, R. D. Lorenz, L.I. Lunine, G. Picardi, R. Sue, E. Flamini, G. Mitri, C. Notarnicola, P. Paillou, and H. Zebker. The Bathymetry and Composition of a Titan Sea, *GRL* 2014

[51] M. Palucis, W. E. Dietrich, **A.G. Hayes,** D.Y. Sumner, C. Hardgrove, S. Gupta, and F. Calef, The origin and evolution of the Peace Vallis fan system that drains to the Curiosity landing area, Gale Crater, *JGR Planets* 2014

[50] A. Lucas, O. Aharonson, C. Deledalle, **A. G. Hayes**, R. Kirk, E. Howington-Kraus. Insights into Titan's geology and hydrology based on enhanced image processing of Cassini RADAR data *JGR Planets* 2014

[49] C. Culha***, A. G. Hayes**, M. Manga, and A. Thomas. Doule Ridges on Europa Accommodate Some of the Missing Surface Contraction, *JGR Planets* 2014

[48] G. Mitri, R. Meriggola, **A. G. Hayes**, G. Tobie, A. Genova, J. I. Lunine, and L. Iess. Shape, Topography, Gravity Anomalies, and Tidal Deformation on Titan, *Icarus* 2014

[47] R. D. Lorenz, B. W. Stiles, O. Aharonson, A. Lucas, **A. G. Hayes**, R. L. Kirk, A. Zebber, E. P. Turtle, F. Nimmo, C. D. Neish, J. W. Barnes, E. R. Stofan A Global Topographic Map of Titan, Icarus 2013.

[46] C. D. Neish, R. L. Kirk, R. D. Lorenz, V. Bray, P. Schenk, B. Stiles, E. P. Turtle, K. Mitchell, **A. G. Hayes** Crater Topography on Titan: Implications for Landscape Evolution, Icarus 2013.

[45] **A. G. Hayes**, R. D. Lorenz, M. Manga, M. A. Donelan, H. L. Tolman, W. W. Fischer, S. D. Graves, M. P. Lamb, J. I. Lunine, P. Encrenaz, O. Aharonson, and the Cassini RADAR Team. Wind driven capillary-gravity waves on Titan's Lakes: Hard to Detect or Non-Existent? Icarus 2013.

[44] R. M. C. Lopes, R. L. Kirk, K. L. Michell, A. LeGall, J. W. Barnes, **A. G. Hayes,** J. Kargel, L. Wye, J. Radebaugh, E. R. Stofan, M. A. Janssen, C. D. Neish, S. D. Wall, C. A. Wood, J. I. Lunine, and M. Malaska. Cryovolcanism on Titan: New Results from the Cassini RADAR and VIMS. Journal of Geophysical Research, Planets, 2013.

[43] R. D. Lorenz and **A. G. Hayes.** The Growth of Wind-Waves in Titan's Hydrocarbon Seas. Icarus 2012.

[42] B. Ventura, N. Claudia, D. Casarano, F. Posea, L. Wye, and **A. G. Hayes.** Electromagnetic models and inversion techniques for Titan's Ontario Lacus depth estimation from Cassini RADAR data. Icarus 2012.

[41] C. Sotin, K.J. Lawrence, B. Reinhardt, J. W. Barnes, R. H. Brown, **A. G. Hayes**, S. Le Mouelic, L. A. Soderblom, B. J. Buratti, R. N. Clark, R. Jaumann, J. M. Soderblom, K. Stephan, K. H. Baines, and P. D. Nicholson. Observations of Titan's northern lakes at 5 microns: Implications for the organic cycle and geology. Icarus 2012.

[40] A. Le Gall, **A. G. Hayes**, and R. C. Ewing, M. A. Janssen,J. Radebaugh, C. Savage, and P. Encrenaz. Latitudinal and altitudinal controls of Titan's dune field morphometry. Icarus, 2012.

[39] E. P. Turtle, J. E. Perry, **A. G Hayes**, R. D. Lorenz, J. W. Barnes, A. S. McEwen, R. A. West, T. L. Ray, A. D. Del Genio, J. M. Barbara, and E. L. Schaller. Extensive and Rapid Surface changes near Titan's equator: Evidence for April Showers? Science, 2011.

[38] A. Le Gall, M. A. Janssen, L. C. Wye, **A. G. Hayes,** H. Zebker, R. D. Lorenz, J. Radebough, J. I. Lunine, R. L. Kirk, R. M. C. Lopes, S. Wall, P. Callahan, E. R. Stofan, T. Farr, and the Cassini RADAR Team. Cassini SAR Radiometry, Scatterometry, and Altimetry Observations of Titan's Dune Fields Icarus, 2011.

[37] **A. G. Hayes,** J. Grotzinger, L. Edgar, W. Watters, S. Squyres, and J. Sohl-Dickstien. Reconstruction of Ancient Eolian Bed Forms and Paleo-Currents from Cross-Bedded Strata at Merdiani Planum, Mars. Journal of Geophysical Research: Planets, Vol. 116, E00F21, April 2011.

[36] J. W. Barnes, J. Bow, J. Schwartz, R. H. Brown, J. Soderblom, **A. G. Hayes**, S. Le Mou_elic, S. Rodriguez, C. Sotin, R. Jaumann, K. Stephan, L. A. Soderblom, R. N. Clark, B. J. Buratti, K. H. Baines, and P. D. Nicholson. Organic sedimentary deposits in Titan's dry lakebeds: Probable Evaporite. Icarus Letters, 2011.

[35] L. A. Edgar, J. P. Grotzinger, **A. G. Hayes**, D. M. Rubin, S. W. Squyres, J. F. Bell, and K. E. Herkenhoff. Stratigraphic Architecture of Bedrock Reference Section, Victoria Crater, Meridiani Planum, Mars. Journal of Sedimentary Research, 2011.

[34] **A. G. Hayes,** O. Aharonson, J. Lunine, H. Zebker, L. Wye, R. Lorenz, E. Turtle, P. Paillou,G. Mitri, S. Wall, E R. Stofan, C. Elachi, and The Cassini RADAR Team. Transient Surface Liquid in Titan's Polar Regions from Cassini. Icarus, vol. 211, January 2011

[33] E. P. Turtle, J. E. Perry, **A. G. Hayes,** and A. S. McEwen. Shoreline Retreat at Titan's Ontario Lacus and Arrakis Planitia from Cassini Imaging Science Subsystem Observations. Icarus Letters, January 2011.

[32] R. Lorenz, B. Stiles, **A. G. Hayes**, R. L. Kirk, P. Callahan, O. Aharonson, C. Wood, E. R. Stofan, J. Radebaugh, and K. L. Mitchell. Hypsometry on Titan. Icarus, vol. 211, January 2011

[31] W. A. Watters, J. F. Bell, J. Grant, J. P. Grotzinger, **A. G. Hayes,** R. Li, S. W. Squyres, and M. T. Zuber. Origin of the structure and planform shape of small impact craters in fractured targets: Edurance Crater at Meridiani Planum, Mars. Icarus, vol. 211, January 2011.

[30] **A. G. Hayes,** A. S. Wolf, O. Aharonson, H. Zebker, R. Lorenz, P. Paillou, S. Wall, and C. Elachi. Bathymetry and Absorptivity of Titan's Ontario Lacus. Journal of Geophysical Research: Planets, Vol. 115, E09009, September 2010.

[29] J. Radebaugh, R.D. Lorenz, S.D. Wall, R.L. Kirk, C.A. Wood, J.I. Lunine, E.R. Stofan, R.M.C. Lopes, P. Valora, T.G. Farr, **A. G. Hayes**, B. Stiles, G. Mitri, H. Zebker, M. Janssen, L. Wye, A. Le Gall, K.Mitchell, F. Paganelli and the Cassini RADAR Team 2010. Regional geomorphology and history of Titan's Xanadu province. Icarus, 2010 (in press).

[28] **A. G. Hayes**, Exploring Lakes on Titan. Astronomy Beat, Astronomy Society of the Pacific, Vol. 56, 20 September 2010.

[27] R. D. Lorenz, B. Jackson, and **A. G. Hayes. .** Racetrack and Bonnie Claire: southwestern US playa lakes as analogs for Ontario Lacus, Titan. Planetary and Space Science, 58:724-731, March 2010.

[26] S. Wall, **A. G. Hayes,** C. Bristow, R. Lorenz, E.R. Stofan, J. Lunine, A. Le Gall, M. Janssen, R.L. Lopes, L. Wye, L. Soderblom, P. Paillou, O. Aharonson, H. Zebker, T. Farr, G. Mitri, R. Kirk, K. Mitchell, C. Notarnicola, D. Casarano, and B. Ventura. Active shoreline of Ontario Lacus, Titan: A morphological study of the lake and its surroundings. Geophysical Research Letters, 37:5202, March 2010.

[25] A. Le Gall, M. A. Jansen, L. C. Wye, **A. G. Hayes**, R. D. Lorenz, J. Radebaugh, and B. Stiles. Modeling observations of variations among Titan's dunes. Icarus 2010 (submitted).

[24] R. M. C. Lopes, E. R. Stofan, R. Peckyno, J. Radebaugh, K. L. Mitchell, G. Mitri, C. A. Wood, R. L. Kirk, S. D. Wall, J. I. Lunine, **A. G. Hayes,** R. Lorenz, T. Farr, L. Wye, J. Craig, R. J. Ollerenshaw, M. Janssen, A.

Legall, F. Paganelli, R. West, B. Stiles, P. Callahan, Y. Anderson, P. Valora, L.A. Soderblom, and Cassini RADAR Team. Distribution and interplay of geologic processes on Titan from Cassini radar data. Icarus, 205:540-558, February 2010.

[23] O. Aharonson, **A. G. Hayes,** J.I. Lunine, R.D. Lorenz, M.D. Allison, and C. Elachi. An asymmetric distribution of lakes on Titan as a possible consequence of orbital forcing. Nature Geosciences, 2:851-854, November 2009.

[22] S. W. Squyres, A. H. Knoll, R. E. Arvidson, J. W. Ashley, J. F. Bell, III, W. M. Calvin, P. R. Christensen, B. C. Clark, B. A. Cohen, P. A. de Souza, Jr., L. Edgar, W. H. Farrand, I. Fleischer, R. Gellert, M. P. Golombek, J. Grant, J. Grotzinger, **A. G. Hayes**, K. E. Herkenhoff, J. R. Johnson, B. Jolliff, G. Klingelhöfer, A. Knudson, R. Li, T. J. McCoy, S. M. McLennan, D. W. Ming, D. W. Mittlefehldt, R. V. Morris, J. W. Rice, Jr., C. Schröder, R. J. Sullivan, A. Yen, and R. A. Yingst Exploration of Victoria Crater by the Mars Rover Opportunity, Science **324** (5930), May 2009

[21] B. W. Stiles, S. Hensley, Y. Gim, D. M. Bates, R. L. Kirk, **A. G. Hayes**, J. Radebaugh, R. D. Lorenz, K. L. Mitchell, P. S. Callahan, H. Zebker, W. T. K. Johnson, S. D. Wall, J. I. Lunine, C. A. Wood, M. Janssen, F. Pelletier, R. D. West, C. Veeramacheneni, and the Cassini RADAR Team. Determining Determining Titan surface topography from Cassini SAR data. Icarus, 202:584-598, August 2009.

[20] **A. G. Hayes,** O. Aharonson, P. Callahan, C. Elachi, Y. Gim, R. Kirk, K. Lewis, R. Lopes, R. Lorenz, J. Lunine, K. Mitchell, G. Mitri, E. Stofan, and S. Wall. Hydrocarbon lakes on Titan: Distribution and interaction with a porous regolith. Geophysical Research Letters, 35:9204, May 2008.

[19] R. L. Kirk, E. Howington-Kraus, B. L. Redding, T. L. Becker, E. M. Lee, B. W. Stiles, S. Hensley, **A. G. Hayes,** R. M. Lopes, K. L. Lorenz, K. L. Mitchell, J. Radebaugh, F. Paganelli, L. A. Soderblom, E. R. Stofan, C. A. Wood, S. D. Wall, and the Cassini Radar Team. High Resolution Topographic Models of Titan's Surface Derived by Radar Stereogrammetry with a Rigorous Sensor Model. Icarus, 2010 (submitted).

[18] R. D. Lorenz, K. L. Mitchell, R. L. Kirk, **A. G. Hayes,** O. Aharonson, H. A. Zebker, P. Paillou, J. Radebaugh, J. I. Lunine, M. A. Janssen, S. D. Wall, R. M. Lopes, B. Stiles, S. Ostro, G. Mitri, and E. R. Stofan. Titan's inventory of organic surface materials. Geophysical Research Letters, 35:2206, January 2008.

[17] R. M. C. Lopes, K. L. Mitchell, S. D. Wall, G. Mitri, M. Janssen, S. Ostro, R. L. Kirk, **A. G. Hayes**, E. R. Stofan, J. I. Lunine, R. D. Lorenz , C. Wood, J. Radebaugh, P. Paillou, H. Zebker, And F. Paganelli, The Lakes and Seas of Titan. Eos, Vol. 88, No. 51, Pp. 569-576, 18 December, 2007

[16] M. Brown, **A. G. Hayes,** K. Anderson, J. James, and D. C. Harrison. Spectral radiant emission of dynamic resistive arrays. In Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, volume 6544 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, April 2007.

[15] J. R. Johnson, W. M. Grundy, M. T. Lemmon, J. F. Bell, M. J. Johnson, R. Deen, R. E. Arvidson, W. H. Farrand, E. Guinness, **A. G. Hayes,** K. E. Herkenhof, F. Seelos, J. Soderblom, and S. Squyres. Spectrophotometric properties of materials observed by Pancam on the Mars Exploration Rovers: 2. Opportunity. Journal of Geophysical Research (Planets), 111:12, December 2006.

[14] J. R. Johnson, W. M. Grundy, M. T. Lemmon, J. F. Bell, M. J. Johnson, R. G. Deen, R. E. Arvidson, W. H. Farrand, E. A. Guinness, **A. G. Hayes,** K. E. Herkenhof, F. Seelos, J. Soderblom, and S. Squyres. Spectrophotometric properties of materials observed by Pancam on the Mars Exploration Rovers: 1. Spirit. Journal of Geophysical Research (Planets), 111:2, February 2006.

[13] **A. G. Hayes,** F. J. Caraco, D. C. Harrison, and J. M. Sorvari. Characterization and comparison of 128x128 element nuclear optical dynamic display system resistive arrays. In Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, volume 6208 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, June 2006.

[12] **A. G. Hayes,** G. Downs, A. Gabrielson, D. C. Harrison, E. L. Hines, L. A. Jiang, J. M. Richardson, and J. Swenson. The seeker experimental system at MIT Lincoln Laboratory. In Society of Photo Optical Instrumentation Engineers (SPIE) Conference Series, volume 6208 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, June 2006.

[11] J. M. Richardson, J. C. Aldridge, D. C. Harrison, **A. G. Hayes,** E. L. Hines, L. A. Jiang, and K. I. Schultz. The Standof Aerosol Active Signature Testbed (SAAST) at MIT Lincoln Laboratory. In Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, volume 6239 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, June 2006.

[10] L. A. Jiang, D. R. Schue, D. C. Harrison, **A. G. Hayes,** E. L. Hines, J. M. Richardson, and K. J. Schultz. Active Range of the Optical Systems Test Facility at MIT Lincoln Laboratory. In Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, volume 6214 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, June 2006.

[9] D. C. Harrison, **A. G. Hayes,** L. A. Jiang, E. L. Hines, and J. M. Richardson. The MIT Lincoln Laboratory optical systems test facility. In Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, volume 6208 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, June 2006.

[8] P. R. Christensen, M. B. Wyatt, T. D. Glotch, A. D. Rogers, S. Anwar, R. E. Arvidson, J. L. Bandfeld, D. L. Blaney, C. Budney, W. M. Calvin, A. Fallacaro, R. L. Fergason, N. Gorelick, T. G. Graf, V. E. Hamilton, **A. G. Hayes,** J. R. Johnson, A. T. Knudson, H. Y. McSween, G. L. Mehall, L. K. Mehall, J. E. Moersch, R. V. Morris, M. D. Smith, S. W. Squyres, S. W. Ruf, and M. J. Wolf. Mineralogy at Meridiani Planum from the Mini-TES Experiment on the Opportunity Rover. Science, 306:1733-1739, December 2004.

[7] K. E. Herkenhof, S. W. Squyres, R. Arvidson, D. S. Bass, J. F. Bell, P. Bertelsen, B. L. Ehlmann, W. Farrand, L. Gaddis, R. Greeley, J. Grotzinger, **A. G. Hayes,** S. F. Hviid, J. R. Johnson, B. Jollif, K. M. Kinch, A. H. Knoll, M. B. Madsen, J. N. Maki, S. M. McLennan, H. Y. McSween, D. W. Ming, J. W. Rice, L. Richter, M. Sims, P. H. Smith, L. A. Soderblom, N. Spanovich, R. Sullivan, S. Thompson, T. Wdowiak, C. Weitz, and P. Whelley. Evidence from Opportunity's Microscopic Imager for Water on Meridiani Planum. Science, 306:1727-1730, December 2004.

[6] J. F. Bell, S. W. Squyres, R. E. Arvidson, H. M. Arneson, D. Bass, W. Calvin, W. H. Farrand, W. Goetz, M. Golombek, R. Greeley, J. Grotzinger, E. Guinness, **A. G. Hayes,** M. Y. H. Hubbard, K. E. Herkenhof, M. J. Johnson, J. R. Johnson, J. Joseph, K. M. Kinch, M. T. Lemmon, R. Li, M. B. Madsen, J. N. Maki, M. Malin, E. McCartney, S. McLennan, H. Y. McSween, D. W. Ming, R. V. Morris, E. Z. N. Dobrea, T. J. Parker, J. Proton, J. W. Rice, F. Seelos, J. M. Soderblom, L. A. Soderblom, J. N. Sohl-Dickstein, R. J. Sullivan, C. M. Weitz, and M. J. Wolf. Pancam Multispectral Imaging Results from the Opportunity Rover at Meridiani Planum. Science, 306:1703-1709, December 2004.

[5] K. E. Herkenhof, S. W. Squyres, R. Arvidson, D. S. Bass, J. F. Bell, P. Bertelsen, N. A. Cabrol, L. Gaddis, **A. G. Hayes,** S. F. Hviid, J. R. Johnson, K. M. Kinch, M. B. Madsen, J. N. Maki, S. M. McLennan, H. Y. McSween, J. W. Rice, M. Sims, P. H. Smith, L. A. Soderblom, N. Spanovich, R. Sullivan, and A.Wang. Textures of the Soils and Rocks at Gusev Crater from Spirit's Microscopic Imager. Science, 305:824-827, August 2004.

[4] J. F. Bell, S. W. Squyres, R. E. Arvidson, H. M. Arneson, D. Bass, D. Blaney, N. Cabrol, W. Calvin, J. Farmer, W. H. Farrand, W. Goetz, M. Golombek, J. A. Grant, R. Greeley, E. Guinness, **A. G. Hayes,** M. Y. H. Hubbard, K. E. Herkenhof, M. J. Johnson, J. R. Johnson, J. Joseph, K. M. Kinch, M. T. Lemmon, R. Li, M. B. Madsen, J. N. Maki, M. Malin, E. McCartney, S. McLennan, H. Y. McSween, D. W. Ming, J. E. Moersch, R. V. Morris, E. Z. Noe Dobrea, T. J. Parker, J. Proton, J. W. Rice, F. Seelos, J. Soderblom, L. A. Soderblom, J. N. Sohl-Dickstein, R. J. Sullivan, M. J. Wolf, and A. Wang. Pancam Multispectral Imaging Results from the Spirit Rover at Gusev Crater. Science, 305:800-807, August 2004.

[3] P. R. Christensen, S. W. Ruf, R. L. Fergason, A. T. Knudson, S. Anwar, R. E. Arvidson, J. L. Bandfield, D. L. Blaney, C. Budney, W. M. Calvin, T. D. Glotch, M. P. Golombek, N. Gorelick, T. G. Graf, V. E. Hamilton, **A. G. Hayes,** J. R. Johnson, H. Y. McSween, G. L. Mehall, L. K. Mehall, J. E. Moersch, R. V. Morris, A. D. Rogers, M. D. Smith, S. W. Squyres, M. J. Wolf, and M. B. Wyatt. Initial Results from the Mini-TES Experiment in Gusev Crater from the Spirit Rover. Science, 305:837-842, August 2004.

[2] J. F. Bell, S. W. Squyres, K. E. Herkenhof, J. N. Maki, H. M. Arneson, D. Brown, S. A. Collins, A. Dingizian, S. T. Elliot, E. C. Hagerott, **A. G. Hayes,** M. J. Johnson, J. R. Johnson, J. Joseph, K. Kinch, M. T. Lemmon, R. V. Morris, L. Scherr, M. Schwochert, M. K. Shepard, G. H. Smith, J. N. Sohl-Dickstein, R. J. Sullivan, W. T. Sullivan, and M. Wadsworth. Mars Exploration Rover Athena Panoramic Camera (Pancam) investigation. Journal of Geophysical Research (Planets), 108:8063, November 2003.

[1] K. E. Herkenhof, S. W. Squyres, J. F. Bell, J. N. Maki, H. M. Arneson, P. Bertelsen, D. I. Brown, S. A. Collins, A. Dingizian, S. T. Elliott, W. Goetz, E. C. Hagerott, **A. G. Hayes,** M. J. Johnson, R. L. Kirk, S. McLennan, R. V. Morris, L. M. Scherr, M. A. Schwochert, L. R. Shiraishi, G. H. Smith, L. A. Soderblom, J. N. Sohl-Dickstein, and M. V. Wadsworth. Athena Microscopic Imager investigation. Journal of Geophysical Research (Planets), 108:8065, November 2003.

INVITED SEMINARS

[62] *Colloquium, NSF REU Astronomy Consortium,* Virtual / Multi-Institution, June 2020

[61] *Colloquium, Department of Astronomy,* University of Rochester, Rochester, NY, April 2020

[60] *Ansatz;* Bethe House, Cornell University, November 2019

[59] *Margaritz Seminar;* Weizmann Institute of Science, Rehovot, Israel, November 2019

[58] *Special Colloquium;* II-VI Optical Systems, Tustin CA, July 2018

[57] *Interdisciplinary Lecture; COSPAR*, Pasadena CA, July 2018

[56] *Invited Review*; Exo-Ocean Workshop, International Space Science Institute, Bern, Switzerland, June 2018

[55] *Featured Lecture*; Cornell REUNION 2018, Ithaca, NY, June 2018

[54] *Science and Suds*; Lime Hollow & Cortland Beer Company, Cortland, NY, May 2018

[53] *Colloquium, University of Maryland*, College Park MD, April 2018

[52] *Colloquium, Planetary Sciences Directorate; South West Research Institute*, Boulder CO, July 2017

[51] *Annual Meeting of New Champions;* World Economic Forum, Dalian, People's Republic of China, June 2017

[50] *Fuertes Observatory Colloquium Series*; Cornell Astronomical Society, Ithaca NY, April 2017

[49] *Colloquium, Department of Earth and Environmental Science;* University of Illinois, Chicago, IL, April 2017

[48] *Planetary Science Seminar, Division of Geological and Planetary Sciences;* Caltech, Pasadena, CA, Feb. 2017

[47] *NASA Hyperwall;* GSA Poster Hall, Denver, CO, September 2016

[46] *Science Cabaret;* Cultivare, Ithaca, NY, September 2016

[45] *Academy Day Speaker, The International Academy of Aeronautics;* Istanbul, Turkey, July 2016 (**Canceled**)

[44] *Science Colloquium;* Jet Propulsion Laboratory, Pasadena, CA, April 2016

[43] *TEDx CornellTech2016;* New York, NY, April 2016

[42] *Planetary Seminar, Department of Earth and Atmospheric Sciences;* Georgia Tech, Atlanta, GA, April 2016

[41] *Colloquium, Department of Physics;* SUNY Albany, Albany, NY, March 2016

[40] *Invited Instructor, Titan Oceanography;* AGU Ocean Science Meeting, New Orleans, LA, February 2016

[39] *Colloquium, Department of Physics;* Louisiana State University, Baton Rouge, LA, February 2016

[38] *Invited Review, Planetary Systems: A Synergistic View;* Rencontres du Vietnam, Quy Nhon, July 2015

[37] *Colloquium, Department of Planetary Sciences;* University of Arizona, Tucson, AZ, April 2015
[36] *Invited Speaker, 10 Years after Huygens Landing: Titan Workshop;* ASI, Tor Vergata, Italy, January 2015
[35] *Department Seminar, Department of Geosciences;* SUNY Stony Brook, Stony Brook, NY, January 2015
[34] *Invited Review,* 45th *Binghamton Geomorphology Symposium;* Knoxville, TN, October 2014
[33] *Invited Speake*r, *Star Fest;* Rochester Academy of Sciences*;* Rochester, NY, July 2014
[32] *Invited Review, Titan Through Time III,* John's Hopkins Applied Physics Lab*;* Laurel, MD, April 2014
[31] *Colloquium, Astronomy Department ;* Cornell University, Ithaca NY, March 2014
[30] *Colloquium, Planetary Science Directorate;* South West Research Institute, Boulder CO, February 2014
[29] *Department Seminar, Division of Geological and Planetary Sciences;* Caltech, Pasadena CA, January 2014
[28] *Division Seminar, Division of Geological and Planetary Sciences;* Caltech, Pasadena CA, January 2014
[27] *Planetary Lunch Seminar, Astronomy Department;* Cornell University, Ithaca NY, September 2013
[26] *Class of 2003 10-Year Reunion;* Cornell University, Ithaca NY, June 2013
[25] *Featured Speaker, Dean's Advisory Council Dinner*, Cornell University; Ithaca, NY, May 2013
[24] *Cassini Project Science Office; Cassini-Huygens Analysis and Results from the Mission (CHARM);* April 2013
[23] *Colloquium, Earth and Atmospheric Sciences;* Cornell University, Ithaca NY, January 2013
[22] *Planetary Lunch Seminar, Astronomy Department;* Cornell University, Ithaca NY, January 2013
[21] *Lunch Seminar, Miller Inst. for Basic Research in Science;* Univ. of California, Berkeley CA, October 2012
[20] *Colloquium, Earth and Planetary Sciences;* University of California, Santa Cruz CA, May 2012
[19] *Colloquium, Space Department;* Johns Hopkins Univ. Applied Physics Lab., Laurel MD, March 2012
[18] *Colloquium, Geology Department;* University of California, Davis CA, January 2012
[17] *SETI Seminar Series;* SETI Institute, Mountain View, CA, January 2012
[16] *CIPS Seminar Series;* Astronomy Department, University of California, Berkeley, CA, December 2011
[15] *East Bay Astronomical Society;* Chabot Space and Science Center, Oakland, CA, December 2011
[14] *Colloquium*, *Department of Geological Sciences;* University of Alabama, Birmingham, AL, November 2011
[13] *Joint EPS/Astronomy Colloquium*; University of California, Berkeley, CA, September 2011
[12] *Aerospace Research Laboratories Colloquium Series;* Northrupp Grumman, El Segundo, CA, May 2011
[11] *Planetary Science Seminar Series;* Jet Propulsion Laboratory, Pasadena, CA, May 2011
[10] *Special Colloquium, Astronomy Department;* Cornell University, Ithaca NY, March 2011
[9] *EAS Seminar Series*; *Department of Earth and Atmospheric Sciences*, Purdue University, February 2011
[8] *Planetary Lunch Seminar*; *Dept. of Earth and Space Sciences,* University of California, LA, CA, January 2011
[7] *Colloquium; NASA Astrobiology Inst. Icy Satellites Environments*, JPL, Pasadena, CA, September 2010.
[6] *Chairman's Counsel Colloquium; Division of Geological & Planetary Sci.*, Caltech, Pasadena CA, June 2010
[5] *Future Missions to Titan: Scientific and Engineering Challenges;* Keck Institute, Pasadena, CA, May 2010.
[4] *Colloquium; Department of Geophysics*, Stanford University; Stanford, CA, April 2010.
[3] *Dinner Speaker, Outer Planets Assessment Group*; St. Regis Hotel, Washington, D.C., February 2010.
[2] *Colloquium; Institute of Earth Sciences*, Hebrew University; Jerusalem, Israel, July 2009.
[1] *Yuk Yung Lunch Seminar*; *Division of Geological and Planetary Sciences*, Caltech, Pasadena, CA, March 2009

SELECT ADVISEE CONFERENCE ABSTRACTS / PROCEEDINGS

[56] A. Dobbs, **A. G. Hayes**, et al., Geomorphologic Characterizations of Comet 67P/Churyumov--Gerasimenko, *AAS 233*, Long Beach, CA, January 2019

[55] J. Miller, **A. G. Hayes**, et al., A New Look at Titan's Channels: Mapping from Radar on Earth and Titan, *AGU*, Washington D. C., December 2018

[54] S. Birch, **A. G. Hayes**, et al., Migrating Scarps in the Hapi Region on Comet 67P/Churyumov-Gerasimenko, *AGU*, Washington D. C., December 2018

[53] V. Poggiali, **A. G. Hayes**, et al., Canyons on Titan: New insights by the Cassini radar altimeter, *COSPAR*, Pasadena, CA, July 2018

[52] C. Tate, **A. G. Hayes**, et al., Titan Clouds Observable Only In The Near-Infrared, *COSPAR*, Pasadena, CA, July 2018

[51] A. Jindal, **A. G. Hayes**, et al., Unveiling the Interior of Venus: Using tectonic deformations along canali to constrain lithospheric structure & mantle convection, *COSPAR*, Pasadena, CA, July 2018

[50] V. Poggiali, **A. G. Hayes**, et al., Improved retrieval of Titan surface topography from the delay-Doppler algorithm applied to Cassini RADAR altimeter data, *COSPAR*, Pasadena, CA, July 2018

[49] S. P. D. Birch, **A. G. Hayes**, et al., Raised Rims around Titan's Small Lakes, *COSPAR*, Pasadena, CA, July 2018

[48] S. P. D. Birch, **A. G. Hayes**, et al., Developing a General Understanding of the Evolution of Cometary Landscapes through Numerical Simulations, *COSPAR*, Pasadena, CA, July 2018

[47] P. Corlies, **A. G. Hayes**, et al., Returning to Titan: Assessing Titan's Transmission for Future Missions, *COSPAR*, Pasadena, CA, July 2018

[46] P. Corlies, **A. G. Hayes**, et al., A Complete Analysis of Titan's Clouds as Observed by Cassini VIMS, *COSPAR*, Pasadena, CA, July 2018

[45] J. Kelland, **A. G. Hayes**, et al., Analyzing the dynamic and morphological characteristics of clouds on Titan using the Cassini VIMS, *COSPAR*, Pasadena, CA, July 2018

[44] N. Kutsop, **A. G. Hayes**, et al., The Geomorphology and Composition of Titan's Surface: Combining the Spatial Information of Cassini RADAR with the Spectral Information of Cassini VIMS, *COSPAR*, Pasadena, CA, July 2018

[43] N. Kutsop, **A. G. Hayes**, et al., Pluto's Haze Properties from disk integrated New Horizons MVIC Observations, *COSPAR*, Pasadena, CA, July 2018

[42] S.P.D. Birch, **A. G. Hayes**, et al., The Raised Rims of Titan's Small Lakes, *LPSC 49*, The Woodlands, TX, March 2018.

[41] S.P.D. Birch, **A. G. Hayes**, et al., Evolution of the Landscapes of Comet 67P/Churyumov Gerasimenko, *LPSC 49*, The Woodlands, TX, March 2018.

[40] F. Nicols-Fleming, **A. G. Hayes**, et al., Tracking Short-Term Variations in Titan's Haze Distribution, *LPSC 49*, The Woodlands, TX, March 2018.

[39] P. Corlies, **A. G. Hayes**, et al., Transmission of Titan's Atmosphere in Application to Future Missions, *LPSC 49*, The Woodlands, TX, March 2018.

[38] N. Kutsop, **A. G. Hayes**, et al., Pluto's haze properties from disk integrated New Horizons MVIC observations *AGU,* New Orleans, LA, December 2017.

[37] S. P. D. Birch, **A. G. Hayes**, et al., Sediment Transport and Landscape Evolution on Comet 67P/Churyumov-Gerasimenko. *AGU,* New Orleans, LA, December 2017.

[36] V. Poggiali, **A.G. Hayes**, et al., Revealing Titan's Dunes through Delay-Doppler Processing of the Cassini Radar Altimeter Dataset. *AGU,* New Orleans, LA, December 2017.

[35] C. Corlies, **A. G. Hayes**, et al., A Report of Clouds on Titan, *DPS*, Provo, UT, October 2017.

[34] J. Kelland, **A. G. Hayes**, et al., Analyzing the Dynamic and Morphological Characteristics of Clouds on Titan using the Cassini VIMS Dataset, *DPS*, Provo, UT, October 2017.

[33] V. Poggiali, **A.G. Hayes**, et al., Delay-Doppler Processing of the Cassini Radar Altimeter Dataset. *LPSC,* The Woodlands, TX, March 2017.

[32] S. P. D. Birch, **A.G. Hayes**, et al., Geomorphology of Comet 67P/Churyumov-Gerasimenko, *LPSC,* The Woodlands, TX, March 2017.

[31] S. P. D. Birch, **A.G. Hayes**, et al., Morphologic Evidence that Titan's Southern Hemisphere Basins are Paleoseas, *LPSC,* The Woodlands, TX, March 2017.

[30] P. Corlies, **A. G. Hayes**, et al., An Updated Approximation of Titan's Global Topography, *LPSC,* The Woodlands, TX, March 2017.

[29] P. Corlies, **A. G. Hayes**, et al., Determining Titan's Cloud Altitude and Opacity in the Cassini VIMS Dataset, *LPSC,* The Woodlands, TX, March 2017.

[28] J. Kelland, **A. G. Hayes**, et al., Analyzing Cloud Locations and Characteristics on Titan with Cassini VIMS, *LPSC,* The Woodlands, TX, March 2017.

[27] H. Tang, **A. G. Hayes**, et al., Boulder Counting on Comet 67P/Churyumov-Gerasimenko, *LPSC,* The Woodlands, TX, March 2017.

[26] P. Corlies, **A. G. Hayes**, et al., Orographic Condensation at the South Pole of Titan, DPS, Pasadena, CA, October 2016.

[25] M. Mastrogiuseppe, **A. G. Hayes**, et al., Sounding the Seas of Titan: Updates on the Depth and Composition of Kraken Mare, Ligeia Mare, Punga Mare, and Ontario Lacus. *EGU,* Vienna, Austria, April 2016.

[24] B. Hadnott, **A.G. Hayes**, et al., Characterization of the Temperature Dependence of O-H Vibrational Modes in Hydrated and Hydroxylated Minerals, with Application to Planetary Exploration. *LPSC*, The Woodlands, TX, March 2016.

[23] B. Hadnott, **A.G. Hayes**, et al., Near Infrared Spectroscopy of Liquid Hydrocarbon Mixtures: Application for In-Situ Titan Lake Missions. *LPSC*, The Woodlands, TX, March 2016.

[22] S. P. D. Birch, **A. G. Hayes** et al., Geomorphology of Titan's Polar Terrains: Constraining Surface Processes, *AGU,* San Francisco, CA, Dec. 2015.

[21] B. Hadnott, R. Hodyss, **A.G. Hayes**, et al., Near Infrared Spectroscopy of Liquid Hydrocarbon Mixtures for Understanding the Composition of Titan's Lakes, *DPS*, Washington, D.C., November 2015.

[20] Z. Zhang, **A. G. Hayes** et al., VLA Observations of Saturn's Rings, *DPS*, Washington, D.C., November 2015.

[19] P. Corlies, **A. G. Hayes** et al., Using the VIMS Dataset to Understand Titan's Hydrologic Cycle Through Cloud Characterization, *DPS,* Washington, D.C., November 2015.

[18] S. P. D. Birch, **A. G. Hayes** et al., Hydrologic Processes on the Surface of Titan, *Rencontres du Vietnam, Planetary Systems: A Synergistic View,* Quy Nhon, Vietnam, July 2015.

[17] J. Hofgartner, **A. G. Hayes** et al., Observing Dynamic Processes in Titan's Surface Liquids, *Rencontres du Vietnam, Planetary Systems: A Synergistic View,* Quy Nhon, Vietnam, July 2015.

[16] Z. Zhang, **A. G. Hayes** et al., Microwave Observations of Saturn's Rings, *LPSC,* The Woodlands, TX, March 2015.

[15] L. Bonnefoy, **A. G. Hayes** et al., Composition of Titan's Dunes from Combining Cassini RADAR and VIMS, *LPSC,* The Woodlands, TX, March 2015.

[14] R. J. Michaelides, **A. G. Hayes** et al., Determining the physical properties of Titan's empty lake basins from radar backscatter modeling, *LPSC,* The Woodlands, TX, March 2015.

[13] J. Hofgartner, **A. G. Hayes** et al., Titan's Magic Island: Transient Features in a Titan Sea, *LPSC,*The Woodlands, TX, March 2015.

[12] J. Hofgartner, **A. G. Hayes** et al., Titan's Magic Island: Transient Features in a Titan Sea, *AGU,* San Francisco, CA, Dec. 2014. **[invited]**

[11] J. Hofgartner, D. B. Campbell, **A. G. Hayes,** J. I. Lunine, Specular Reflections from Titan's Equatorial Region: Solving the Decade Old Mystery, *AGU,* San Francisco, CA, Dec. 2014.

[10] S. P. D. Birch, **A. G. Hayes** et al., Geomorphologic Mapping of Titan's Poles, *AGU,* San Francisco, CA, Dec. 2014.

[9] P. Corlies, **A. G. Hayes** et al., Ground Based Monitoring of Cloud Activity on Titan, *DPS,* Tucson, AZ, October 2014.

[8] Z. Zhang, **A. G. Hayes** et al., Microwave Observations of Saturn's Rings, *DPS,* Tucson, AZ, October 2014.

[7] J. Hofgartner, **A. G. Hayes** et al., The Case of Titan's Mysterious New Island: Analysis of Anonymously Bright Features in the Cassini T92 Pass over Titan's Ligeia Mare. *LPSC*, The Woodlands, TX, March 2014.

[6] G. McDonald, **A. G. Hayes** et al., Examining Effects of Orbital Forcing on Titan's Dune Orientations. *LPSC*, The Woodlands, TX, March 2014.

[5] R. J. Michaelides, **A. G. Hayes** et al., Determining physical properties of Titan's empty lake basins through radar backscatter modeling. *LPSC*, The Woodlands, TX, March 2014.

[4] J. Hofgartner, **A. G. Hayes** et al., The Case of Titan's Mysterious New Island: Analysis of Anonymously Bright Features in the Cassini T92 pass over Titan's Ligeia Mare. *AGU*, San Francisco, CA, Dec. 2013.

[3] C. Chula, **A. G. Hayes** et al., Doulbe-Ridges on Europa can Accommodate Some of the Missing Surface Contraction. *AGU*, San Francisco, CA, Dec. 2013.

[2] Z. Zhang, **A. G. Hayes** et al., Saturn's Rings in the Microwave with Cassini, *DPS*, Denver, CO, Oct. 2013.

[1] C. Chula, **A. G. Hayes** et al., Identifying Contraction and Expansion Along Double Ridges and Bands on Europa with Strike-Slip Displacement. *LPSC*, The Woodlands, TX, March 2013.

CONFERENCE ABSTRACTS / PROCEEDINGS

[41] **A. G. Hayes** et al., Titan's Methane Cycle, *COSPAR,* Pasadena, CA, July 2018 [**invited**]

[40] **A. G. Hayes** et al., The CAESAR New Frontiers Mission, *COSPAR,* Pasadena, CA, July 2018 [**invited**]

[39] **A. G. Hayes** et al., The CAESAR New Frontiers Mission 3 TAG Site Selection and Camera Suite, *LPSC 49*, The Woodlands, TX, Mar. 2018.

[38] **A. G. Hayes** et al., Wind, Waves, and Magic Islands at Titan's Largest Sea: Kraken Mare, *LPSC 49*, The Woodlands, TX, Mar. 2018.

[37] **A. G. Hayes** et al., The CAESAR New Frontiers Mission 3 TAG Site Selection and Camera Suite, *LPSC 49*, The Woodlands, TX, Mar. 2018.

[36] **A. G. Hayes** et al., Topographic Constraints on the Connectivity and Formation of Titan's Lakes. *AGU*, New Orleans, LA, Dec. 2017

[35] **A. G. Hayes** et al., Modeling and Observing the Role of Wind-Waves on Titan's Hydrocarbon Seas: Adding Anemometry to Cassini's Repertoire, *LPSC*, The Woodlands, TX, March. 2017

[34] **A. G. Hayes** et al., Wind-Waves on Titan. *AGU*, San Francisco, VA, Dec. 2016 [**invited**]

[33] **A. G. Hayes** et al., Bathymetry and Composition of Titan's Lakes. *DPS*, Pasadena, CA, Oct. 2016

[32] **A. G. Hayes** et al., Sedimentology of Titan's Polar Terrain. *GSA*, Denver, CO, Sep. 2016 [**invited**]

[31] **A. G. Hayes** et al., The Lakes and Seas of Titan; An Update from the Cassini RADAR Team. *COSPAR*, Istanbul, Turkey, Aug. 2016 [**invited**]**[Conference Canceled]**

[30] **A. G. Hayes** et al., Cassini RADAR Observations of Saturn's Largest Moon, Titan. *AGU*, San Francisco, CA, Dec. 2015 [**invited**]

[29] **A. G. Hayes** et al., Topographic Constraints on the Evolution and Interconnectivity of Titan's Lacustrine Basins. *AGU*, San Francisco, CA, Dec. 2015

[28] **A. G. Hayes** et al., Evidence for Wind-Waves on Titan's Kraken Mare. *AGU*, San Francisco, CA, Dec. 2014

[27] **A. G. Hayes** et al., Recent Discoveries by the Cassini RADAR. *DPS 2014*, Tucson, AZ, October 2014

[26] **A. G. Hayes** et al., A Mariner's Insights in Titan's Seas: Mirrors, Depth Sounds, and Magic Islands. *COSPAR 2014*, Moscow, Russia, August 2014

[25] **A. G. Hayes**. Titan's Lakes and Seas: A Review. *Titan Through Time Workshop III*, Laurel, MD, April 2014

[24] **A. G. Hayes** et al.,The Distribution and Volume of Titan's Hydrocarbon Lakes and Seas. *LPSC*, The Woodlands, TX, March 2014.

[22] **A. G. Hayes** et al.,Constraining the evolution of Titan's north polar landscape. *AGU,* San Franciso, CA, Dec. 2013 **[Invited]**.

[21] **A A. G. Hayes** et al., Microwave Observation of Saturn's rings from Cassini. *European Planetary Science Congress (EPSC),* London, England, September 2013.

[20] **A. G. Hayes** et al., Constraining the evolution of Titan's north polar landscape. *European Planetary Science Congress (EPSC),* London, England, September 2013.

[19] **A. G. Hayes** et al., Morphologic Anlaysis of Polar Landscape Evolution on Titan. *LPSC*, The Woodlands, TX, March 2013.

[18] **A. G. Hayes** et al., Wind driven capillary-gravity waves on Titan's Lakes: Hard to Detect or Non-Existent? *LPSC*, The Woodlands, TX, March 2013.

[17] **A. G. Hayes**, **A. G. Hayes** et al., Determining Timescales of the Dune Forming Winds on Titan. *Third International Planetary Dunes Workshop*, Flagstaff, AZ, June 2012.

[16] **A. G. Hayes** et al., Lacustrine Geomorphology on Titan; Glimpses into the Evolution of Titan's Polar Landscapes. *EGU Spring Meeting Abstracts*, April 2012 [**Invited]**

[15] **A. G. Hayes** et al., Air-Sea Interactions on Titan: Wind Driven Capillary-Gravity Waves; Hard to Detect or Non-Existent. *AGU Ocean Sciences Meeting*, February 2012.

[14] **A. G. Hayes** et al., Reorientation Timescales and Pattern Dynamics for Titan's Dunes: Does the Tail Wag the Dog or the Dragon? *AGU Fall Meeting Abstracts*, December 2011.

[13] **A. G. Hayes** et al., Onset of Gravity-Capillary Waves on Titan's Lakes and Seas, *DPS/EPSC Joint Meeting*, Nante, France, October 2011.

[12] **A. G. Hayes** et al., Titan's Methane Cycle and its Effects on the Surface. *AGU,* San Francisco, CA, Dec. 2010. **[Invited]**

[11] **A. G. Hayes** et al., Reconstruction of Eolian Bedforms and Paleocurrents from Cross-Bedded Strata at Victoria Crater, Meridiani Planum, Mars. *DPS*, Pasadena, CA, October 2010.

[10] **A. G. Hayes** et al., Titan's Lakes: Implications for Change on Seasonal and Orbital Timescales. *COSPAR*, July 2010. **[Invited]**

[9] **A. G. Hayes** et al., Bathymetry and Absorptivity of Titans Ontario Lacus. *EGU*, May 2010.

[8] **A. G. Hayes** et al., Observations and Modeling of Transient Lacustrine Featuers in Titan's South Polar Region. *AGU*, Dec. 2009. **[Invited]**

[7] **A. G. Hayes** et al., Evidence for Transient Surface Liquid in Titan's South Polar Region. *DPS*, Puerto Rico, September 2009.

[6] **A. G. Hayes** et al., Titan's global lake distribution and implied hydrocarbon hydrology from Cassini SAR imagery and topography. *AGU,* San Francisco, CA, December 2008.

[5] **A. G. Hayes** et al., Hydrocarbon Lakes on Titan: Asymmetric Distribution and Relative Topography. *Titan After Cassini-Huygens Book Symposium*, 2008.

[4] **A. G. Hayes** et al., Joint Analysis Of Titan's Surface Using The Cassini Vims And Radar Instruments. *DPS,* Ithaca, NY, September 2008.

[3] **A. G. Hayes** et al., Reconstruction of Eolian Bedforms from Cross-Bedded Strata at Victoria Crater, Meridiani Planum, Mars. *AGU,* San Francisco, CA, December 2007.

[2] **A. G. Hayes** et al., Titan's Lake Distribution and Classification from the Cassini RADAR *AGU,* San Francisco, CA, December 2007

[1] **A. G. Hayes** et al., Titan's North Polar Region: Lake Distribution, Statistics, and Implied Methane Hydrology from Cassini SAR. *DPS*, October 2007.

ADVISING

Postdoctoral

- Lea Bonnefoy (11/2020 – Present)
- Daniel Lalich (09/2018 – Present)
- Samuel Birch (01/2018 – Present)
- Valerio Poggiali (11/2016 – Present)
- Marco Mastrogiuseppe (10/2014 – 10/2016)
  Now Senior Scientist at La Sapienza Roma
  Currently Visiting Scientist at Caltech GPS

Graduate

- Jason Hofgartner (01/2013 – 12/2015) [Co-Advised]
  Ph.D., Astronomy
  Now NASA Postdoctoral Fellow at JPL
- Zhimeng Zhang (03/2013 – 12/2016)
  Ph.D., Astronomy
  Now Postdoctoral Fellow at Caltech
- Samuel Birch (08/2014 – 12/2017)
  Ph.D., Earth and Atmospheric Science
  Now 51-PegB Fellow at MIT
- Paul Corlies (09/2013 – 11/2019)
  Ph.D., Astronomy
  Now Postdoc at MIT / EAPS
- Nicolas Kutsop (08/2014 – Present)
  Ph.D., Astronomy
- Abhinav Jindal (11/2017 – Present)
  Ph.D., Astronomy
- Christian Tate (08/2017 – Present)
  Ph.D., Astronomy
- Megan Barrington (08/2018 – Present)
  Ph.D., Earth and Atmospheric Science
- Thomas Gautier (10/2015 – 09/2016)
  M.Eng., Applied and Engineering Physics
  Now Technical Staff at Syracuse Research Corp.
- Mengnan Zhao (09/2013 – 09/2014)
  Ph.D., Applied and Engineering Physics
  1st Year Committee, AEP

Visiting Graduate

- Marica Raguso (10/2015 – 09/2016)

Ph.D., La Sapienza Roma
Now Postdoc at Caltech

Undergraduate

- Cece Thieberger (01/2019– Present)
- Lexi Neese (09/2018– Present)
- Samantha Moruzzi (09/2018 – Present)
- Julia Miller (01/2018– Present)
- Kelly Waldvolgal (01/2018 – Present)
- Dalia Kirshenblat (01/2018– Present)
- Anjali Rajesh (01/2018– Present)
- Alexis Eggleston (01/2018– Present)
- Maheenuz Zaman; Cornell (01/2016 – Present)
- James Haber; Cornell (01/2016 – 05/2018)
- John Kelland; Cornell (10/2015 – 05/2018)
- Weigang Liang; Cornell (09/2015 – 05/2018)
- Harry Tang Yuhui; Cornell (06/2015 – 05/2018)
- Ian Cummings; Cornell (09/2016 – 05/2018)
- Katherine Gershfeld; Cornell (09/2015 – 05/2018)
- Fiona Nichols-Fleming; U.Roch (05/2017-08/2017)
- Travis Rogowski; Hofstra (05/2016 – 08/2016)
- Valerio Poggiali (06/2015 – 09/2015)
  Ph.D., La Sapienza Roma
  Now Research Associate at Cornell
- Peter Dohn; RPI (05/2016 – 08/2016)
- Vinisha Mittal; Cornell (01/2016 – 01/2017)
- Joseph Mullen; Drake Univ. (06/2015 – 09/2016)
- Ryan de Freitas Bart; Cornell (09/2014 – 05/2017)
- Jialong Wang; Cornell (09/2015 – 01/2016)
- Kylee Hereid; Simpson Univ. (06/2016 – 09 /2015)
- Roger Michaelides; Cornell (10/2012 – 05/2015)
- Scott Mansfield; Cornell (02/2013 – 05/2015)
- Thomas Gautier; Cornell (05/2013 – 05/2015)
- Lea Bonnefoy; Cornell (01/2014 – 09/2015)
- Sam Birch; UC Berkeley (06/2013 – 09/2013)
- George McDonald; Cornell (02/2013 – 08/2014)
- Julia Cisneros; Texas A&M (06/2014-09/2013)
- Christian Klein; Regis College (06/2013-09/2013)
- Abby Perrot; Cornell (02/2013 – 01/2014)
- Cansu Chula; UC Berkeley (09/2011 – 09/2013)
- Curtis Baden; UC Berkeley (09/2011 – 09/2013)

HIGH SCHOOL

- Justin Tan; Ithaca HS (06/2017 – Present)
- Harrison Yaeger; Bellmore Central (05/2016 – Present)
- Leonardo Cuozzo; WCM HS (05/2016 – Present)
- Ian Cummings; Ithaca HS (10/2015 – 09/2016)
- Leslie Young; Ithaca HS (11/2014 – 09/2015)
- Peter Dohn; Corning HS (07/2014 – 08/2014)
- Rishi Verma; Ithaca HS (07/2014 – 08/2014)

MISSION PARTICIPATION

- Dragonfly
  - Co-I
- Europa Clipper
  - Geology Working Group, *Co-Lead* (2019-2021)
  - Europa Imaging System (EIS); *Co-I* (2015 – Present),
- Mars2020 Rover
  - Mastcam-Z; *Co-I*, *Calibration Working Group Lead* (2014 – Present)
- Mars Science Laboratory
  - Participating Scientist Collaborator (2012 – 2017)
- Cassini-Huygens Mission to Saturn
  - Participating Scientist (2012 – 2017)
  - RADAR Team; *Associate Team Member* (2008 - 2019)
  - VIMS Team; *Associate* (2012 – 2019)
- Mars Exploration Rover (MER)
  - Panoramic Camera (Pancam); *Payload Uplink / Downlink Lead* (2004-2005)
  - Microscopic Imager (MI); *Payload Uplink / Downlink Lead* (2004-2005)
  - Engineering Cameras (Eng. Cam); *Payload Uplink / Downlink Lead* (2004-2005)
  - *Flight Calibration Team;* Pancam / MI / Eng. Cam (2003)
  - *Collaborator* (2003 – 2019)

- Trident [NASA Discovery 14] (Under Phase A Study)
    - *Co-I* (*PI* is Louise Prockter, LPI)

PRE-PROPOSAL OR UNDER REVIEW:

- CAESAR (Comet Astrobiology Exploration Sample Return) [NASA New Frontiers 5 Proposal]
    - *Principal Investigator*
- NEAT (Nucleus Evolution and Activity Tour) [NASA SIMPLEx Proposal]
    - *Principal Investigator*
- C-LIFE Imaging System [NASA Europa Lander Instrument Proposal]
    - *Co-I (PI* is Shane Byrne, University of Arizona)
- Seismometer to Investigate Ice and Ocean Structure (SIIOS) [NASA Europa Lander Instrument Proposal]
    - *Co-I* (*PI* is Veronica Bray, University of Arizona)

NOT SELECTED:

- CAESAR (Comet Astrobiology Exploration Sample Return) [NASA New Frontiers 4 Proposal]
    - *Payload Lead / Successor PI* (*PI* is Steven Squyres, Cornell University)
- Oceanus (Titan Orbiter) [NASA New Frontiers 4 Proposal]
    - *Deputy PI / Successor PI (PI* is Christophe Sotin, Jet Propulsion Laboratory)
- Europa Lander Color Imager (ELCI) [NASA Europa Lander Instrument Proposal]
    - *Co-I* (*PI* is Justin Maki, Jet Propulsion Laboratory)
- Exploration of Enceladus and Titan (E^2T) (Saturn Orbiter) [ESA M5 Proposal]
    - *Co-I* of US Contributed Infrared Camera (*European PI* was Giuseppe Mitri, University de Nantes)
- Kuiper (Near-Earth observatory) [NASA Discovery 13]
    - *Deputy PI of VIS/NIR Camera* (*PI* was James Bell, ASU)
- Exploration of Enceladus and Titan (E^2T) (Saturn Orbiter + Titan Sea Probe) [ESA M4 Proposal]
    - *PI* of US Contributed Sea Lander System (*European PI* was Gabriel Tobie, University de Nantes)
- Europa Clipper (Jupiter Orbiter) [NASA Flagship]
    - Multi-channel Spectrometer for Europa (MuSE); *Co-I* (*PI* was Kevin Hand, JPL)
- Mars2020 (Mars Rover) [NASA Flagship]
    - Near Infrared Spectrometer (NIRSpec); *Instrument Scientist* (*PI* was Tony Colaprete, NASA Ames)
- Jupiter Icy Moons Explorer (JUICE) (Jupiter Orbiter) [ESA L3 Misison]
    - Jupiter and Icy-Moons Imagers (JIMI); *Co-I* (*PI* was Elizabeth Turtle, JHU APL)
- Journey to Enceladus and Titan (JET) (Saturn Orbiter) [NASA Discovery 12]
    - *Co-I* (*PI* was Christophe Sotin, JPL)
- Titan Mare Explorer (TiME) (Titan Lake Lander) [NASA Discovery 12]
    - *Collaborator* (*PI* was Ellen Stofan, Proxemy Research)

OBSERVING

- ESO 2013 Period 93A, "Seasonal changes in Titan's meteorology through cloud monitoring with VLT/SINFONI"
    - 21 hrs + 8.6 hrs ToO from April 1 – Sep. 30, 2014
- Gemini ES-026, "Investigating seasonal changes in Titan's meteorology through cloud monitoring with GPI"
    - 2 hrs from April 1 – Sep. 30, 2014
- VLA 2014 Period 2014B, "Multi-frequency Observations of Saturn and its Rings"
    - 16 hours, Priority A
- ESO 2014 Period 94, "Seasonal changes in Titan's meteorology through cloud monitoring with VLT/SINFONI"
    - 11.4 hrs + 2 hrs ToO from Oct. 1, 2014 – March 31, 2015
- Gemini 2015A Rapid ToO, "Seasonal changes in Titan's meteorology through cloud monitoring with GPI"
    - 8 hrs from April 1 – Sep. 30, 2015

- Gemini Fast Turnaround, “Seasonal changes in Titan’s meteorology through cloud monitoring with NIFS”
  - .5 hrs from April 1 – April 30, 2015
- Gemini 2015B Rapid ToO, “Seasonal changes in Titan's meteorology through cloud monitoring with GPI”
  - 3 hrs from June 1 – Sep. 30, 2015
- Gemini Fast Turnaround, “Seasonal changes in Titan’s meteorology through cloud monitoring with NIFS”
  - 1.1 hrs from June 1 – August 30, 2015
- IRTF Semester 2015B “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 34 nights from August 1 – Sep. 30 2015
- Gemini Fast Turnaround, “Seasonal changes in Titan’s meteorology through cloud monitoring with NIFS”
  - 2.25 hrs from February 1 – March 31, 2016
- Gemini Fast Turnaround, “Seasonal changes in Titan’s meteorology through cloud monitoring with NIFS”
  - 4.25 hrs from March 1 – June 30, 2016
- IRTF Semester 2016A “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 34 nights from January 1 – August. 1 2016
- IRTF Semester 2016B “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 34 nights from August 1 – Sep. 30 2016
- IRTF Semester 2017A “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 21 nights from January 1 – August. 1 2017
- IRTF Semester 2017B “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 17 nights from August 1 – October 30 1 2017
- IRTF Semester 2018A “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 34 nights from January 1 – August 1 1 2018
- IRTF Semester 2018B “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 17 nights from August 1 – October 30 1 2019
- IRTF Semester 2019A “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 34 nights from January 1 – August 1 1 2018
- IRTF Semester 2019B “Seasonal changes in Titan’s metrology through cloud monitoring with SpeX”
  - 17 nights from August 1 – October 30 1 2019

PROFESSIONAL ACTIVITIES

- Workshop Organizer:
  - Europa Clipper PSG, June 2019; Ithaca NY
  - Titan Surface Workshop, Spring 2018; Ithaca NY
  - Cassini VIMS Team Meeting, Spring 2016; Ithaca NY
  - Titan *Lakefest2015!* Summer 2015; Ithaca NY
  - KISS Workshop: In-Situ Sample Handling Technologies for Titan’s Surface, Spring 2015; Pasadena CA
  - Titan Surface Workshop, Fall 2014; Ithaca NY
  - Regional Planetary Imaging Facilities Directors Meeting, Fall 2013; Ithaca NY
- Conference Organizer
  - 2020 COSPAR Meeting: *Ocean Worlds Sessions (B5.3)*
  - 2018 COSPAR Meeting: *Ocean Worlds Sessions (B5.3)*
  - 2017 LPSC Program Committee: *Outer Planets Sessions*
- Session Organizer:
  - 2019 AGU Meeting: *Titan*
  - 2018 AGU Meeting: *Titan*
  - 2018 EPSC Meeting: *Ocean Worlds*
  - 2017 AGU Meeting: *Titan*
  - 2016 COSPAR Meeting: *Ocean Worlds; Europa, Enceladus, Titan, Triton, and Beyond* (**Canceled**)

  - 2014 GSA Meeting: *Dynamic Planetary Geology Revealed by Long-Term Observations*
  - 2013 EPSC Meeting: *Surface Modification Processes on Planets and Satellites with an Atmosphere*
- Session Chair:
  - 2017 AGU Meeting; Oral: *Titan After Cassini*
  - 2016 LPSC Meeting; Oral: *Titan: A Real Cool World*
  - 2014 DPS Meeting; Oral: *Titan's Surface*
  - 2014 LPSC Meeting; Oral: *Springtime in Titan's Lake District*
  - 2013 LPSC Meeting; Oral: *Titan's Surface*
  - 2010 DPS Meeting; Oral: *Titan's Surface*
  - 2010 COSPAR Meeting; Oral: *Titan's Atmosphere I*
- Guest Editor:
  - *"Recent Advances in Surface Processes and Surface-Atmosphere Interactions on Titan", Icarus 2016*
- Mission Concept Studies:
  - NASA Ice Giants Science Definition Team, 2016-2017
  - NASA Europa Lander Science Definition Team, 2016-2017
  - JPL Europa Lander Study, 2015-2016
  - JPL Titan Mission Concept Study, JPL, 2013-2014
  - NASA Lake Lander Concept Study, Decadal Survey, JPL, 2009-2010
- Panel Reviewer: *Mars Data Analysis Program (MDAP), Cassini Data Analysis Program (CDAP), Outer Planets Research Program (OPR), Solar System Observations Program (SSO), Discovery 13 Step-2, Keck Telescope Allocation Committee*
- External Reviewer: *Mars Data Analysis Program (MDAP), Cassini Data Analysis Program (CDAP), Outer Planets Research Program (OPR), Mars Fundamental Research Program (MFRP), NASA Earth and Space Science Fellowship (NESSF), NASA Postdoctoral Program (NPP), Belgian Research Action Through Interdisciplinary Networks (BRAIN), Planetary Data Archiving Restoration and Tools (PDART), EUROPA14 Instrument Reviews, Solar System Workings (SSW)*
- Peer Reviewer: *Astrophysical Journal, Geology, Geomorphology, Geophysical Research Letters, Icarus, Journal of Geophysical Research, Nature, Nature Geosciences, Nature Astronomy, Planetary Science, Planetary and Space Science, Science, Ocean Engineering, IEEE TGRS, IEEE GRSL*

SERVICE ACTIVITIES

External:
- Chair, Ocean Worlds and Dwarf Planets Panel, 2023-2032 Planetary Science and Astrobiology Decadal Survey
- Panel Member, COSPAR Panel on Planetary Protection [PPP] (2018-Present)
- Committee Member, National Academy of Sciences Space Studies Board: *Committee on Astrobiology and Planetary Science* [CAPS] (2017-Present)
- Vice-Chair of COSPAR Sub-Commission B5: *Outer Planets and their Satellites* (2016-Present)
- AAS DPS Federal Relations Sub-Committee (2015-Present)
- AAS DPS Education and Public Outreach Committee (2010-Present)
- Chair of the Titan sub-committee of the International Outer Planets Watch (IOPW) (2015-Present)
- Director; Cornell/NASA Spacecraft Planetary Imaging Facility [NASA RPIF] (2012-Present)
- Icarus Editorial Advisory Board; Elsevier / AAS DPS (2013-2016)
- Committee Member, SPIE Defense and Security Symposium: *Technologies for Synthetic Environments, Hardware-in-the-loop-Testing* (2006-2008)

Internal (Cornell):
- Dean's Advisory Committee on Appointments (2018-Present)
- Faculty Fellow, Hans Bethe House, Cornell University (2017-Present)
- Faculty Steering Committee, Cornell University College Scholar Program (2016-Present)

- Advisory Board, Carl Sagan Institute, Cornell University (2015-Present)
- Advisory Board, Cornell University College Scholar Program (2014-Present)
- Website Committee, Cornell Astronomy Department (2014-Present)
- Course Committee, Cornell Astronomy Department (2013-2015, 2017 – Present)
- Agenda Committee, College of Arts and Sciences, Cornell University (2015-Present, Chair 2016-2018)
- Assistant Professor Search Committee, Cornell Astronomy Department (2016-2017, 2017-2018)
- 1st Year Committee, Cornell Astronomy Department (2015-2017)
- Enhanced Colloquium Committee, Cornell Astronomy Department (2013-2015)
- Science Communications Workshop: Allan Alda Center for Communication Science (May 2013)

Internal (Caltech):

- Resident Associate; Caltech Avery House (2008-2011)

SELECTED FIELD EXPERIENCE

- **Izu Oshima Island, Tokyo Prefecture, Japan** (2019) [Participant]
  Research Objective: Drop tests of CAESAR Sample Return Capsule.
- **Mojave Desert / Death Valley, CA** (2015, 2017, 2020) [Organizer / Instructor]
  Research Objective: Ground truthing of remote sensing data and planetary analogs (Cornell Class A6577).
- **Namibia** (2013) [Researcher]
  Research Objective: Titan analog studies at the Namib Sand Sea and Roter Kam Crater.
  Organizers: Ralph Lorenz and Jani Radebaugh
- **Atacama Desert, Chile** (2012) [Researcher]
  Research Objective: Mud Flows and Alluvial Fans (MSL Landing Site Analog Studies)
  Organizers: Alan Howard and Bill Dietrich
- **Mojave Desert, CA** (2006-2011) [Teaching Assistant]
  Research Objective: Field testing of remote sensing data and type-examples of surface processes.
  Organizer: Oded Aharonson
- **Death Valley and Red Rock Canyon, CA** (2007) [Student]
  Research Objective: Lower Johnny Formation Stratigraphy and Sedimentology
  Organizer: John Grotzinger
- **New Mexico** (2006) [Student]
  Research Objective: Investigation of Mars analog environments.
  Organizer: John Grotzinger and John Southard

CUMULATIVE FUNDS (FY13-Present): $7.7 M (PI: $5 M / Co-I: $2.7 M)

REU2019	FY 20-24	Cornell REU Site	PI	$400K
CDAP2019	FY 19-23	The Impact of Titan's Impacts	Co-I	$100K
CDAP2019	FY 19-23	Understanding Transient Changes in 67P Smooth Terrain	Co-I	$100K
RDAP 2018	FY 19-23	Combining VIMS and RADAR observations of Titan	PI	$423K
NESSF 2018	FY 19-23	Habitability of Hydrocarbon Worlds: Titan and Beyond	PI	$90K
NAI CAN8	FY 18-22		Co-I	$419K
CDAP 2017	FY 18-20	Sun glints on hydrocarbon seas	PI	$419K
PDART 2017	FY 18-20	Super Res. Processing of the Cassini Altimetry Dataset	PI	$400K
CP4SMPVC+	FY 17-21	Life on the Edge	Co-I	$100K
JPL	FY 16-17	Ice Giants SDT Member Support	PI	$18K
JPL	FY 16	Europa Ladner SDT Member Support	Co-I	$24K
CDAP 2015	FY 16-18	Investigating Titan as a Sedimentary World	Co-I	$118K
EUROPA	FY 16-18	Europa Imaging System: Phase A/B Co-I Support	Co-I	$128K
NESSF 2015	FY 16-18	Geomorphology of Titan's polar terrains: Using landscape form to understand surface process	PI	$90K

MDAP 2014	FY 16-18	Deciphering fine-scale surface properties from vis/nir spectrophotometry at recent martian landing sites	Co-I	$65K
SSO 2014	FY 15-17	Analysis of Multi-Frequency VLA Data of Saturn and its Rings: Origin and Particle Properties	PI	$455K
CDAP 2014	FY 15-17	Digging for Hydrocarbon Gold with the Cassini Altimeter	PI	$358K
CDAP 2014	FY 15-17	Participating Scientist	PI	$60K
JPL SURP	FY 15-17	Graduate Student Support for Co-Analysis of Cassini VIMS/RADAR data of Tita	PI	$150K
JPL SURP	FY 15	Understanding Titan's Dune Composition with Cassini	PI	$50 K
JPL SURP	FY 15	Does methane ice float?	Co-PI	$25K
MARS2020	FY 15-23	MastcamZ Investigation: Co-I Support	Co-I	$1.2M
NESSF 2014	FY 15-17	Understanding Titan's Hydrologic Cycle: A Combined Ground and Spacecraft-Based Approach	PI	$90K
OPR 2013	FY 15-17	Understanding Titan's Methane Cycle Through Global Climate Models	Collaborator	N/A
OPR 2013	FY 15-17	Observing Saturn's Rings in the Microwave with Cassini	PI	$404K
ECF 2013	FY 15-16	Sounding the Lakes and Seas of Titan: Postdoctoral Support in Planetary Remote Sensing at Cornell University	PI	$100K
PGG 2013	FY14-18	Support for the Cornell/NAS Spacecraft Planetary Imaging Facility (SPF): A NASA Regional Planetary Imaging Facility	PI	$484K
CDAPS 2013	FY 14-16	Characterizing Titan's dunes and dune-topography interactions: Implications for climate change in Titan's equatorial region	Co-I	$110K
ICEE 2013	FY 14-15	Topographic and Reconnaissance Imaging for Europa Exploration	Collaborator	N/A
OPR 2012	FY 13-15	Physical Processes in Titan's Seas	Collaborator	N/A
CDAPS 2012	FY 13-15	Seas, Lakes, Channel Networks and Hillslopes: A Coupled Analysis to Explore the Evolution of Titan's Polar Landscapes	PI	$437K
CDAPS 2012	FY 13-15	Participating Scientist	PI	$100K
MSLPS 2011	FY 13-16	Aeolian System Source-to-Sink Analysis for MSL Landing Site and Basin (Participating Scientist Program)	Collaborator	N/A
Cassini	FY 13-15	Radar Science Team: Associate Team Member Support	PI	$80K
PGG 2012	FY 13	Cornell/NASA Spacecraft Planetary Imaging Facility (SPIF)	PI	$120K
Ramsden Fund	FY 12	Charles H. Ramsden Fund, UC Berkeley	PI	$6K
CDAP 2011	FY 12-14	Modeling Titan Surface Backscatter From Fine-Resolution, Global Scatterometry Observations	Collaborator	N/A
Miller Fellow	FY 11-12	Miller Institute for Basic Research in Science (Berkeley)	PI	$111K
GSRP 2008	FY 09-11	Understanding Titan's Methane Cycle	Co-I	$120K

PROFESSIONAL MEMBERSHIPS

- Society of Photo-Optical Instrum. Engineers (SPIE)
- American Inst. of Aeronautics & Astronautics (AIAA)
- American Geophysical Union (AGU)
- European Geophysical Union (EGU)
- Geological Society of America (GSA)
- AAS Division of Planetary Science (DPS)
- Committee on Space Research (COSPAR)
- USA Hockey [*Volunteer Coach*]
- American Red Cross [*First Responder*]
- PADI Dive Association [*Rescue Diver*]
- Private Pilots Association [*80 hrs. PIC*]
- Ryuku Kempo Kobudo [*3rd Deg. Black Belt*]
- Sigma Alpha Epsilon Fraternity

REFERENCES

- Professor Oded Aharonson, Weizman Institute
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  Previously Graduate Thesis Advisor
  Email Oded.Aharonson@weizmann.ac.il
  Phone: +972-8-934-6961
  Address: 121Su; Weizzman Institute for Science, Rehovot 76100 Israel

- Dr. Charles Elachi, JPL Director Emeritus
  Relationship: Graduate Co-Advisor
  Email: Charles.Elachi@jpl.nasa.gov
  Phone: 818-354-5673
  Address: Director, Jet Propulsion Laboratory; 4800 Oak Grove Dr., Pasadena CA 91109

- Professor Jonathan I. Lunine, Cornell University
  Relationship: Collaborator
  Email: jlunine@astro.cornell.edu
  Phone: 607-255-5911
  Address: 402 Space Sciences Building; Cornell University, Ithaca NY 14853

- Professor Steven W. Squyres, Cornell University
  Relationship: Collaborator, Previously Undergraduate Advisor / Employer
  Email: squyres@astro.cornell.edu
  Phone: 607-255-3508
  Address: 428 Space Sciences Building; Cornell University, Ithaca NY 14853

- Professor James F. Bell, Arizona State Univ.
  Relationship: Collaborator, Previously Undergraduate Advisor / Employer
  Email: Jim.Bell@asu.edu
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  Address: 686 Bateman Physical Sciences Center F-wing; SESE, Tempe AZ 85287

- Dr. Stephen D. Wall, JPL
  Relationship: Collaborator,
  Acting Cassini RADAR Team Leader
  Email: stephen.d.wall@jpl.nasa.gov
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- Professor John P. Grotzinger, Caltech
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  Previously Graduate Co-Advisor
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  Phone: 626-395-6785
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- Professor George R. Rossman, Caltech
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  Email: grr@gps.caltech.edu
  Phone: 626-395-6471
  Address: MC 170-25 Caltech; 1200 E. California Blvd., Pasadena CA 91125

- Dr. Israel Soibelman, Division Head, MIT Lincoln Laboratory
  Relationship: Past Supervisor
  Email: isoibelman@ll.mit.edu
  Phone: 781-981-5500
  Address: Division 4, MIT Lincoln Laboratory; 244 Wood St.
  Lexington, MA 02420

- Mr. David C. Harrison, Senior Staff, MIT Lincoln Laboratory
  Relationship: Past Supervisor
  Email: dchtravel38@yahoo.com
  Phone: 781-981-5500
  Address: Group 38, MIT Lincoln Laboratory; 244 Wood St.
  Lexington, MA 02420

- Additional References Available Upon Request