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## Professional Positions

### University of Arizona – Lunar and Planetary Laboratory

Associate Professor & Director: Space Imagery Center (8/2013 – Present)

Assistant Professor & Director: Space Imagery Center (8/2007 – 8/2013)

Research Associate – with HiRISE team. (9/2005 – 8/2007)

### Massachusetts Institute of Technology, 12/2003 – 9/2005.

Postdoctoral Scholar – with Professor Maria Zuber.

### California Institute of Technology, 6/2003 – 12/2003.

Assistant Scientist – with Professor Bruce Murray.

### California Institute of Technology, 8/1998 – 6/2003.

Graduate Research Assistant – with Professors Murray and Ingersoll.

## Education

### California Institute of Technology, Pasadena, CA. 1998-2003

Ph.D. Planetary Science, with minor in Astronomy (2003)

Advisors: Professors Bruce C. Murray and Andrew P. Ingersoll

M.S. Planetary Science, with minor in Astronomy (2001)

### University of Cardiff, Cardiff, United Kingdom 1994-1998

Master of Physics. Astrophysics (1998)

## Service and Professional Memberships

- Member: American Geophysical Union  
American Astronomical Society – Division of Planetary Science
- NASA: Director of Space Imagery Center  
*A NASA Regional Planetary Image Facility*  
Planetary Cartography and Geologic Mapping Working Group  
Numerous NASA review panels  
MDAP, MFRP, PG&G, CDAP, NESSF external reviewer
- Conferences: Keck Institute for Space Studies workshop convener  
Session convener – AGU 2008  
Science organization committee: DPS 2011  
Science organization committee: Mars Polar Science 2011  
Local organization committee: DPS 2014
- Session Chair: American Geophysical Union – Fall Meeting  
International conference on Mars polar science and exploration  
Lunar and Planetary Science Conference
- Reviewer for: Nature, Science, Journal of Geophysical Research, Geophysical Research Letters, Icarus, Planetary and Space Science, The Mars Journal, Annals of Glaciology, Geology.

## Planetary Mission Involvement

- Dawn Mission at Ceres – Guest Investigator
- Colour and Stereo Surface Imaging System (CaSSIS) – Co-Investigator
- High Resolution Science Experiment (HiRISE) – Co-Investigator.
- High-Resolution Stereo Color Imager (HiSCI) (2010-2012) – Deputy-PI.
- Europa Camera Suite (ECAMS) proposal (2014) – Co-investigator
- Chronos Mars-scout proposal (2006) – Co-Investigator.
- MOSAIC Mars-scout proposal (2006) – Co-Investigator.
- Boreale Explorer Mars-scout proposal (2006) – Co-Investigator.
- Mars Orbiter Laser Altimeter (MOLA) (2002-2006).
- MIT manned lunar exploration initiative (2004-2005).
- Landing site selection, Mars Polar Lander (1999).

## Honors and Awards

**University of Arizona**, Tucson, AZ.

Outstanding Faculty for Graduate Students – 2<sup>nd</sup> place (2017)

**NASA**

Group Achievement Award, MRO HiRISE Science Team (2011)

**Caltech Planetary Science**, Pasadena, CA

Excellence in teaching award for 'Planetary Surfaces' (2001).

**University of Cardiff**, Cardiff, United Kingdom

Received award for highest academic standing, 1995, 1996, 1997 & 1998

## Classes Taught

- U. of Arizona, PTYS 554: Evolution of Planetary Surfaces
- U. of Arizona, PTYS 594: Planetary Geology Field Studies
- U. of Arizona, PTYS 411/511: Geology and Geophysics of the Solar System
- U. of Arizona, PTYS 395A: Mercury: Open Questions and New Data.
- U. of Arizona, PTYS 395B: The Moon.
- U. of Arizona, PTYS 206: Our golden age of planetary exploration
- *Contributed lectures:*
  - U. of Arizona: PTYS442/542: Mars
  - MIT, EAPS 12.601: Essentials of Planetary Science
  - Caltech, Ge151: Fundamentals of Planetary Surfaces
  - Caltech, Ge158: Applications of Remote Sensing in the Field

## Peer-Reviewed Publications

Molaro, J.L., **S. Byrne**, and J.-L. Le, Thermally induced stresses in boulders on airless body surfaces, and implications for rock breakdown, *Icarus*, 294, 247-261, 2017.

Schmidt, B.E., K. Hughson, H.T. Chilton, J.E. Scully, T. Platz, A. Nathues, H. Sizemore, M.T. Bland, **S. Byrne**, S. Marchi, D.P. O'Brien, N. Schorghofer, H. Hiesinger, R. Jaumann, D. Buzckowski, J.C. Castillo-Rogez, M.V. Sykes, P.M. Schenk, M.C. DeSanctis, G. Mitri, M. Formisano, J.-Y. Li, V. Reddy, L. LeCorre, C.T. Russell,

- and C.A. Raymond, Geomorphological evidence for ground ice on Ceres, *Nature Geoscience*, 10, 338–343, 2017.
- Sori, M.M., **S. Byrne**, M.T. Bland, A.M. Bramson, A.I. Ermakov, C.W. Hamilton, K.A. Otto, O. Ruesch, and C. T. Russell, The vanishing cryovolcanoes of Ceres, *Geophys. Res. Lett.*, 44, 1243–1250, 2017.
- Sori, M.M., J. Bapst, A.M. Bramson, **S. Byrne**, and M.E. Landis, A Wunda-full world? carbon dioxide ice deposits on Umbriel and other Uranian moons, *Icarus*, 290, 1-13, 2017.
- Becerra, P., M.M. Sori, and **S. Byrne**, Signals of astronomical climate forcing in the exposure topography of the North Polar Layered Deposits of Mars, *Geophys. Res. Lett.*, 43, 2017.
- Viola, D., A. S. McEwen, C. M. Dundas, and **S. Byrne**, Subsurface volatile content of martian double-layer ejecta (DLE) craters, *Icarus*, 284, 325-343, 2017.
- Titus, T.N., **S. Byrne**, A. Colaprete, F. Forget, T.I. Michaels and T.H. Prettyman, The CO<sub>2</sub> cycle, Cambridge University Press, Ed.s Haberle, Clancy, Forget, Smith and Zurek, Chapter 12, 2017.
- Forget, F., **S. Byrne**, J.W. Head, M.A. Mischna and N. Schörghofer, Recent climate variations, Cambridge University Press, Ed.s Haberle, Clancy, Forget, Smith and Zurek, Chapter 16, 2017.
- Platz, T., A. Nathues, N. Schorghofer, F. Preusker, E. Mazarico, S. E. Schroder, **S. Byrne**, T. Kneissl, N. Schmedemann, J.-P. Combe, M. Schafer, G. S. Thangjam, M. Hoffmann, P. Gutierrez-Marques, M. E. Landis, W. Dietrich, J. Ripken, K.-D. Matz, and C. T. Russell, Surface water-ice deposits in the northern shadowed regions of Ceres, *Nature Astronomy*, 1, 0007, 2016.
- Becerra, P., **S. Byrne**, M.M. Sori, S. Sutton, and K.E. Herkenhoff, Stratigraphy of the north polar layered deposits of Mars from high-resolution topography, *J. Geophys. Res. Planets*, 121, 1445-1471, 2016.
- Buczowski, D.L., B. E. Schmidt, D.A. Williams, S.C. Mest, J.E.C. Scully, A.I. Ermakov, F. Preusker, P. Schenk, K.A. Otto, H. Hiesinger, D. O'Brien, S. Marchi, H. Sizemore, K. Hughson, H. Chilton, M. Bland, **S. Byrne**, N. Schorghofer, T. Platz, R. Jaumann, T. Roatsch, M.V. Sykes, A. Nathues, M.C. De Sanctis, C.A. Raymond, and C.T. Russell, The geomorphology of Ceres, *Science*, 353, 4332, 2016.
- Combe, J.-P., T.B. McCord, F. Tosi, E. Ammannito, F.G. Carrozzo, M.C. De Sanctis, A. Raponi, **S. Byrne**, M.E. Landis, K.H.G. Hughson, C.A. Raymond, and C.T. Russell, Detection of local H<sub>2</sub>O exposed at the surface of Ceres, *Science*, 353, 3010, 2016.
- Ruesch, O., T. Platz, P. Schenk, L.A. McFadden, J.C. Castillo-Rogez, L.C. Quick, **S. Byrne**, F. Preusker, D.P. O'Brien, N. Schmedemann, D.A. Williams, J.-Y. Li, M.T. Bland, H. Hiesinger, T. Kneissl, A. Neesemann, M. Schaefer, J.H. Pasckert, B.E. Schmidt, D.L. Buczowski, M.V. Sykes, A. Nathues, T. Roatsch, M. Hoffmann, C.A. Raymond, and C.T. Russell, Cryovolcanism on Ceres, *Science*, 353, 4286, 2016.

- Brown, A. J., W. M. Calvin, P. Becerra, and **S. Byrne**, Martian north polar cap summer water cycle, *Icarus*, 277, 401-415, 2016.
- Bierson, C.J., R.J. Phillips, I.B. Smith, S.E. Wood, N.E. Putzig, D. Nunes and **S. Byrne**, Stratigraphy and Evolution of the Buried CO<sub>2</sub> Deposit in the Martian South Polar Cap, *Geophys. Res. Lett.*, 43(9), 4172-4179, 2016.
- Landis, M.E., **S. Byrne**, I.J. Daubar, K.E. Herkenhoff and C.M. Dundas, A revised surface age for the North Polar Layered Deposits of Mars, *Geophys. Res. Lett.*, 43, 2016.
- Thompson, M.S., T.J. Zega, P. Becerra, J.T. Keane, **S. Byrne**, The Oxidation State of Nanophase Fe Particles in Lunar Soil: Implications for Space Weathering, *Meteoritics & Planetary Science*, 51(6), 1082-1095, 2016.
- Sori, M.M., **S. Byrne**, C.W. Hamilton, and M.E. Landis, Viscous flow rates of icy topography on the North Polar Layered Deposits of Mars, *Geophys. Res. Lett.*, 42, 2016.
- Daubar, I.J., C. Dundas **S. Byrne**, P. Geissler, G. Bart, A.S. McEwen, P.S. Russell, M. Chojnacki and M.P. Golombek, Changes in Blast Zone Albedo Patterns Around New Martian Impact Craters, *Icarus*, 267, 86-105, 2016.
- Dundas, C.M., **S. Byrne**, and A.S. McEwen, Modeling the development of martian sublimation thermokarst landforms, *Icarus*, 262, 154-169, 2015.
- Bramson, A.M., **S. Byrne**, N.E. Putzig, S. Sutton, J.J. Plaut, T.C. Brothers, and J.W. Holt, Widespread excess ice in Arcadia Planitia, Mars, *Geophys. Res. Lett.*, 42, 6566-6574, 2015.
- Becerra, P., **S. Byrne**, and A.J. Brown, Transient bright "halos" on the South Polar Residual Cap of Mars: Implications for mass-balance, *Icarus*, 251, 211-225, 2015.
- Hansen, C.J., S. Diniega, N. Bridges, **S. Byrne**, C. Dundas, A. McEwen, and G. Portyankina, Agents of change on Mars' northern dunes: CO<sub>2</sub> ice and wind, *Icarus*, 251, 264-274, 2015.
- Piqueux, S., **S. Byrne**, H.H. Kieffer, T.N. Titus, and C.J. Hansen, Enumeration of Mars years and seasons since the beginning of telescopic exploration, *Icarus*, 251, 332-338, 2015.
- Viola, D., A.S. McEwen, C.M. Dundas, and **S. Byrne**, Expanded secondary craters in the Arcadia Planitia region, Mars: Evidence for tens of Myr-old shallow subsurface ice, *Icarus*, 248, 190-204, 2015.
- Molaro, J.L., **S. Byrne**, and S.A. Langer, Grain-scale thermoelastic stresses and spatiotemporal temperature gradients on airless bodies, implications for rock breakdown, *J. Geophys. Res.*, 120, 255-277, 2015.
- Brown, A.J., T.I. Michaels, **S. Byrne**, W. Sun, T.N. Titus, A. Colaprete, M.J. Wolff, G. Videen and C.J. Grund, The Science Case for a Modern, Multi-Wavelength, Polarization-Sensitive LIDAR in Orbit around Mars., *Journal of Quantitative Spectroscopy and Radiative Transfer*, 153, 131-143, 2015.
- Daubar, I.J., C. Atwood-Stone, **S. Byrne**, A.S. McEwen, and P.S. Russell, The morphology of small fresh craters on Mars and the Moon, *J. Geophys. Res.*, 119, 2620-2639, 2014.

- Ojha, L., A.S. McEwen, C.M. Dundas, **S. Byrne**, S.S. Mattson, J.J. Wray, M. Masse and E. Schaefer, HiRISE Observations of Recurring Slope Lineae (RSL) during Southern Summer on Mars, *Icarus*, 231, 365-376, 2014.
- Dundas, C.M., **S. Byrne**, A.S. McEwen, M.T. Mellon, M.R. Kennedy, I.J. Daubar and L. Saper, HiRISE Observations of New Impact Craters Exposing Martian Ground Ice, *J. Geophys. Res.*, 109-127, 2014.
- McEwen, A.S., C.M. Dundas, S.S. Mattson, A.D. Toigo, L. Ojha, J.J. Wray, M. Chojnacki, **S. Byrne**, S.L. Murchie and N. Thomas, Recurring slope lineae in equatorial regions of Mars, *Nature Geoscience*, 7, 53-58, 2014.
- Christian, S., J.W. Holt, **S. Byrne** and K.E. Fishbaugh, Integrating Radar Stratigraphy with High Resolution Visible Stratigraphy of the North Polar Layered Deposits, Mars, *Icarus*, 226, 1241-1251, 2013.
- Clifford, S. M., K. Yoshikawa, **S. Byrne**, W. Durham, D. Fisher, F. Forget, M. Hecht, P. Smith, L. Tamppari, T. Titus, and R. Zurek, Introduction to the fifth Mars Polar Science special issue: Key questions, needed observations, and recommended investigations, *Icarus*, 225, 864-868, 2013.
- Hansen, C.J., **S. Byrne**, G. Portyankina, M. Bourke, C. Dundas, A. McEwen, M. Mellon, A. Pommerol and N. Thomas, Observations of the northern seasonal polar cap on Mars: I. Spring sublimation activity and processes, *Icarus*, 225, 881-897, 2013.
- Daubar, I., A. McEwen, **S. Byrne**, M. Kennedy and B. Ivanov, The Current Martian Cratering Rate, *Icarus*, 225, 506-516, 2013.
- Molaro, J., and **S. Byrne**, Rates of Temperature Change of Airless Landscapes and Implications for Thermal Stress Weathering, *J. Geophys. Res.*, 117, E10011, 2012.
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- Dundas, C.M., S. Diniega, C.J. Hansen, **S. Byrne** and A.S. McEwen, Seasonal Activity and Morphological Changes in Martian Gullies, *Icarus*, 220, 124-143, 2012.
- Sharma, P., and **S. Byrne**, Comparison of Titan's north polar lakes with terrestrial analogs, *Geophys. Res. Lett.*, 38, L24203, 2011.
- McEwen, A.S., and 9 colleagues, Seasonal Flows on Warm Martian Slopes, *Science*, 333, 740-743, 2011.
- Hansen, C.J., and 11 colleagues, Seasonal Erosion and Restoration of Mars' Northern Polar Dunes, *Science*, 331, 575-578, 2011.
- Phillips, R.J., and 17 colleagues, Massive CO<sub>2</sub> Ice Deposits Sequestered in the South Polar Layered Deposits of Mars, *Science*, 332, 838-841, 2011.
- Diniega, S., **S. Byrne**, N.T. Bridges, C.M. Dundas and A.S. McEwen, Seasonality of Present-day Martian Dune-Gully Activity, *Geology*, 38(11), 1047-1050, 2010.

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- Reufer, A., N. Thomas, W. Benz, S. **Byrne**, V. Bray, C. Dundas and M. Searls, Models of high velocity impacts into dust-covered ice: Application to Martian northern lowlands, *Planet. Space Sci.*, 58(10), 2010.
- Diniega, S., K. Glasner and S. **Byrne**, Long-time evolution of models of aeolian sand dune fields: Influence of dune formation and collision, *Geomorphology*, 121, 55-68, 2010.
- Holt, J.W., K.E. Fishbaugh, S. **Byrne**, S. Christian, K. Tanaka, P. S. Russell, K.E. Herkenhoff, A. Safaeinili, N.E. Putzig, and R.J. Phillips, The Construction of Chasma Boreale on Mars, *Nature*, 465, 446-449, 2010.
- Dundas, C.M., A.S. McEwen, S. Diniega, and S. **Byrne**, New and recent gully activity on Mars as seen by HiRISE, *Geophys. Res. Lett.*, 37(7), L07202, 2010.
- Fishbaugh, K.E., C.S. Hvidberg, S. **Byrne**, P.S. Russell, K.E. Herkenhoff, M. Winstrup, and R.L. Kirk, The first high-resolution stratigraphic column of the martian north polar layered deposits, *Geophys. Res. Lett.*, 37(7), L07201, 2010.
- Dundas, C.M., and S. **Byrne**, Modeling Sublimation of Ice Exposed by Recent Impacts in the Martian Mid-Latitudes, *Icarus*, 206(2), 716-728, 2010.
- Fishbaugh, K.E., S. **Byrne**, K.E. Herkenhoff, R.L. Kirk, C. Fortezzo, P.S. Russell and A. McEwen, Evaluating the meaning of 'layer' in the martian north polar layered deposits and the impact on the climate connection, *Icarus*, 205(1), 269-282, 2010.
- Hansen, C.J., N. Thomas, G. Portyankina, A. McEwen, T. Becker, S. **Byrne**, K. Herkenhoff, H. Kieffer, M. Mellon, HiRISE Observations of gas sublimation-driven activity in Mars' southern polar regions: I. Erosion of the Surface, *Icarus*, 205(1), 283-295, 2010.
- McEwen, A., and 65 colleagues, The High Resolution Imaging Science Experiment (HiRISE) during MRO's Primary Science Phase (PSP), *Icarus*, 205(1), 2-37, 2010.
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- Piqueux, S., S. **Byrne**, and M.I. Richardson, The sublimation of Mars southern CO<sub>2</sub> ice cap and the formation of "spiders", *J. Geophys. Res.*, 108(E8), 5084, 2003.
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