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**Associate Professor**

**Department of Planetary Sciences**  
**University of Arizona**

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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  
PG&G review panel  
MDAP, MFRP, PG&G, CDAP, NESSF external reviewer
- Conferences: 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

- 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).

## 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

- Piqueux, S., **S. Byrne**, T.N. Titus, C.J. Hansen and H.H. Kieffer, Enumeration of Mars Years and Seasons since the Beginning of Telescopic Exploration, *Icarus*, In Press, 2014.
- Hansen, C.J., S. Diniega, N. Bridges, **S. Byrne**, C.M. Dundas, A.S. McEwen, and G. Portyankina, Agents of change on Mars' northern dunes: CO<sub>2</sub> Ice and Wind, *Icarus*, In Press, 2014.
- 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.*, In Press, 2014.
- Brown, A.J., T.I. Michaels, **S. Byrne**, W. Sun, T.N. Titus, A. Colaprete, M.J. Wolff, and G. Videen, The Science Case for a Modern, Multi-Wavelength, Polarization-Sensitive LIDAR in Orbit around Mars, *Journal of Quantitative Spectroscopy and Radiative Transfer*, In Press, 2014.
- 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*, In Press, 2014.

- Becerra, P., **S. Byrne** and A. Brown, Transient Bright "Halos" on the South Polar Residual Cap of Mars: Implications for Mass-Balance, *Icarus*, In Press, 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.
- Caudill, C.M., L.L. Tornabene, A.S. McEwen, **S. Byrne**, L. Ojha and S. Mattson, Layered Megablocks in the Central Uplifts of Impact Craters, *Icarus*, 221, 710-720, 2012.
- Hvidberg, C.S., K.E. Fishbaugh, M. Winstrup, A. Svensson, **S. Byrne** and K. Herkenhoff, Reading the climate record of the Martian polar layered deposits, *Icarus*, 221, 405-419, 2012.
- Beyer, R.A., K.M. Stack, J.L. Griffes, R.E. Milliken, K.E. Herkenhoff, **S. Byrne**, J.W. Holt and J.P. Grotzinger, An Atlas of Mars Sedimentary Rocks as seen by HiRISE, *Society for Sedimentary Geology Special Publication*, 102, 49-96, 2012.
- 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.
- Sharma, P., and S. **Byrne**, Constraints on Titan's topography through fractal analysis of shorelines, *Icarus*, 209(2), 723-737, 2010.
- Banks, M.E., S. **Byrne**, K. Galla, A.S. McEwen, V.J. Bray, K.E. Fishbaugh, C.M. Dundas, K.E. Herkenhoff, B.C. Murray and the HiRISE Team, Crater Population and Resurfacing of the Martian North Polar Layered Deposits, *J. Geophys. Res.*, 115, E08006, 2010.
- 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.
- Byrne**, S., and 17 colleagues, Distribution of Mid-Latitude Ground-Ice on Mars from New Impact Craters, *Science*, 325, 1674, 2009.
- Byrne**, S., The polar deposits of Mars, *Ann. Rev. Earth Plan. Sci.*, 37, 2009.
- Russell, P., N. Thomas, S. **Byrne**, K. Herkenhoff, K. Fishbaugh, N. Bridges, C. Okubo, M. Milazzo, I. Daubar, C. Hansen, A. McEwen, Seasonally active frost-dust avalanches on a north polar scarp of Mars captured by HiRISE, *Geo. Phys. Lett.*, 35(23), L23204, 2008.
- Brown, A., S. **Byrne**, L.L. Tornabene and T. Roush, Louth crater: Evolution of a layered water ice mound, *Icarus*, 196(2), 433-445, 2008.

- Winebrenner, D.P., M.R. Koutnik, E.D. Waddington, A.V. Pathare, B.C. Murray, S. **Byrne** and J.L. Bamber, Evidence for ice flow prior to trough formation in the martian north polar layered deposits, *Icarus*, 195(1), 90-105, 2008.
- Byrne**, S., M. T. Zuber, G. A. Neumann, Interannual and Seasonal Behavior of Martian Residual Ice-Cap Albedo, *Planet. Space Sci.*, 56(2), 194-211, 2008.
- Herkenhoff, K.E., S. **Byrne**, P.S. Russell, K.E. Fishbaugh, and A.S. McEwen, Meter-Scale Morphology of the North Polar Region of Mars, *Science*, 317, 1711, 2007.
- McEwen, A.S., and 32 colleagues, A Closer Look at Water-Related Geologic Activity on Mars, *Science*, 317(5845), 1706, 2007.
- Koutnik, M., S. **Byrne**, B.C. Murray, A.D. Toigo, and Z.A. Crawford, Eolian controlled modification of the Martian south polar layered deposits, *Icarus*, 174, 490-501, 2005.
- Schaller, E., B.C. Murray, A.V. Pathare, J. Rasmussen, and S. **Byrne**, Modification of Secondary Craters on the Martian South Polar Layered Deposits, *J. Geophys. Res.*, 110, E02004, 2005.
- Jerolmack, D., D. Mohrig, M.T. Zuber, and S. **Byrne**, A minimum time for the formation of the Holden Northeast Fan, Mars, *Geophys. Res. Lett.*, 31, L21701, 2004.
- Byrne**, S., and A.B. Ivanov, The internal structure of the Martian south polar layered deposits, *J. Geophys. Res.*, 109, E11001, 2004.
- 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.
- Byrne**, S., and A.P. Ingersoll, Martian climatic events on timescales of centuries: Evidence from feature morphology in the residual south polar cap, *Geophys. Res. Lett.*, 30(13), 2003.
- Byrne**, S., and A.P. Ingersoll, A Sublimation Model for Martian South Polar Ice Features, *Science*, 299, 1051-1053, 2003.
- Koutnik, M., S. **Byrne**, and B.C. Murray, South Polar Layered Deposits of Mars: The Cratering Record, *J. Geophys. Res.*, 107(E11), 5100, 2002.
- Byrne**, S., and B.C. Murray, North polar stratigraphy and the paleo-erg of Mars, *J. Geophys. Res.*, 107(E6), 5044, 2002.
- Murray, B.C., M. Koutnik, S. **Byrne**, L.A. Soderblom, K.E. Herkenhoff, and K.L. Tanaka, Preliminary Geological Assessment of the Northern Edge of Ultimi Lobe, Mars South Polar Layered Deposits, *Icarus*, 154, 80-97, 2001.