

Paul Withers

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Citizenship: British (Green Card holder)

Education

- PhD, Planetary Science, University of Arizona 2003
- MS, Physics, Cambridge University, Great Britain 1998
- BA, Physics, Cambridge University, Great Britain 1998

Professional Experience

- Assistant Professor, Astronomy Department, Boston Univ. 2010-present
Analysis of atmosphere and ionospheric data from Venus, Earth and Mars, plus involvement with accelerometer and radio science spaceflight instruments
- Senior research associate, Boston Univ. Dr. Michael Mendillo 2007 – 2010
- Research associate, Boston Univ. Dr. Michael Mendillo 2003 – 2007
Analysis of ionospheric data from Venus, Earth and Mars, plus numerical modelling
- Graduate research assistant, Univ. of Arizona Dr. Stephen Bougher 1998 – 2003
Studies of tides in the martian upper atmosphere, plus an advisory role in mission operations for Mars Global Surveyor and Mars Odyssey aerobraking

Selected Fellowships, Honors, and Awards

- Selected by National Academy of Sciences to participate in Forum for New Leaders in Space Science (bilateral forum with China) 2014
- NASA Group Achievement Award to MSL Science Office Development and Operations Team 2013
- NASA Early Career Fellowship 2009

Selected Invited Presentations

- The ionosphere of Mars before the arrival of MAVEN, MIT Haystack Observatory 2014
- The ionosphere of Mars before the arrival of MAVEN, University of Massachusetts – Lowell 2014
- Exploring the ionosphere of Mars, Swedish Institute of Space Physics (IRF), Uppsala, Sweden 2012
- Getting the most out of entry probes, Georgia Tech 2012
- How the ionosphere of Mars works, MIT 2012

- The unusual electrodynamics of Mars, European Planetary Science Congress, Rome, Italy 2010
- Results from the Phoenix Atmospheric Structure Experiment, 7th International Planetary Probe Workshop, Barcelona, Spain 2010
- The effects of solar flares on planetary ionospheres, AOGS meeting, Singapore 2009

Selected Data Archiving Activities

- Coordinated delivery of Venus ionospheric data from Venera 15 and 16 to NASA Planetary Data System for review and archiving 2010
- Delivered atmospheric entry profiles (density, pressure, temperature) for Phoenix, and associated documentation, to NASA Planetary Data System for review and archiving 2010
- Delivered atmospheric entry profiles (density, pressure, temperature) for Spirit and Opportunity, and associated documentation, to NASA Planetary Data System for review and archiving 2008
- Delivered Odyssey aerobraking data (measured accelerations, derived density profiles, fitted constant altitude densities), and associated documentation, to NASA Planetary Data System for review and archiving 2008

Membership of Committees and Working Groups

- NASA Living With a Star (LWS) Targeted Research and Technology (TR&T) Steering Committee 2013-2014
- DPS Executive Committee 2012-present
- Mars Exploration Program Analysis Group (MEPAG) Goals Committee member 2008-present
- Mars Exploration Program Analysis Group (MEPAG) Mars Human Precursor Science Steering Group - Atmospheric Focus Team member 2004-2005

Selected Spacecraft Mission Involvement

- MAVEN Participating Scientist
- ExoMars Entry Demonstrator Module Entry Science Investigation (Co-I)
- Venus Express Accelerometer Instrument (Co-I)
- Venus Express Radio Science Instrument (Co-I)
- Mars Express Radio Science Instrument (Co-I)
- Mars Science Laboratory “Atmospheric Council” for EDL Planning
- Mars Odyssey Accelerometer Instrument (Participating Scientist)
- Huygens Atmospheric Structure Instrument (ACC sub-system Team Member)

Selected Peer Reviewed Publications

- **Withers** (2014) Predictions of the effects of Mars' encounter with comet C/2013 A1 (Siding Spring) upon metal species in its ionosphere, *Geophysical Research Letters*, 41, 6635-6643
- **Withers**, Moore, Cahoy, and Beerer (2014) How to process radio occultation data: 1. From time series of frequency residuals to vertical profiles of atmospheric and ionospheric properties, *Planetary and Space Science*, 101, 77-88
- **Withers**, *Fallows*, and Matta (2014) Predictions of electron temperature in the Mars ionosphere and their effects on electron densities, *Geophysical Research Letters*, 41, 2681-2686
- Matta, Galand, Moore, Mendillo, and **Withers** (2013) Numerical simulations of ion and electron temperatures in the ionosphere of Mars: Multiple ions and diurnal variations, *Icarus*, 227, 78-88
- **Withers**, Fillingim, Lillis, Haeusler, Hinson, Tyler, Paetzold, Peter, Tellmann, and Witasse (2012) Observations of the nightside ionosphere of Mars by the Mars Express Radio Science Experiment MaRS, *Journal of Geophysical Research*, 117, A12307, doi:10.1029/2012JA018185
- **Withers**, *Fallows*, Girazian, Matta, Haeusler, Hinson, Tyler, Morgan, Paetzold, Peter, Tellmann, Peralta, and Witasse (2012) A clear view of the multifaceted dayside ionosphere of Mars, *Geophysical Research Letters*, 39, L18202, doi: 10.1029/2012GL053193
- Lollo, **Withers**, *Fallows*, Girazian, Matta, and Chamberlin (2012) Numerical simulations of the ionosphere of Mars during a solar flare, *Journal of Geophysical Research*, 117, A05314, doi:10.1029/2011JA017399
- **Withers**, Pratt, Bertaux, and Montmessin (2011) Observations of thermal tides in the middle atmosphere of Mars by the SPICAM instrument, *Journal of Geophysical Research*, 116, E11005, doi:10.1029/2011JE003847
- **Withers** and Catling (2010) Observations of atmospheric tides at the season and latitude of the Phoenix atmospheric entry, *Geophysical Research Letters*, 37, L24204, doi:10.1029/2010GL045382
- **Withers** (2009) A review of observed variability in the dayside ionosphere of Mars, *Advances in Space Research*, 44, 277-307
- **Withers** (2008) Theoretical models of ionospheric electrodynamics and plasma transport, *Journal of Geophysical Research*, 113, A07301, doi:10.1029/2007JA012918
- Mendillo, **Withers**, Hinson, Rishbeth, and Reinisch (2006) Effects of solar flares on the ionosphere of Mars, *Science*, 311, 1135-1138
- Bougher, Bell, Murphy, Lopez-Valverde, and **Withers** (2006) Polar warming in the Mars thermosphere: Seasonal variations owing to changing insolation and dust distributions, *Geophysical Research Letters*, 33, L02203, doi:10.1029/2005GL024059
- Fulchignoni and 42 colleagues, including **Withers** (2005) In situ measurements of the physical characteristics of Titan's environment, *Nature*, 438, 785-791, doi:10.1038/nature04314
- **Withers**, Bougher, and Keating (2003) The effects of topographically-controlled thermal tides in the martian upper atmosphere as seen by the MGS Accelerometer, *Icarus*, 164, 14-32
- **Withers** and Neumann (2001) Enigmatic northern plains of Mars, *Nature*, 410, 651
- Lorenz, Lunine, **Withers**, and McKay (2001) Titan, Mars and Earth: Entropy production by latitudinal heat transport, *Geophysical Research Letters*, 28, 415 – 418