

# Douglas Hemingway – Curriculum Vitae

Miller Institute for Basic Research in Science, University of California Berkeley  
Department of Earth & Planetary Science, 307 McCone Hall, Berkeley, California, 94720, USA  
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## RESEARCH INTERESTS

Evolution of planetary interiors and surfaces, especially as revealed by their gravitational and magnetic fields; the geophysical processes that govern this evolution and the diversity we see across the Solar System.

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## EDUCATION

2010–2015 PhD, Earth & Planetary Sciences, [University of California Santa Cruz](#), USA  
2008–2009 MSc, *cum laude*, Space Studies, [International Space University](#), Strasbourg, France  
1996–2001 BAsC, *first class honours*, Systems Design Engineering, [University of Waterloo](#), Canada

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## EMPLOYMENT & RESEARCH EXPERIENCE

2015–2018 Postdoctoral Research Fellow, Miller Institute for Basic Research in Science, [University of California Berkeley](#)  
- *Department of Earth & Planetary Science (Faculty Host: Michael Manga)*

2010–2015 Graduate Student Researcher: Planetary Geophysics, [University of California Santa Cruz](#)  
- *Lunar magnetism and space weathering (Advisor: Ian Garrick-Bethell)*  
- *Icy satellite gravity, topography, and interiors (Advisor: Francis Nimmo)*

2009 Graduate Student Intern, [JAXA Institute of Space and Astronautical Science \(ISAS\)](#), Sagami-hara, Japan  
- *Autonomous navigation for planetary exploration rovers (Advisor: Takashi Kubota)*

2001–2010 Operations & Controls Engineering, [MDA Space Missions](#), Brampton, Canada  
- *Kinematics, trajectory tracking, and performance analysis, International Space Station robotic servicing system*  
- *Engineering Support Lead at Mission Operations Centre, [Canadian Space Agency](#), Montreal, Canada*  
- *Hubble Space Telescope (HST) robotic servicing mission design, lab-based analysis and demonstrations at [NASA Goddard Space Flight Center](#), Greenbelt, Maryland, USA*

1997–2001 Undergraduate Student Researcher, [University of Waterloo](#), Waterloo, Canada  
- *Lead developer for autonomous helicopter artificial vision and intelligence systems, Waterloo Aerial Robotics Group (Advisor: David Wang)*

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## SELECTED AWARDS

2015–2018 Miller Research Fellowship, University of California Berkeley  
2014 Student's choice award for outstanding TA, Honorable Mention  
2013 Waters Award for outstanding PhD research proposal  
2012 Dornik Award for best graduate student oral presentation at 43<sup>rd</sup> LPSC  
2010–2011 Chancellor's Fellowship, University of California Santa Cruz  
2008–2009 European Space Agency full scholarship award, International Space University  
2005 NASA Goddard Space Flight Center: "Outstanding Teamwork" Award for contribution to the preliminary design of the Hubble Space Telescope robotic servicing mission  
2005 MDA Space Missions: "Innovation Award" for initial concept development and demonstrations of robotic servicing capability for the Hubble Space Telescope

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## TEACHING & OUTREACH

2015 Instructor, UC Santa Cruz, Earth & Planetary Sciences, *EART110C (Upper Division Geophysics)*  
2014 Teaching Assistant, UC Santa Cruz, Earth & Planetary Sciences, *EART110C (Upper Division Geophysics)*  
2004 Trained NASA and ESA astronauts to carry out tele-robotic servicing of the Hubble Space Telescope  
2002– Space sciences and engineering outreach talks and activities for students in grades 4-12  
2000–2005 Interviewed for Discovery Channel specials including "Airbots" and "Hubble and Beyond"

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PROFESSIONAL ACTIVITIES

- 2014 NASA JPL Planetary Science Summer School
- 2013– Cassini team associate (RADAR and Radio Science)
- 2013– Referee: PDS archives; GRL; JGR: Planets; Icarus; EPSL
- 2010– American Geophysical Union
- 2009– Planetary Society

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REFEREED PUBLICATIONS

- (2017) Hemingway, D. J. & Mittal, T. (in prep.). Structure of Enceladus' ice shell, *Icarus*.
- Hemingway, D. J., less, L., Tajeddine, R., Tobie, G. (in revision). Interior of Enceladus, in *Enceladus and the Icy Moons of Saturn, Space Science Series*, University of Arizona Press.
- 2017 Black, B.A., Perron, J.T., Hemingway, D., Bailey, E., Nimmo, F., Zebker, H. (2017). Global drainage patterns and the origins of topographic relief on Earth, Mars, and Titan, *Science* 356 (6339), 727-731.
- Hemingway, D. J., & Matsuyama, I. (2017). Isostatic equilibrium in spherical coordinates and implications for crustal thickness on the Moon, Mars, Enceladus, and elsewhere, *Geophysical Research Letters* 44, 1-11.
- Nayak, M., Hemingway, D. J., Garrick-Bethell, I. (2017). Magnetization in the South Pole-Aitken Basin: Implications for the lunar dynamo and true polar wander, *Icarus* 286, 153-192.
- 2016 Hurford, T., Asphaug, E., Spitale, J., Hemingway, D., Rhoden, A., Henning, W., Bills, B., Kattenhorn, S., & Walker, M. (2016). Tidal disruption of Phobos as the cause of surface fractures, *Journal of Geophysical Research: Planets*, 121, 1054-1065.
- Poppe, A., Fatemi, S., Garrick-Bethell, I., Hemingway, D. J., Holmström, M. (2016). Solar wind interaction with the Reiner Gamma crustal magnetic anomaly: Connecting source magnetization to surface weathering. *Icarus* 266, 261-266.
- Tortora, P., Zannoni, M., Hemingway, D., Nimmo, F., Jacobson, R. A., less, L., Parisi, M. (2016). Rhea gravity field and interior modeling from Cassini data analysis. *Icarus* 264, 264-273.
- 2015 Hemingway, D. J., Garrick-Bethell, I., Kreslavsky, M. A. (2015). Latitudinal variation in spectral properties of the lunar maria and implications for space weathering. *Icarus* 261, 66-79.
- 2014 less, L., Stevenson, D. J., Parisi, M., Hemingway, D., Jacobson, R. A., Lunine, J. I., Nimmo, F., Armstrong, J. W., Asmar, S. W., Ducci, M., Tortora, P. (2014). The Gravity Field and Interior Structure of Enceladus. *Science* 344 (6179), 78-80.
- 2013 Hemingway, D., Nimmo, F., Zebker, H., & less, L. (2013). A rigid and weathered ice shell on Titan. *Nature* 500 (7464), 550-552.
- Garrick-Bethell, I., Lin, R. P., Sanchez, H., Jaroux, B. S., Bester, M., Brown, P., Cosgrove, D., Dougherty, M. K., Halekas, J. S., Hemingway, D., Lozano, P. C., Martel, F., Whitlock, C. W. (2013). Lunar magnetic field measurements with a cubesat. *Proceedings of SPIE Defense, Security, and Sensing*, paper 8739-2.
- 2012 Hemingway, D. & Garrick-Bethell, I. (2012). Magnetic field direction and lunar swirl morphology: Insights from Airy and Reiner Gamma. *Journal of Geophysical Research: Planets*, 117, E10012.

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SELECTED PRESENTATIONS

- 2017 Hemingway, D. J. & Tikoo, S. Lunar crustal magnetization inferred from characteristics of lunar swirls. *48<sup>th</sup> Lunar and Planetary Science Conference*, March 2017, Houston, Texas.
- 2016 Hemingway, D. J. Structure of Enceladus' Ice Shell. *AGU Fall Meeting*, December 2016, San Francisco, California.
- Hemingway, D. (invited), less, L., Tajeddine, R., & Tobie, G. Interior of Enceladus. *Enceladus and the Icy Moons of Saturn*, July 2016, Boulder, Colorado.
- Hemingway, D. (invited) & Poppe, A. Crustal Magnetic Field Topology and Space Weathering at Lunar Swirls. *Berkeley Space Physics Seminar, UC Berkeley*, April 2016, Berkeley, California.
- Hemingway, D., Zannoni, M., Tortora, P., Nimmo, F., & Asmar, S. Dione's Internal Structure Inferred from Cassini Gravity and Topography. *47<sup>th</sup> Lunar and Planetary Science Conference*, March 2016, Houston, Texas.
- Hemingway, D. (invited), Tidal/Rotational Distortion and Interior Modeling from Shape and Gravity. *Center for Integrative Planetary Science, UC Berkeley*, February 2016, Berkeley, California.

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SELECTED PRESENTATIONS (CONTINUED)

- 2015 **Hemingway, D.**, Garrick-Bethell, I., & Kreslavsky, M., Latitudinal Variation in the Color of the Lunar Maria and Implications for Space Weathering. *Poster at AGU Fall Meeting*, December 2015, San Francisco, California.
- Hemingway, D.**, Garrick-Bethell, I., & Kreslavsky, M., Latitudinal Variation in Spectral Properties of the Lunar Maria and Implications for Space Weathering. *Workshop on Space Weathering of Airless Bodies*, November 2015, Houston, Texas.
- Hemingway, D. (invited)**, Interiors of Titan and Enceladus Inferred From Their Topography and Gravity Fields. *Berkeley Seismo Lab, UC Berkeley*, October 2015, Berkeley, California.
- Hemingway, D.**, Zannoni, M., & Tortora, P. Interior Structure of Dione Inferred from *Cassini* Gravity and Topography. *Cassini Project Science Group Meeting #67, JPL*, October 2015, Pasadena, California.
- Hemingway, D.**, Nimmo, F., Tortora, P., Zannoni, M., less, L., Parisi, M., Thomas, P. Rhea's Internal Structure Inferred from *Cassini* Gravity and Topography. *46<sup>th</sup> Lunar and Planetary Science Conference*, March 2015, Houston, Texas.
- 2014 Pieters, C., Garrick-Bethell, I., & **Hemingway, D.**, Magnetic Sorting of the Regolith on the Moon: Lunar Swirls. *AGU Fall Meeting*, December 2014, San Francisco, California.
- Nayak, M., Garrick-Bethell, I., & **Hemingway, D.**, Evidence for Mini-Magnetospheres at four Lunar Magnetic Anomalies: Reiner-Gamma, Airy, Descartes and Crozier. *AGU Fall Meeting*, December 2014, San Francisco, California.
- Hemingway, D. (invited)**, Garrick-Bethell, I., & Kreslavsky, M., Space Weathering at Lunar Swirls and at High Lunar Latitudes. *Lunar Science Workshop, Kyung Hee University, May 2014*, South Korea.
- Hemingway, D.**, Garrick-Bethell, I., & Kreslavsky, M., Space Weathering at Lunar Swirls and at High Lunar Latitudes. *45<sup>th</sup> Lunar and Planetary Science Conference*, March 2014, Houston, Texas.
- 2013 **Hemingway, D.**, Nimmo, F., & less, L., Enceladus' interior structure inferred from Cassini-derived gravity and topography. *AGU Fall Meeting*, December 2013, San Francisco, California.
- Hemingway, D.**, Nimmo, F., & less, L., Interior structure of Enceladus inferred from gravity and topography. *Cassini Project Science Group Meeting #61, JPL*, October 2013, Pasadena, California.
- Hemingway, D.**, Nimmo, F., Zebker, H., & less, L., A rigid and weathered ice shell on Titan. *Titan Surface Workshop, MIT*, August 2013, Cambridge, Massachusetts.
- Hemingway, D. (invited)** Lunar Magnetism: Origins and influence on space weathering. *Colloquium seminar at Lunar and Planetary Institute*, April 2013, Houston, Texas.
- Hemingway, D.**, Nimmo, F., Zebker, H., & less, L., Elastic thickness of Titan's ice shell estimated from a combined study of gravity and topography. *44<sup>th</sup> Lunar and Planetary Science Conference*, March 2013, Houston, Texas.
- 2012 **Hemingway, D.** & Garrick-Bethell, I., Insights into Lunar Swirl Morphology and Magnetic Source Geometry: Models for the Reiner Gamma and Airy Anomalies. *43<sup>rd</sup> Lunar and Planetary Science Conference*, March 2012, Houston, Texas.
- 2011 **Hemingway, D.** & Garrick-Bethell, I., How magnetic field direction influences lunar swirl morphology. *Poster at AGU Fall Meeting*, December 2011, San Francisco, California.
- Garrick-Bethell, I., Lin, R., Sanchez, H., & **Hemingway, D.**, Lunar Swirl Impactors: A low-cost mission to study lunar swirls, magnetism, water, space weathering, dust and plasma physics. *Annual Meeting of the Lunar Exploration Analysis Group*, November 2011, Houston, Texas.
- Asphaug, E., **Hemingway, D.**, & Movshovitz, N., What do grooves mean? *NASA Second Annual Conference on the Exploration of Phobos and Deimos*, March 2011, Mountain View, California.

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NON-REFEREED PUBLICATIONS

- 2015 **Hemingway, D.** (2015). Lunar Magnetism, Space Weathering, and Icy Satellite Interiors. *Doctoral Dissertation, University of California Santa Cruz*, Santa Cruz, California.
- 2009 **Hemingway, D.** (2009). An Autonomous Navigation System for Lunar and Planetary Exploration Rovers. *JAXA Internship Project Report for the Master of Space Studies, International Space University*, Strasbourg, France.
- 2009 **Hemingway, D.** (2009). Mitigating the Lunar Dust Hazard. *Research Project for the Master of Space Studies, International Space University*, Strasbourg, France.