

Douglas Hemingway – Curriculum Vitae

Assistant Research Professor, University of Texas Institute for Geophysics, University of Texas at Austin

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RESEARCH INTERESTS

Geophysical modeling of planetary interiors. The evolution and behavior of rocky and icy bodies and what gives rise to all the diversity we see across our solar system and beyond. Focus areas include planetary magnetism and icy ocean worlds.

EDUCATION

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| 2010–2015 | PhD, Earth & Planetary Sciences, University of California Santa Cruz , Santa Cruz, CA, USA |
| 2008–2009 | MSc, cum laude, Space Studies, International Space University , Strasbourg, Alsace, France |
| 1996–2001 | BASc, first class honours, Systems Design Engineering, University of Waterloo , Waterloo, ON, Canada |

PROFESSIONAL APPOINTMENTS

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| 2022–present | Assistant Research Professor, University of Texas Institute for Geophysics, University of Texas at Austin , USA |
| 2020–2022 | Chief Scientist and Senior Director, Civil Space Business Development, Maxar Technologies , Palo Alto, CA, USA |
| 2018–2020 | Carnegie Fellow, Carnegie Institution for Science , Washington, DC, USA |
| 2015–2018 | Miller Fellow, Miller Institute for Basic Research in Science, University of California Berkeley , Berkeley, CA, USA |
| 2010–2015 | Graduate Student Researcher, University of California Santa Cruz , Santa Cruz, CA, USA |
| 2009 | Graduate Student Intern, JAXA Institute of Space and Astronautical Science (ISAS) , Sagamihara, Japan |
| 2001–2010 | Space Robotics Operations & Controls Engineering, MDA Space Missions , Brampton, ON, Canada |
| 1997–2001 | Student Researcher/Manager, Waterloo Aerial Robotics Group, University of Waterloo , Waterloo, ON, Canada |

SELECTED AWARDS, HONORS, GRANTS

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| 2024 | Outstanding Early Career Researcher Award, University of Texas Institute for Geophysics |
| 2024–2027 | Principal Investigator for NASA Habitable Worlds grant |
| 2024–2027 | Principal Investigator for NASA Solar System Workings grant |
| 2023–2026 | Co-Investigator for NASA Cassini Data Analysis Program grant |
| 2018–2020 | Carnegie Postdoctoral Fellowship, Carnegie Institution for Science |
| 2015–2018 | Miller Research Fellowship, University of California Berkeley |
| 2014 | Student's choice award for outstanding TA, Honorable Mention, University of California Santa Cruz |
| 2013 | Waters Award for outstanding PhD research proposal, University of California Santa Cruz |
| 2012 | Dwornik Award for best graduate student oral presentation at 43 rd Lunar and Planetary Science Conference |
| 2010 | Chancellor's Fellowship, University of California Santa Cruz |
| 2008 | European Space Agency full scholarship award, International Space University |
| 2005 | NASA Goddard Space Flight Center Outstanding Teamwork Award, and MDA Innovation Award for initial concept development and demonstrations of robotic servicing capability for the Hubble Space Telescope |

PROFESSIONAL ACTIVITIES

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| 2015–present | Research proposal writing: NASA: CDAP, SSW, HW, LDAP |
| 2015–present | Mission/technology proposal writing: NASA: Discovery, PRISM, LTV; DARPA |
| 2013–present | Panelist or external reviewer for: NASA ROSES; ETH Zurich |
| 2013–present | Peer review: NASA Planetary Data System archives; <i>Earth & Planetary Science Letters</i> ; <i>Earth & Space Science</i> ; <i>Geophysical Research Letters</i> ; <i>Icarus</i> ; <i>Journal of Geophysical Research: Planets</i> ; <i>Monthly Notices of the Royal Astronomical Society</i> ; <i>Nature Astronomy</i> ; <i>Nature Geoscience</i> ; <i>Planetary Science Journal</i> |
| 2010–present | Member of the American Geophysical Union |
| 2009–present | Member of the Planetary Society |
| 2021–2022 | Keck Institute for Space Studies: Next Generation Planetary Geodesy |
| 2013–2018 | Cassini team associate (RADAR and Radio Science teams) |
| 2014 | NASA JPL Planetary Science Summer School (Uranus orbiter mission design with Team X) |

TEACHING, TRAINING

- 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
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OUTREACH, MEDIA

- 2002–present Space sciences and engineering outreach talks and activities for K-12 students
2024 Invited presenter at Texas Space Grant total solar eclipse event with Smilin V Scout Ranch
2024 Interviewed for Heights of Humanity podcast (long-form)
2019 Interviewed for CBC (Canadian Broadcasting Corporation) radio “As It Happens” for Enceladus ice shell paper
2013 Interviewed for ABC (Australian Broadcasting Corporation) radio “Star Stuff” for Titan ice shell paper
2005 Featured in Discovery Science Channel special “Hubble and Beyond” while at NASA GSFC
2000 Interviewed for Discovery Science Channel special “Airbots” at the International Aerial Robotics Competition
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INVITED SEMINARS

- 2025 [Southwest Research Institute-Boulder](#)
2024 [German Aerospace Center \(DLR\)](#), Institute of Planetary Research
[Carnegie Institution for Science](#), Earth & Planets Laboratory
2023 [Baylor University](#), Department of Geosciences
[University of Texas at Austin](#), Center for Planetary Systems Habitability
2022 [University of Texas at Austin](#), Institute for Geophysics
2021 [University of Oxford](#), Earth Sciences
2020 [Planetary Science Institute](#)
[Johns Hopkins University](#), Earth & Planetary Sciences
[University of Maryland](#), Department of Geology
[University of New Mexico](#), Earth & Planetary Sciences
[University of Oxford](#), Earth Sciences
2019 [University of Cambridge](#), Earth Sciences
[Rutgers University](#), Earth & Planetary Sciences
[NASA Jet Propulsion Laboratory](#)
[Smithsonian Natural History Museum](#), Department of Mineral Sciences
[University of Nantes](#), Laboratoire de Planétologie et Géodynamique
[Carnegie Institution for Science](#), Department of Terrestrial Magnetism
[NASA Goddard Space Flight Center](#), Planetary Geology, Geophysics & Geochemistry
[University of Maryland](#), Department of Astronomy
2018 [Cornell University](#), Department of Astronomy
[UC Berkeley](#) Center for Integrative Planetary Science
[Harvard University](#), Earth & Planetary Sciences
[Rutgers University](#), Earth & Planetary Sciences
[Caltech](#), Division of Geological & Planetary Sciences
2017 [Massachusetts Institute of Technology](#), Earth, Atmospheric & Planetary Sciences
[San Jose State University](#), Geology Club
[UC Berkeley](#), Earth & Planetary Sciences
[Fresno State University](#), Earth & Environmental Sciences

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- Caltech, Planetary Sciences Seminar
San Francisco State University, Earth & Climate Sciences
2016 UC Berkeley, Center for Integrative Planetary Science
 UC Berkeley, Space Sciences Laboratory / Space Physics Seminar
 NASA Jet Propulsion Laboratory, Science Division
2015 UC Berkeley, Berkeley Seismo Lab
2013 Lunar and Planetary Institute

PUBLICATIONS ID 0000-0001-5617-207X

Submitted/Under Review

- Hemingway, D.J.** Geometric properties of the magnetic field outside a magnetised rectangular prism. Submitted to *Royal Astronomical Society Techniques and Instruments*.
Byrne, P., Dawson, H., Klimczak, C. Regensburger, P., Crane, K., Catalano, J., Melwani Daswani, M., Elder, C., Foley, B., German, C., Green, A., **Hemingway, D.J.**, Panning, M., Randolph-Flagg, N., Sherwood Lollar, B., Skemer, P., Wiens, D., Vance, S. Little to No Active Faulting Likely at Europa's Modern-Day Seafloor. In revision for *Nature Communications*.

Refereed publications

30. Miles, G., Howett, C.J.A., Nimmo, F., **Hemingway, D.J.** (accepted) Endogenic heat detected at Enceladus' north pole. *Science Advances*.
29. Bi, H., Sun, D., Sun, N., Mao, Z., Dai, M., and **Hemingway, D.** (2025) Seismic Detection of a 600-km Solid Inner Core in Mars. *Nature* 645, (8079). doi:10.1038/s41586-025-09361-9
28. Montiel, N., Lavier, L., and **Hemingway, D.J.** (2025) Regionalized Formation and Recycling of New Venusian Crust at Chasmata. *Planetary Science Journal* 6, (9). doi:10.3847/PSJ/adef37
27. **Hemingway, D. J.**, and Nimmo, F. (2024) Looking for subsurface oceans within the moons of Uranus using librations and gravity. *Geophysical Research Letters* 51, (18). doi:10.1029/2024GL110409
26. Park, R. S., Mastodemos, N., Jacobson, R. A., Berne, A., Vaughan, A. T., **Hemingway, D. J.**, Castillo-Rogez, J. C., Keane, J. T., Konopliv, A. S., Leonard, E. J., Nimmo, F., Riedel, J. E., Simons, M., Vance, S. (2024) The global shape, gravity field, and libration of Enceladus. *Journal of Geophysical Research: Planets*, 129 (1). doi:10.1029/2023JE008054
25. Wieczorek, M., Weiss, B., Breuer, D., Cébron, D., Fuller, M., Garrick-Bethell, I., Gattaccea, J., Halekas, J., **Hemingway, D.**, Hood, L., Laneuville, M., Nimmo, F., Oran, R., Purucker, M., Rückriemen, T., Soderlund, K., Tikoo, S. (2023) Lunar Magnetism. *Reviews in Mineralogy & Geochemistry*, 89 (1), 207-241. doi:10.2138/rmg.2023.89.05
24. Ermakov, E., Park, R. S., Roa, J., Castillo-Rogez, J., Keane, J. T., Nimmo, F., Kite, E., Sotin, C., Lazio, J., Steinbrügge, G., Howell, S. M., Bills, B., **Hemingway, D. J.**, Viswanathan, V., Tobie, G., and Lainey, V. (2021). A Recipe for Geophysical Exploration of Enceladus. *Bulletin of the American Astronomical Society*, 53 (4). doi:10.3847/PSJ/ac06d2
23. **Hemingway, D. J.**, and Driscoll, P. E. (2021). History and future of the Martian dynamo and implications of a hypothetical solid inner core. *Journal of Geophysical Research: Planets*, 126. doi:10.1029/2020JE006663
22. Deca, J., **Hemingway, D. J.**, Divin, A., Lue, C., Poppe, A., Garrick-Bethell, I., Lembège, B., and Horányi, M. (2020). Simulating the Reiner Gamma swirl: the long-term effect of solar wind standoff. *Journal of Geophysical Research: Planets*, 125. doi:10.1029/2019JE006219
21. Zannoni, M., **Hemingway, D. J.**, Gomez Casajus, L., and Tortora, P. (2020). The gravity field and interior structure of Dione. *Icarus* 345. doi:10.1016/j.icarus.2020.113713
20. **Hemingway, D. J.**, Rudolph, M., and Manga, M. (2020). Cascading parallel fractures on Enceladus. *Nature Astronomy* 4, 234-239. doi:10.1038/s41550-019-0958-x
19. McFadden, J., Garrick-Bethell, I., Kyung Sim, C. Kim, S., and **Hemingway, D. J.** (2019). Iron content determines how space weathering flux variations affect lunar soils. *Icarus* 333, 323-342. doi:10.1016/j.icarus.2019.05.033
18. Lopes, R. M. C., Wall, S. D., Elachi, C., Birch, S.P.D., Corlies, P., Coustenis, A., Hayes, A.G., Hofgartner, J.D., Janssen, M.A., Kirk, R.L., LeGall, A., Lorenz, R.D., Lunine, J.I., Malaska, M.J., Mastrogiovanni, M., Mitri, G., Neish, C.D., Notarnicola, C., Paganelli, F., Paillou, P., Poggiali, V., Radebaugh, J., Rodriguez, S., Schoenfeld, A., Soderblom, J.M., Solomonidou, A., Stofan, E.R., Stiles, B.W., Tosi, F., Turtle, E.P., West, R.D., Wood, C.A., Zebker, H.A., Barnes, J.W., Casarano, D., Encrenaz, P., Farr, T., Grima, C., **Hemingway, D.**, Karatekin, O., Lucas, A., Mitchell, K.L., Ori, G., Orosei, R., Ries, P., Riccio, D., Soderblom,

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- L.A., Zhang, Z. (2019). Titan as Revealed by the Cassini Radar. *Space Science Reviews* 215:33. doi:10.1007/s11214-019-0598-6
17. **Hemingway, D. J.** and Mittal, T. (2019). Enceladus's ice shell structure as a window on internal heat production. *Icarus* 332, 111-131. doi:10.1016/j.icarus.2019.03.011
 16. Durante, D., **Hemingway, D. J.**, Racopappa, P., less, L., and Stevenson, D.J. (2019). Titan's gravity field and interior structure after Cassini. *Icarus* 326, 123-132. doi:10.1016/j.icarus.2019.03.003
 15. **Hemingway, D. J.** and Tikoo, S. (2018). Lunar swirl morphology constrains the geometry, magnetization, and origins of lunar magnetic anomalies. *Journal of Geophysical Research: Planets*, 123, 2223-2241. doi:10.1029/2018je005604
 14. Castillo-Rogez, J. C., **Hemingway, D.**, Rhoden, A., Tobie, G., and McKinnon, W. B. (2018). Origin and evolution of Saturn's mid-sized moons. In *Enceladus and the Icy Moons of Saturn*, pp. 285-305, Space Science Series, University of Arizona Press. doi:10.2458/azu_uapress_9780816537075-ch014
 13. **Hemingway, D. J.**, less, L., Tajeddine, R., and Tobie, G. (2018). The Interior of Enceladus. In *Enceladus and the Icy Moons of Saturn*, pp. 57-77, Space Science Series, University of Arizona Press. doi:10.2458/azu_uapress_9780816537075-ch004
 12. Citron, R. I., Manga, M., and **Hemingway, D. J.** (2018). Timing of oceans on Mars from shoreline deformation. *Nature* 555, 643-646. doi:10.1038/nature26144
 11. **Hemingway, D. J.**, and Matsuyama, I. (2017). Isostatic equilibrium in spherical coordinates and implications for crustal thickness on the Moon, Mars, Enceladus, and elsewhere. *Geophysical Research Letters* 44, 7695-7705. doi:10.1002/2017GL073334
 10. Black, B.A., Perron, J.T., **Hemingway, D.**, Bailey, E., Nimmo, F., and Zebker, H. (2017). Global drainage patterns and the origins of topographic relief on Earth, Mars, and Titan. *Science* 356 (6339), 727-731. doi:10.1126/science.aag0171
 9. Nayak, M., **Hemingway, D. J.**, and Garrick-Bethell, I. (2017). Magnetization in the South Pole-Aitken Basin: Implications for the lunar dynamo and true polar wander. *Icarus* 286, 153-192. doi:10.1016/j.icarus.2016.09.038
 8. Hurford, T., Asphaug, E., Spitale, J., **Hemingway, D.**, Rhoden, A., Henning, W., Bills, B., Kattenhorn, S., and Walker, M. (2016). Tidal disruption of Phobos as the cause of surface fractures. *Journal of Geophysical Research: Planets*, 121, 1054-1065. doi:10.1002/2015JE004943
 7. Poppe, A., Fatemi, S., Garrick-Bethell, I., **Hemingway, D. J.**, and Holmström, M. (2016). Solar wind interaction with the Reiner Gamma crustal magnetic anomaly: Connecting source magnetization to surface weathering. *Icarus* 266, 261-266. doi:10.1016/j.icarus.2015.11.005
 6. Tortora, P., Zannoni, M., **Hemingway, D.**, Nimmo, F., Jacobson, R. A., less, L., and Parisi, M. (2016). Rhea gravity field and interior modeling from Cassini data analysis. *Icarus* 264, 264-273. doi:10.1016/j.icarus.2015.09.022
 5. **Hemingway, D. J.**, Garrick-Bethell, I., and Kreslavsky, M. A. (2015). Latitudinal variation in spectral properties of the lunar maria and implications for space weathering. *Icarus* 261, 66-79. doi:10.1016/j.icarus.2015.08.004
 4. 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., and Tortora, P. (2014). The Gravity Field and Interior Structure of Enceladus. *Science* 344 (6179), 78-80. doi:10.1126/science.1250551
 3. **Hemingway, D.**, Nimmo, F., Zebker, H., and less, L. (2013). A rigid and weathered ice shell on Titan. *Nature* 500 (7464), 550-552. doi:10.1038/nature12400
 2. 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., and Whitlock, C. W. (2013). Lunar magnetic field measurements with a cubesat. *Proceedings of SPIE Defense, Security, and Sensing*, paper 8739-2. doi:10.1117/12.2015666
 1. **Hemingway, D.** and Garrick-Bethell, I. (2012). Magnetic field direction and lunar swirl morphology: Insights from Airy and Reiner Gamma. *Journal of Geophysical Research: Planets*, 117, E10012. doi:10.1029/2012JE004165

Non-refereed publications

Keane, J.T., Sori, M.M., Ermakov, A.I., Austin, A., Bapst, J., Berne, A., Bierson, C., Bills, B., Bramson, A., Boeing, C., D'Amico, S., Denton, A., Evans, A., **Hemingway, D.**, Hernandez, S., Hogstrom, K., Izquierdo, K., James, P., Johnson, B., Kahre, M., Lau, H., Navarro, T., Neveu, M., Nimmo, F., O'Rourke, J., Ojha, L., Paik, H.J., Park, R., Rosen, P., Simons, M., Smrekar, S., Soderlund, K., Steinbrügge, G., Tikoo, S., Vance, S., Wagner, N., Weber, R., Zebker, H. (2023). Next-Generation Planetary Geodesy. *Keck Institute for Space Studies Final Report*, Pasadena, California.

Hemingway, D. (2015). Lunar Magnetism, Space Weathering, and Icy Satellite Interiors. *Doctoral Dissertation*, University of California Santa Cruz, Santa Cruz, California.

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.

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Hemingway, D. (2009). Mitigating the Lunar Dust Hazard. *Research Project for the Master of Space Studies, International Space University*, Strasbourg, France.

Turner, C., Kroetsch, D., **Hemingway, D.**, Lai, G., Wang, W. (2001). An Autonomous Multi-Vehicle System for Reconnaissance. *Journal of the AUVS International Aerial Robotics Competition*, Richland, Washington.

SELECTED CONFERENCE PRESENTATIONS

Hemingway, D. J. How can we converge on models of the interior of Enceladus? *Europlanet Society Congress & Division for Planetary Sciences Joint Meeting*, September 2025, Helsinki, Finland.

Hemingway, D. J. What should we believe about the interior of Enceladus? *AGU Fall Meeting*, December 2024, Washington, DC.

Hemingway, D. J., Nimmo, F. Physical Librations of Uranian Ocean Worlds. *Texas Area Planetary Science Meeting*, August 2024, San Antonio, Texas.

Hemingway, D. J., Nimmo, F. Physical Librations of Uranian Ocean Worlds. *Lunar and Planetary Science Conference*, March 2024, Houston, Texas.

Hemingway, D. J. and Driscoll, P. History and Future of the Martian Dynamo. *AGU Fall Meeting*, December 2023, San Francisco, California.

Hemingway, D. J. and Driscoll, P. History and Future of the Martian Dynamo. *Bay Area Planetary Science Meeting*, September 2023, Santa Cruz, California.

Hemingway, D. J. and Driscoll, P. History and Future of the Martian Dynamo. *Texas Area Planetary Science Meeting*, August 2023, San Antonio, Texas.

Hemingway, D. J. (invited), and Driscoll, P. The Life, Death, and Resurrection of Thermal-Compositional Dynamos. *AGU Fall Meeting*, December 2019, San Francisco, California.

Hemingway, D. J., Rudolph, M., and Manga, M. Cascading Parallel Fractures on Enceladus: Origin of the Tiger Stripes. *AGU Fall Meeting*, December 2019, San Francisco, California.

Hemingway, D. J. (invited) Insights from magnetic field direction. *Core of the Moon workshop*, May 2019, Marseille, France.

Hemingway, D. J., Rudolph, M., and Manga, M. Cascading Parallel Fractures Due to Thinning Ice and Bending Stresses: Implications from Enceladus's Tiger Stripes. *50th Lunar and Planetary Science Conference*, March 2019, Houston, Texas.

Hemingway, D. J. and Tikoo, S. Lunar swirl morphology constrains the geometry, magnetization, and origins of lunar magnetic anomalies. *AGU Fall Meeting*, December 2018, Washington, DC.

Hemingway, D. J. (invited) Isostasy on a small icy moon: implications for Enceladus's ice shell structure. *Geological Society of America Fall Meeting*, October 2017, Seattle, Washington.

Hemingway, D. J. and Tikoo, S. Lunar crustal magnetization inferred from characteristics of lunar swirls. *48th Lunar and Planetary Science Conference*, March 2017, Houston, Texas.

Hemingway, D. J. Structure of Enceladus' Ice Shell. *AGU Fall Meeting*, December 2016, San Francisco, California.

Hemingway, D. (invited), less, L., Tajeddine, R., and Tobie, G. Interior of Enceladus. *Enceladus and the Icy Moons of Saturn*, July 2016, Boulder, Colorado.

Hemingway, D., Zannoni, M., Tortora, P., Nimmo, F., and Asmar, S. Dione's Internal Structure Inferred from Cassini Gravity and Topography. *47th Lunar and Planetary Science Conference*, March 2016, Houston, Texas.

Hemingway, D., Garrick-Bethell, I., and Kreslavsky, M. Latitudinal Variation in the Color of the Lunar Maria and Implications for Space Weathering. *AGU Fall Meeting*, December 2015, San Francisco, California.

Hemingway, D., Garrick-Bethell, I., and 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., Nimmo, F., Tortora, P., Zannoni, M., less, L., Parisi, M., and Thomas, P. Rhea's Internal Structure Inferred from Cassini Gravity and Topography. *46th Lunar and Planetary Science Conference*, March 2015, Houston, Texas.

Pieters, C., Garrick-Bethell, I., and **Hemingway, D.**, Magnetic Sorting of the Regolith on the Moon: Lunar Swirls. *AGU Fall Meeting*, December 2014, San Francisco, California.

Hemingway, D. (invited), Garrick-Bethell, I., and 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., and Kreslavsky, M., Space Weathering at Lunar Swirls and at High Lunar Latitudes. *45th Lunar and Planetary Science Conference*, March 2014, Houston, Texas.

Hemingway, D., Nimmo, F., and less, L., Enceladus' interior structure inferred from Cassini-derived gravity and topography. *AGU Fall Meeting*, December 2013, San Francisco, California.

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Hemingway, D., Nimmo, F., Zebker, H., and less, L., A rigid and weathered ice shell on Titan. *Titan Surface Workshop, MIT*, August 2013, Cambridge, Massachusetts.

Hemingway, D., Nimmo, F., Zebker, H., and less, L., Elastic thickness of Titan's ice shell estimated from a combined study of gravity and topography. *44th Lunar and Planetary Science Conference*, March 2013, Houston, Texas.

Hemingway, D. and Garrick-Bethell, I., Insights into Lunar Swirl Morphology and Magnetic Source Geometry: Models for the Reiner Gamma and Airy Anomalies. *43rd Lunar and Planetary Science Conference*, March 2012, Houston, Texas.

Hemingway, D. and Garrick-Bethell, I., How magnetic field direction influences lunar swirl morphology. *AGU Fall Meeting*, December 2011, San Francisco, California.