

Steven A. Hauck, II

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Research Biography

I am an Earth and planetary scientist focused on understanding the long-term, evolutionary processes that connect the crust, lithosphere and deep interiors of planetary bodies. My work, and that of my research group and our colleagues, integrates spacecraft observations with theory and computational approaches to investigate planetary processes such as the origin of deep focus earthquakes, impact cratering, crustal formation, lithospheric deformation, mantle convection, and metallic core evolution. I have been involved with the NASA Mars Global Surveyor and MESSENGER missions, the latter as a Participating Scientist, working primarily with the laser altimetry and radio science instrumentation. I have also been heavily involved in work developing future lander missions to Mercury. Our work has shown how mid-sized bodies such as Mars, Mercury, and Ganymede evolve; elucidated the internal structure of Mercury; and demonstrated how metallic cores can crystallize from the top-down and its influence on magnetic field generation. Our recent work is focused on unraveling the consequences of the nucleation barrier for crystallization of the inner core of the Earth and other planetary bodies. My group and I thrive on involvement in interdisciplinary and international teams; that teamwork and collaboration is central to how our group has always made progress.

Employment

Department Chair	Case Western Reserve University	2019 – Present
Professor	Case Western Reserve University	2015 – Present
Associate Professor	Case Western Reserve University	2009 – 2015
Assistant Professor	Case Western Reserve University	2003 – 2009
Postdoctoral Associate	Carnegie Institution of Washington	2001 – 2003
Graduate Research Assistant	Washington University in St. Louis	1996 – 2001
Graduate Teaching Assistant	Washington University in St. Louis	1996 – 1999
Undergraduate Teaching Assistant	University of Minnesota	1995 – 1996
Undergraduate Research Assistant	University of Minnesota	1994
Laboratory Assistant	Natural Resources Research Institute	1992

Education

Washington University in St. Louis	Earth and Planetary Sciences	Ph.D. – 2001
Washington University in St. Louis	Earth and Planetary Sciences	A.M. – 1998
University of Minnesota	Aerospace Engineering and Mechanics	B.A.E.M. – 1996

Selected Honors

CWRU UCITE Mentoring Fellow, Interactive Commons AR/XR Fellow	2014, 2022
NASA Group Achievement Award for MESSENGER Orbital Operations	2017
MESSENGER Participating Scientist	2007 – 2016

Professional Society Memberships

American Geophysical Union	1994 – Present
Geological Society of America	2011 – Present
National Association of Geoscience Teachers	2017 – Present

Selected Publications

- M. E. Wyession, L. Beal, G. Caprarelli, K. Caylor, G. Destouni, J. Dixon, Q. Duan, **S. A. Hauck, II**, K. B. Karnauskas, K. Lajtha, N. Lugaz, A. Montanari, H. Nguyen, J. K. Parrish, A. V. Rowan, I. R. Santos, T. Schildgen, A. Schubnel, L. Tschirhart, M. A. Xenopolous, The Executive Order “Restoring Gold Standard Science” is Dangerous for America, *AGU Advances*, 6, e2025AV002011, doi: 10.1029/2025AV002011, 2025.
- M. A. Xenopolous, L. Beal, G. Caprarelli, K. Caylor, G. Destouni, Q. Duan, **S. A. Hauck, II**, M. Huber, K. B. Karnauskas, K. Lajtha, N. Lugaz, A. Montanari, H. Nguyen, J. K. Parrish, A. Rowan, I. R. Santos, A. Schubnel, M. Wyession, Commitment to Advance Excellence and Inclusion in the Earth and Space Sciences Scholarly Publications, *AGU Advances*, 6, e2025AV001726, doi: 10.1029/2025AV001726, 2025.
- Ernst, C. M., N. L. Chabot, R. L. Klima, S. Kubota, G. Rogers, P. K. Byrne, **S. A. Hauck, II**, K. E. Vander Kaaden, R. L. Vervack, Jr., S. Besse, D. T. Blewett, B. W. Denevi, S. Goossens, S. J. Indyk, N. R. Izenberg, C. L., Johnson, L. M. Jozwiak, H. Korth, R. L. McNutt, Jr., S. L. Murchie, P. N. Peplowski, J. M. Raines, E. B. Rampe, M. S. Thompson, S. Z. Weider, Science goals and mission concept for a landed investigation of Mercury, *Planetary Sci. Journal*, doi: 10.3847/PSJ/ac1c0f, 2022.
- S. A. Hauck, II**, Sharing planetary science in plain language, *Journal of Geophysical Research: Planets*, 124, 2462–2464, doi: 10.1002/2019JE006152, 2019.
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- Hauck, S. A., II**, M. Grott, P. K. Byrne, B. W. Denevi, S. Stanley, T. J. McCoy, Mercury’s global evolution, in *Mercury after the MESSENGER Mission*, (S. C. Solomon, B. J. Anderson, and L. R. Nittler, Eds), Cambridge University Press, pp. 516-543, doi:10.1017/9781316650684.020, 2018.
- Huguet, L., J. A. Van Orman, **S. A. Hauck, II**, M. Willard, Earth’s inner core nucleation paradox, *Earth and Planetary Science Letters*, 487, 9-20, doi: 10.1016/j.epsl.2018.01.018, 2018.
- Hauck, S. A., II**, J.-L. Margot, S. C. Solomon, R. J. Phillips, C. L. Johnson, F. G. Lemoine, E. Mazarico, T. J. McCoy, S. Padovan, S. J. Peale, M. E. Perry, D. E. Smith, M. T. Zuber, The curious case of Mercury’s internal structure, *J. Geophys. Res. Planets*, 118, 1204-1220, doi:10.1002/jgre.20091, 2013.
- Zuber, M. T., D. E. Smith, R. J. Phillips, S. C. Solomon, G. A. Neumann, **S. A. Hauck, II**, S. J. Peale, O. S. Barnouin, J. W. Head, C. L. Johnson, F. G. Lemoine, E. Mazarico, X. Sun, M. H. Torrence, A. M. Freed, C. Klimczak, J.-L. Margot, J. Oberst, M. E. Perry, R. L. McNutt, Jr., §J. A. Balcerski, N. Michel, M. J., Talpe, D. Yang, Topography of the northern hemisphere of Mercury from MESSENGER laser altimetry, *Science*, 336, 217-220, doi: 10.1126/science.1218805, 2012.
- Peplowski, P. N., L. G. Evans, **S. A. Hauck, II**, T. J. McCoy, W. V. Boynton, J. J. Gillis-Davis, D. S. Ebel, J. O. Goldsten, D. K. Hamara, D. J. Lawrence, R. L. McNutt, L. R. Nittler, S. C. Solomon, E. A. Rhodes, A. L. Sprague, R. D. Starr, K. R. Stockstill-Cahill, Radioactive elements on Mercury’s surface from MESSENGER: Implications for the planet’s formation and evolution, *Science*, 333, 1850-1852, doi: 10.1126/science.1211576, 2011.
- Hauck, S. A., II**, J. M. Aurnou, and A. J. Dombard, Sulfur’s impact on core evolution and magnetic field generation on Ganymede, *J. Geophys. Res.*, 111, E09008, doi:10.1029/2005JE002557, 2006.
- Hauck, S. A., II**, R. J. Phillips, Thermal and crustal evolution of Mars, *J. Geophys. Res.*, 107, 5052, 10.1029/2001JE001801, 2002.
- Phillips, R. J., M. T. Zuber, S. C. Solomon, M. P. Golombek, B. M. Jakosky, W. B. Banerdt, D. E. Smith, R. M. Williams, B. Hynek, O. Aharonson, **S. A. Hauck, II**, Ancient geodynamics and global-scale hydrology on Mars, *Science*, 291, 2587-2591, 2001.
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