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CURRICULUM VITAE
of
Marshall John Styczinski

PERSONAL

Information: US Citizen, born 1988 in Dublin, California.
Position: Affiliate Research Scientist, Blue Marble Space Institute of Science.
Interests: Magnetic sounding; astrobiology; open science; science communication and public outreach
Website: https://moosh.run

EDUCATION

09/2012 – 08/2021 University of Washington
Degree conferred: Doctor of Philosophy, Physics
Significant works: "Analytical forward models for magnetic induction of asymmetric, icy ocean worlds with implications for spacecraft investigations" (Doctoral dissertation, July 2021)
Degree conferred: Graduate Certificate, Astrobiology
Degree conferred: Master of Science, Physics

09/2006 – 06/2010 University of California, Davis
Degree conferred: Bachelor of Science with Highest Honors, Physics
Significant works: "On the Return of HP West: The Revival and Restoration of a Hewlett-Packard 5950A Photoelectron Spectrometer" (Undergraduate honors thesis, May 2010)

PROFESSIONAL QUALIFICATIONS

Extensive experience with a wide variety of programming languages and systems, especially:
SPICE ephemeris software, NASA PDS, UNIX & bash, Python, Matlab, Fortran, C++, IDL, and LaTeX
Open-source science, software, data, and project management with GitHub, Zenodo, PyPI packaging, and more
6 years formal experience teaching university physics, including TA training and exam writing

HONORS AND AWARDS

03/2024 Expert consultant, Universe Today article "Planetary Geophysics: What is it? What can it teach us about finding life beyond Earth?"
09/2023 Proposal selection (Science PI): "Modernizing the PlanetProfile Geophysical Framework" under NASA ROSES F.8 Supplemental Open-Source Software Awards ($74k total)
06/2023 Proposal selection (Science PI): "Joint Inversion of Magnetic Induction and Gravity Science Measurements Using New Laboratory Data for Europa Analog Solutions" under NASA ROSES C.27 Precursor Science Investigations for Europa Clipper ($2.00M total)
09/2021 – 08/2023 NASA Postdoctoral Program recipient
04/2019 – 08/2023 Europa Clipper Science Team Affiliate
05/2023 Panelist, NASA xD podcast "NASA Cross Divisional with Mobius Digital" — Part I; Part II
03/2023 Expert consultant, Space.com article "Europa Clipper: A guide to NASA's new astrobiology mission"
01/2022 Expert consultant, UW Astrobiology Program "life detection mission" workshop
09/2018 – 08/2021 NASA Earth and Space Science Fellowship recipient
05/2020 – 08/2020 JPL Planetary Science Summer School participant
04/2019 – 09/2019 Visiting Scholar, University of Oregon Planetary Science Group

08/2018 – 09/2018 Visiting Scholar, University of Melbourne Astrophysics Group
06/2018 – 08/2018 JPL Space Grant Summer Internship participant
03/2017 – 08/2021 Science Communication Fellow, Pacific Science Center
06/2010 Bachelor of Science with Highest Honors from UC Davis

SELECTED PRESENTATIONS

07/2023 Invited speaker, American Association of Physics Teachers Summer Meeting 2023:
"Doing Physics at NASA and Aggressively Rejecting a Gender Binary"
03/2023 Colloquium speaker, JPL Science Visitors Colloquium Program:
"SPD-41a and You: Key Points for SMD-funded Researchers and Mission Scientists from NASA's New Open Science Policy" (link to slides)
12/2022 Invited speaker, American Geophysical Union Fall Meeting 2022:
"Induced Magnetic Fields from Asymmetric Subsurface Oceans"
06/2022 Colloquium speaker, JPL Science Visitors Colloquium Program:
"Magnetic sounding of icy moons with constraints from multiple investigations"
05/2022 Colloquium speaker, JPL Icy worlds Collaboration and Exchange (ICE) seminar:
"Magnetic sounding of icy moons with constraints from multiple investigations"
04/2022 Colloquium speaker, NASA Ames Exobiology Group:
"Magnetic sounding of icy moons with constraints from multiple investigations"
07/2021 University of Washington PhD defense presentation:
"Magnetic sounding of icy moons"
08/2018 Colloquium speaker, University of Melbourne Astrophysics:
"Constraining Asymmetry in Europa's Oceans"
12/2017 Pacific Science Center's "Science in the City" speaker series:
"Models of Europa and the Search for Life"
05/2016 Town Hall Theater's "UW Science Now" speaker series (link to recording):
"Seeing the Light: Making Physics More Accessible"

SCIENTIFIC PUBLICATIONS

1. D. M. Schroeder, N. S. Wolfenbarger, G. B. Steinbrügge, R. Culberg, S. M. Howell, E. M. Spiers, and **M. J. Styczinski**. Constraining the thickness of the conductive portion Europa's ice shell using sparse radar echoes. *Geophysical Research Letters*, submitted, 2024.
2. C. J. Cochrane, **M. J. Styczinski**, S. D. Vance, J. B. Biersteker, and B. Weiss. On detecting and characterizing planetary oceans in the solar system using a big-data approach: Application to the uranus system. *Philosophical Transactions of the Royal Society A*, submitted, 2024.
3. C. J. Cochrane, S. D. Vance, **M. J. Styczinski**, L. Liuzzo, and J. C. Castillo-Rogez. Stronger evidence of a subsurface ocean within Callisto from a multifrequency investigation of its induced magnetic field. *AGU Advances*, in revision, 2024.
4. C. A. Psarakis, T. T. Fidelis, K. B. Chin, B. Journaux, A. Kavner, P. Sarker, **M. J. Styczinski**, S. D. Vance, and T. Wei. Electrical conductivity of subsurface ocean analog solutions from molecular dynamics simulations. *ACS Earth and Space Chemistry*, in press, 2024.
5. F. Petricca, J. C. Castillo-Rogez, A. Genova, M. Melwani Daswani, **M. J. Styczinski**, C. J. Cochrane, and S. D. Vance. Partial differentiation of Europa inferred from Galileo gravity data. *Nature Astronomy*, in press, 2024.
6. L. Pou, M. P. Panning, **M. J. Styczinski**, M. Melwani Daswani, C. Nunn, and S. D. Vance. Tidal seismology in the silicate interior of Europa. *Planetary Science Journal*, in press, 2024.
7. **M. J. Styczinski** and C. J. Cochrane. *PlanetMag:* software for evaluation of outer planet magnetic fields and corresponding excitations at their moons. *Earth and Space Science*, in press, 2024.

8. M. J. Schaible, N. Szeinbaum, G. O. Bozdag, L. Chou, N. Grefenstette, S. Colón-Santos, L. E. Rodriguez, **M. J. Styczinski**, J. L. Thweatt, Z. R. Todd, A. Vázquez-Salazar, A. Adams, M. N. Araújo, T. Altair, S. Borges, D. Burton, J. A. Campillo-Balderas, E. M. Cangi, T. Caro, E. Catalano, K. Chen, P. L. Conlin, Z. S. Cooper, T. M. Fisher, S. Mestre Fos, A. Garcia, D. M. Glaser, C. E. Harman, N. Y. Hermis, M. Hooks, K. Johnson-Finn, O. Lehmer, R. Hernández-Morales, K. H. G. Hughson, R. Jácome, T. Z. Jia, J. J. Marlow, J. McKaig, V. Mierzejewski, I. Mu noz Velasco, C. Nural, G. C. Oliver, P. I. Penev, C. Govinda Raj, T. P. Roche, M. C. Sabuda, G. A. Schaible, S. Sevgen, P. Sinhadc, L. H. Steller, K. Stelmach, J. Tarnas, F. Tavares, G. Trubl, M. Vidaurri, L. Vincent, J. M. Weber, M. M. Weng, R. L. Wilpiszeki, and A. Young. Chapter 1: The Astrobiology Primer 3.0. *Astrobiology*, 24(S1):S–4–S–39, 2024. DOI: 10.1089/ast.2021.0129

9. **M. J. Styczinski**, Z. S. Cooper, D. M. Glaser, O. Lehmer, V. Mierzejewski, and J. Tarnas. Chapter 7: Assessing habitability beyond earth. *Astrobiology*, 24(S1):S–143–S–163, 2024. DOI: 10.1089/ast.2021.0097

10. **M. J. Styczinski**, D. M. Glaser, M. Hooks, T. Z. Jia, K. Johnson-Finn, G. A. Schaible, and M. J. Schaible. Chapter 11: Astrobiology education, engagement, and resources. *Astrobiology*, 24(S1):S–216–S–227, 2024. DOI: 10.1089/ast.2021.0098

11. S. D. Vance, K. L. Craft, E. Shock, B. E. Schmidt, J. I. Lunine, K. P. Hand, W. B. McKinnon, E. M. Spiers, C. Chivers, J. D. Lawrence, N. Wolfenbarger, E. J. Leonard, K. J. Robinson, **M. J. Styczinski**, D. M. Persaud, G. Steinbrügge, M. Yu. Zolotov, L. C. Quick, J. E. C. Scully, T. M. Becker, S. M. Howell, R. N. Clark, A. J. Dombard, C. R. Glein, O. Mousis, M. A. Sephton, J. C. Castillo-Rogez, F. Nimmo, A. S. McEwen, M. S. Gudipati, I. Jun, X. Jia, F. Postberg, K. M. Soderlund, and C. M. Elder. Investigating Europa's habitability with Europa Clipper. *Space Science Reviews*, 219(81), 2023. DOI: 10.1007/s11214-023-01025-2

12. F. Petricca, A. Genova, J. C. Castillo-Rogez, **M. J. Styczinski**, C. J. Cochrane, and S. D. Vance. Characterization of icy moon hydrospheres through joint inversion of gravity and magnetic field measurements. *Geophysical Research Letters*, 50(17), 2023. DOI: 10.1029/2023GL104016

13. B. H. Chua, E. Gloesener, M. Choukroun, T. Vu, M. Melwani Daswani, B. Journaux, **M. J. Styczinski**, and S. D. Vance. Low-temperature specific heat capacity of water–ammonia mixtures down to the eutectic. *ACS Earth and Space Chemistry*, 7(10), 2023. DOI: 10.1021/acsearthspacechem.3c00091

14. J. H. Roberts, W. B. McKinnon, C. M. Elder, G. Tobie, J. B. Biersteker, D. Young, R. S. Park, G. Steinbrügge, F. Nimmo, S. M. Howell, J. C. Castillo-Rogez, M. L. Cable, J. N. Abrahams, M. T. Bland, C. Chivers, C. J. Cochrane, A. J. Dombard, C. Ernst, A. Genova, C. Gerekos, C. Glein, C. D. Harris, H. C. F. C. Hay, P. O. Hayne, M. Hedman, H. Hussmann, X. Jia, K. Khurana, W. S. Kiefer, R. Kirk, M. Kivelson, J. Lawrence, E. J. Leonard, J. I. Lunine, E. Mazarico, T. B. McCord, A. McEwen, C. Paty, L. C. Quick, C. A. Raymond, K. D. Retherford, L. Roth, A. Rymer, J. Saur, K. Scanlan, D. M. Schroeder, D. A. Senske, W. Shao, K. Soderlund, E. Spiers, **M. J. Styczinski**, P. Tortora, S. D. Vance, M. N. Villarreal, B. P. Weiss, J. H. Westlake, P. Withers, N. Wolfenbarger, B. Buratti, H. Korth, R. T. Pappalardo, and The Interior Thematic Working Group. Exploring the interior of Europa with the Europa Clipper. *Space Science Reviews*, 219(6):46, 2023. DOI: 10.1007/s11214-023-00990-y

15. **M. J. Styczinski**, S. D. Vance, and M. Melwani Daswani. *PlanetProfile:* self-consistent interior structure modeling for terrestrial bodies in python. *Earth and Space Science*, 10(8):e2022-EA002748, 2023. DOI: 10.1029/2022EA002748

16. J. Becker, D. Z. Seligman, F. C. Adams, and **M. J. Styczinski**. The influence of tidal heating on the habitability of planets orbiting white dwarfs. *The Astrophysical Journal Letters*, 945(L24), 2023. DOI: 10.3847/2041-8213/acbe44

17. A. M. Plattner, C. L. Johnson, **M. J. Styczinski**, S. D. Vance, and A. C. Mills. On Ganymede's magnetic quadrupolar strength. *Planetary Science Journal*, 4(134), 2023. DOI: 10.3847/PSJ/acde7f

18. A. Arredondo, A. Hodges, J. N. H. Abrahams, C. C. Bedford, B. D. Boatwright, J. Buz, C. Cantrall, J. Clark, A. Erwin, S. Krishnamoorthy, L. Magaña, R. M. McCabe, E. C. McIntosh, J. L. Noviello, M. Pellegrino, C. Ray, **M. J. Styczinski**, and P. Weigel. VALENTInE: A concept for a new frontiers-class long-duration in situ balloon-based aerobot mission to Venus. *Planetary Science Journal*, 3(7):152, 2022. DOI: 10.3847/psj/ac7324

19. **M. J. Styczinski**, S. D. Vance, E. M. Harnett, and C. J. Cochrane. A perturbation method for evaluating the

magnetic field induced from an arbitrary, asymmetric ocean world analytically. *Icarus*, 376:114840, 2022. DOI: 10.1016/j.icarus.2021.114840

20. C. J. Cochrane, S. D. Vance, T. A. Nordheim, **M. J. Styczinski**, A. Masters, and L. H. Regoli. In search of subsurface oceans within the uranian moons. *Journal of Geophysical Research: Planets*, 126(12):e2021JE006956, 2021. DOI: 10.1029/2021JE006956
21. S. D. Vance, **M. J. Styczinski**, B. G. Bills, C. J. Cochrane, K. M. Soderlund, N. Gómez-Pérez, and C. S. Paty. Magnetic induction responses of Jupiter's ocean moons including effects from adiabatic convection. *Journal of Geophysical Research: Planets*, 126(2):e2020JE006418, 2021. DOI: 10.1029/2020JE006418
22. **M. J. Styczinski** and E. M. Harnett. Induced magnetic moments from a nearly spherical ocean. *Icarus*, 354:114020, 2021. DOI: 10.1016/j.icarus.2020.114020
23. D. Pellett, A. Baldwin, G. Gallagher, D. Olson, and **M. J. Styczinski**. Radiation damage studies of materials and electronic devices using hadrons. *U.S. Department of Energy Office of Scientific and Technical Information Reports*, 2014. DOI: 10.2172/1132076
24. G. T. Seidler, D. R. Mortensen, A. J. Remesnik, J. I. Pacold, N. A. Ball, N. Barry, **M. Styczinski**, and O. R. Hoidn. A laboratory-based hard x-ray monochromator for high-resolution x-ray emission spectroscopy and x-ray absorption near edge structure measurements. *Review of Scientific Instruments*, 85(11):113906, 2014. DOI: 10.1063/1.4901599

OPEN-SOURCE SOFTWARE AND DATA RELEASES

1. **M. J. Styczinski** and C. Cochrane. coreyjcochrane/PlanetMag: Model updates following publication peer review, 2024. DOI: 10.5281/zenodo.10864719
2. **M. J. Styczinski**. itsmoosh/MoonMag: Support for passing more direct file paths, 2024. DOI: 10.5281/zenodo.5002955
3. S. Vance, **M. J. Styczinski**, M. Melwani Daswani, A. G. Marusiak, M. Niesyt, A. S. Bryant, A. Lisitsyn, and K. Vega. vancesteven/PlanetProfile: Viscosity added to columnar output data, 2024. DOI: 10.5281/zenodo.844130
4. **M. J. Styczinski** and D. Crichton. JPL cross-divisional Open Science and Data Management Plan template for ROSES-23, 2023. DOI: 10.5281/zenodo.8371336
5. B. Journaux, J. M. Brown, P. Espinoza, **M. J. Styczinski**, E. Clinton, and T. Gordon. Bjournaux/SeaFreeze: Updated package README and authorship info, 2023. DOI: 10.5281/zenodo.3367729
6. **M. J. Styczinski**, S. Vance, and M. Melwani Daswani. PlanetProfile default model outputs, 2023. DOI: 10.5281/zenodo.7250785
7. **M. J. Styczinski**, S. Vance, and M. Melwani Daswani. PlanetProfile Python version outputs compared to models of Vance et al. (2018), 2023. DOI: 10.5281/zenodo.7318029
8. A. Plattner and **M. J. Styczinski**. NASA-Planetary-Science/GanymedeMagModels: Small changes in figures, 2023. DOI: 10.5281/zenodo.7318029
9. C. J. Cochrane, **M. J. Styczinski**, and S. Vance. Degree-1 magnetic excitation spectra for icy moons, 2021. DOI: 10.5281/zenodo.5057571

RESEARCH POSITIONS

09/2023 – present *Affiliate Research Scientist*, Blue Marble Space Institute of Science
Research focus: Magnetic sounding of icy ocean worlds
Magnetic induction modeling and data analysis
Geophysical modeling of planetary interior structure
Laboratory analog studies for magnetic sounding

09/2021 – 08/2023 *NASA Postdoctoral Program Fellow*, Jet Propulsion Laboratory, California Institute of Technology
Research focus: Magnetic sounding of icy ocean worlds
Magnetic induction modeling and data analysis
Geophysical modeling of planetary interior structure
Advisor: NASA Research Scientist Steven D. Vance

05/2018 – 08/2021 *Doctoral Candidate*, University of Washington
Research focus: Magnetic sounding of icy moons, especially Europa
Magnetospheric plasma modeling
Advisor: Affiliate Professor Erika Harnett

09/2012 – 05/2018 *Graduate Student*, University of Washington
Past research: Improving the efficiency of conceptual instruction in- and out-of-class
Student understanding of Gauss's law
Interdisciplinary learning in science courses
Advisor: Professors Paula R. L. Heron and Peter S. Shaffer

04/2011 – 07/2012 *Junior Specialist*, University of California, Davis
Duties: Design, build, test, and analyze cryogenic bubble detection experiment (Tripathi);
Develop and implement software for analyzing irradiated magnets,
assess radiation damage of magnets used in Linear Collider R&D (Pellett);
Supervisor(s): Professor S. Mani Tripathi, Professor Emeritus David Pellett

07/2010 – 04/2011 *Development Technician*, University of California, Davis
Duties: Restore, repair, and improve indium evaporative deposition system (Tripathi);
Construct sensitive Double Chooz neutrino detector in international team (Svoboda);
Train and mentor undergraduate laboratory assistants
with X-ray photoemission spectrometer (Fadley)
Supervisor(s): Professor S. Mani Tripathi, Professor Robert Svoboda, Distinguished Professor
Charles S. Fadley

05/2008 – 06/2010 *Undergraduate Research Assistant*, University of California, Davis
Duties: Restore and optimize X-ray photoemission spectrometer system, analyze Si/Mo
multilayer crystal native oxide properties
Supervisor(s): Distinguished Professor Charles S. Fadley

TEACHING EXPERIENCE

09/2012 – 06/2018 *Graduate Teaching Assistant*, University of Washington
Courses: Introductory physics tutorials and laboratories, advanced electromagnetism tutorials,
and introductory courses in astrobiology, planetary science, and space science
Structure: Sole or co-instructor leading discussions in 24−32 student classrooms
Note: Most terms as head TA, leading training sessions for other TAs, writing exams,
and course administration (including curriculum writing and revisions)

09/2012 – 06/2018 *Physics Study Center Staff*, University of Washington
Courses: Introductory and advanced physics
Structure: Individual homework and conceptual guidance

10/2007 – 06/2012 *Physics Club Volunteer Tutor*, University of California, Davis
Courses: Introductory physics and calculus
Structure: Individual homework and conceptual guidance