

John D. Soltis

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EDUCATION:

Johns Hopkins University Krieger School of Arts & Sciences M.A. in Physics (2023) Ph.D in Astronomy and Astrophysics	2019 - 05/2025 (expected)	Baltimore, MD
University of Michigan Honors Program, College of Literature, Science, and the Arts B.S. in Physics and Mathematical Physics	2014 - 2018	Ann Arbor, MI

PROFESSIONAL INTERESTS:

Observational Cosmology, Artificial Intelligence, Science Policy, Data Science

SKILLS:

Python, Pytorch, Tensorflow, Science Communication, Policy Advocacy

RESEARCH PROJECTS & TEACHING:

Deep Learning Applications in Galaxy Cluster Cosmology <i>Johns Hopkins University & Space Telescope Science Institute</i> <i>Advisor: Michelle Ntampaka</i> Designed, trained, and tested artificial intelligence models to characterize galaxy cluster mass accretion rates and improve X-ray observations. Developed novel interpretability methods to enable physical discovery.	2021 - Present
Robustness of Cosmological Simulations <i>Center for Computational Astrophysics, Flatiron Institute</i> <i>Advisor: Lehman Garrison</i> Investigated the robustness of dark matter halo mass accretion rates in cosmological simulations.	2023 - 2024
Tip of Red Giant Branch Calibration <i>Johns Hopkins University & Space Telescope Science Institute</i> <i>Advisor: Adam Riess</i> Measured the Hubble constant using updated position data of Milky Way stars. Experimented with hierarchical Bayesian models, Hamiltonian Monte Carlo, and kernel density estimation.	2019 - 2020

Machine Learning Applications in Wildfire Detection 2018 - 2019*Lawrence Berkeley National Laboratory**Advisor: Carl Pennypacker*

Used images from wildfire detection cameras in California and Nevada to train a convolutional neural network to detect wildfires early.

Testing Statistical Isotropy with Type Ia Supernovae 2017 - 2018*University of Michigan**Advisor: Dragan Huterer*

Implemented a novel and robust test of statistical isotropy in the Universe using type Ia supernovae residuals.

Learning Assistant in Introductory Physics 2018*University of Michigan**Advisors: Timothy McKay & Yuri Popov*

Answered students' questions in class and in office hours for the introductory physics course.

Simulation of Laser-Driven Plasma Instabilities 2015 - 2016*University of Michigan**Advisor: Matthew Trantham*

Simulated laser-driven plasma instabilities with a variety of experimental conditions. Results were used to improve experimental design.

Summer Scholar Internship Program 2015*Lawrence Livermore National Laboratory**Advisors: John Heebner & Jason Chou*

Improved the accuracy of laser waveform generation in order to aid experiments at the National Ignition Facility.

PROFESSIONAL DEVELOPMENT:

Johns Hopkins University Mentorship Program 2023 - Present

Advised mentees on career paths, and professional opportunities.

Space Telescope Science Institute Liaison 2024 - Present

Serving as contact point between students in my department and Space Telescope.

Organizing lunches for students and colloquium speakers.

Union Steward 2024 - Present

Serving as an advocate for my peers on workplace issues.

American Astronomical Society 2024

Met with Members of Congress and their staffs to advocate for increased NASA and NSF funding at Congressional Visit Day.

Institute of Electrical and Electronics Engineers	2024
Advocated for NSF funding and improved STEM workforce policies at Congressional Visit Day.	
Johns Hopkins Science Policy & Diplomacy Group	2024
Advocated for the Keep STEM Talent Act of 2023 during Congressional Visit Day. Co-authored memo on immigration reform for those with advanced STEM-degrees. Current Science Policy Coordinator, organizing professional and advocacy events.	
Graduate Representative Organization	2021 - 2023
Represented my department on issues like travel grants and campus security.	
Maryland Space Grant Consortium Observatory Fellow	2021 - 2022
Hosted open house events, trained perspective observers, and helped run the MDSGC symposium.	
Public Forum Debate Judge	2020 - 2022
Judged for Michigan Interscholastic Forensics Association Public Forum League	
Michigan Journal of International Affairs	2014 - 2016
Writer for the Asia Region	
Brother Rice Debate Team	2010 - 2014
Varsity in Public Forum Debate	

SELECTED TALKS AND POSTERS:

1. *Direct Estimation of Galaxy Cluster Mass Accretion Rates using Machine Learning*. Cosmology and Galaxy Astrophysics with Simulations and Machine Learning 2024 Conference, Flatiron Institute. December 9th, 2024.
2. *Direct Estimation of Galaxy Cluster Mass Accretion Rates using Machine Learning*. Galaxy Cluster Group Meeting, Center for Astrophysics, Harvard-Smithsonian. October 22nd, 2024.
3. *Direct Estimation of Galaxy Cluster Mass Accretion Rates using Machine Learning*. Yale Data Science X Astronomy - Astrophysics Seminar, Yale University. September 17th, 2024.
4. *Estimating Galaxy Cluster Mass Accretion Rates from Observations using Machine Learning*. 2024 AstroAI Workshop, Center for Astrophysics, Harvard-Smithsonian. June 17-21, 2024.
5. *Galaxy Cluster Dynamical State, Follow-Up Observations, and Machine Learning*. Machine Learning Seminar, Argelander Institute for Astronomy, Bonn. June 6th, 2024.
6. *Testing the Robustness of Mass Accretion Histories in Scale-Free Simulations*. Merging Clusters Workshop, Yonsei University. December 21st, 2023.
7. **J. Soltis**, M. Ntampaka. "Predicting Follow-Up Observations of Galaxy Clusters Using Machine Learning", American Astronomical Society Meeting #240, id. 139.19. *Bulletin of the American Astronomical Society*, Vol. 54, No. 6 e-id 2022n6i139p19 (2022)

PUBLICATIONS:

1. **J. Soltis**, M. Ntampaka, B. Diemer, J. ZuHone, S. Bose, A. M. Delgado, B. Hadzhiyska, C. Hernández-Aguayo, D. Nagai, H. Trac. “A Multi-Wavelength Technique for Estimating Galaxy Cluster Mass Accretion Rates”, arXiv: 2412.05370, (2024)
2. B. E. M. Davis, M. Razavi-Mohseni, **J. Soltis**, H. N. Zhang, E. Kavanagh. “International STEM Graduate Students: A Key to Strengthening the American Economy and Building Competitiveness”, *Journal of Science Policy and Governance*, 25, 1, (2024)
3. **J. Soltis**, L. Garrison. “Self-Similar Mass Accretion Histories in Scale-Free Simulations”, *Monthly Notices of the Royal Astronomical Society*, 532, 2, 1729-1743, (2024)
4. M. Ho, **J. Soltis**, A. Farahi, D. Nagai, A. Evrard, M. Ntampaka. “Benchmarks and Explanations for Deep Learning Estimates of X-ray Galaxy Cluster Masses”, *Monthly Notices of the Royal Astronomical Society*, 524, 3, 3289-3302, (2023)
5. **J. Soltis**, M. Ntampaka, J. Wu, J. ZuHone, A. Evrard, A. Farahi, M. Ho, D. Nagai. “A Machine Learning Approach to Enhancing eROSITA Observations”, *The Astrophysical Journal*, 940, 1, 60 (2022)
6. **J. Soltis**, S. Casertano, A. G. Riess. “The Parallax of Omega Centauri Measured from Gaia EDR3 and a Direct, Geometric Calibration of the Tip of the Red Giant Branch and the Hubble Constant”, *The Astrophysical Journal Letters*, 908, L5 (2021)
7. **J. Soltis**, A. Farahi, D. Huterer, C. M. Liberato. “Percent-Level Test of Isotropic Expansion Using Type Ia Supernovae”, *Phys. Rev. Lett.*, 122, 091301 (2019)
8. W.C. Wan, G. Malamud, A. Shimony, C.A. Di Stefano, M.R. Trantham, S.R. Klein, **J.D. Soltis**, D. Shvarts, R.P. Drake, C.C. Kuranz. “Impact of ablator thickness and laser drive duration on a platform for supersonic, shockwave-driven hydrodynamic instability experiments”, *High Energy Density Physics*, 22, (2017)