John D. Soltis

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EDUCATION:

Johns Hopkins University 2019 - 2025 Baltimore, MD
Krieger School of Arts & Sciences
Ph.D in Astronomy and Astrophysics

Johns Hopkins University 2019 - 2023 Baltimore, MD
Krieger School of Arts & Sciences
M.A. in Physics

University of Michigan 2014 - 2018 Ann Arbor, MI
Honors Program, College of Literature, Science, and the Arts
B.S. in Physics and Mathematical Physics

Brother Rice High School 2010 - 2014 Bloomfield Hills, MI
Salutatorian of Class of 2014

SKILLS:

General
Science Communication, Machine Learning, Hierarchical Bayesian Modeling, Data Analysis

Software Packages & Languages
Python, Pytorch, Tensorflow, Unix, LaTeX, MATLAB, Microsoft Excel, C++

RESEARCH PROJECTS & EMPLOYMENT:

Deep Learning Applications in Galaxy Cluster Cosmology 2021 - Present
Johns Hopkins University & Space Telescope Science Institute *Advisor: Michelle Ntampaka*
Using convolutional neural networks to characterize galaxy cluster properties and improve observations.

Robustness of Cosmological Simulations 2023 - 2024
Flatiron Institute *Advisor: Lehman Garrison*
Investigated the robustness of dark matter halo mass accretion rates in cosmological simulations.

Maryland Space Grant Observatory Fellow 2021 - 2022
Johns Hopkins University *Advisor: Matt Collinge*
Hosted open house events, trained perspective observers on the telescope, and helped run the MDSGC symposium.

Tip of Red Giant Branch Calibration 2019 - 2020
Johns Hopkins University & Space Telescope Science Institute *Advisor: Adam Riess*
Measured the Hubble constant using updated position data of Milky Way stars.

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.

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.

EXTRACURRICULARS:

Science Policy and Diplomacy Group Congressional Visit Day 2025
Advocated for robust science funding and against severe budget cuts.

Science Policy and Consulting Career Panel 2025
Hosted five person panel on science policy careers for Johns Hopkins graduate students

Institute of Electrical and Electronics Engineers Congressional Visit Day 2025
Advocated for science funding, small business funding, and improved STEM workforce policies

American Astronomical Society Congressional Visit Day 2024
Met with Members of Congress and their staffs to advocate for increased NASA and NSF funding

Institute of Electrical and Electronics Engineers Congressional Visit Day 2024
Advocated for NSF funding and improved STEM workforce policies

Science Policy and Diplomacy Group Congressional Visit Day 2024
Advocated for the Keep STEM Talent Act of 2023

Graduate Representative Organization 2021 - 2023
General Council Representative for the Physics & Astronomy Department

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

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, (*Accepted for Publication*)
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)

SELECTED TALKS AND POSTERS:

1. **J. Soltis**, M. Ntampaka. "Direct Estimation of Galaxy Cluster Mass Accretion Rates using Machine Learning", American Astronomical Society Meeting #245, id. 412.02D. *Bulletin of the American Astronomical Society*, Vol. 57, No. 2 e-id 2025n2i412p02 (2025)
2. *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.
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. *Galaxy Cluster Mass Accretion History.* 6th Neighborhood Workshop, Pennsylvania State University. April 25th, 2024.
7. *Testing the Robustness of Mass Accretion Histories in Scale-Free Simulations.* Merging Clusters Workshop, Yonsei University. December 21st, 2023.
8. **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)