

# John D. Soltis

Johns Hopkins University - Department of Physics & Astronomy  
 Bloomberg Center for Physics and Astronomy  
 3400 N. Charles Street, Baltimore, MD 21218

<https://orcid.org/0000-0002-0104-3593> | <https://github.com/johnsoltis>

## EDUCATION:

<b>Johns Hopkins University</b> Krieger School of Arts & Sciences Ph.D in Astronomy and Astrophysics	2019 - Present	Baltimore, MD
<b>Johns Hopkins University</b> Krieger School of Arts & Sciences M.A. in Physics	2019 - 2023	Baltimore, MD
<b>University of Michigan</b> Honors Program, College of Literature, Science, and the Arts B.S. in Physics and Mathematical Physics	2014 - 2018	Ann Arbor, MI
<b>Brother Rice High School</b> Salutatorian of Class of 2014	2010 - 2014	Bloomfield Hills, MI

## 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:

<b>Deep Learning Applications in Galaxy Cluster Cosmology</b> <i>Johns Hopkins University &amp; Space Telescope Science Institute</i> Using convolutional neural networks to characterize galaxy cluster properties and improve observations.	2021 - Present <i>Advisor: Michelle Ntampaka</i>
<b>Robustness of Cosmological Simulations</b> <i>Flatiron Institute</i> Investigated the robustness of dark matter halo mass accretion rates in cosmological simulations.	2023 - 2024 <i>Advisor: Lehman Garrison</i>
<b>Maryland Space Grant Observatory Fellow</b> <i>Johns Hopkins University</i> Hosted open house events, trained perspective observers on the telescope, and helped run the MDSGC symposium.	2021 - 2022 <i>Advisor: Matt Collinge</i>
<b>Tip of Red Giant Branch Calibration</b> <i>Johns Hopkins University &amp; Space Telescope Science Institute</i> Measured the Hubble constant using updated position data of Milky Way stars.	2019 - 2020 <i>Advisor: Adam Riess</i>

**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:****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

**Johns Hopkins 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 & POSTERS:**

**J. Soltis**, M. Ntampaka, B. Diemer, J. ZuHone. "Estimating Galaxy Cluster Mass Accretion History From Observations Using Machine Learning", *in prep*

**J. Soltis**, L. Garrison. "Self-Similar Mass Accretion Histories in Scale-Free Simulations", *Submitted*, eprint arXiv:2405.05360 (2024)

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)

**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)

**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)

**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)

**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)