

Address: 909 Oakwood Avenue, State College, PA 16803

Email: ocurtis@psu.edu

Phone: +1 (813) 966-6168

Website: o-curtis.github.io

ACADEMIC POSITIONS

November 2024 – Present **The Pennsylvania State University, University Park, PA**
Postdoctoral Scholar
Department of Astronomy and Astrophysics
The Penn State Extraterrestrial Intelligence Center
Research Advisor: Jason T. Wright

EDUCATION

May 2020 – August 2024 **Boston University, Boston, MA**
Doctor of Philosophy, Astronomy
Dissertation Title: [Properties of Voids and Void Galaxies](#)
Research Advisor: Tereasa G. Brainerd

September 2018 – May 2020 **Boston University, Boston, MA**
Master of Arts, Astronomy
Graduate Coursework: Galaxies, High-energy Astrophysics, Plasma Physics, Radiative Transfer, Fluid Mechanics

August 2014 – May 2018 **University of South Florida, Tampa, FL**
Bachelor of Science, Physics
Bachelor of Arts, Mathematics (pure concentration)
USF Honors College
GPA: 3.98/4.00, Summa Cum Laude
Graduate Coursework: Computational Physics, General Relativity

GRANTS

- [1] 2026 CO-I – Nancy Grace Roman Characterizing the Interstellar Medium with Stacked Spectra of Ten Million Galaxies
 - [2] 2026 CO-I – A Census of Black Hole Evolution using High-Ionization Emission Lines
 - [3] 2026 CO-I – JWST Cycle 5 “CEDAR: Characterizing Electron Densities At Reionization” – \$234,113
 - [4] 2025 CO-I – PSU Institute for Computational and Data Science Rising Researcher Grant – \$75k
 - [5] 2023 Graduate School of Arts & Sciences Summer Fellowship – \$6,375.50
 - [6] 2023 BU Graduate Student Organization Travel Grant – \$1,000
 - [7] 2017 Society of Physics Students National Travel Grant – \$1,000
 - [8] 2017 USF Travel Grant – \$1,000
-

AWARDS AND ACCOMPLISHMENTS

- [1] 2026 Penn State Astronomy & Astrophysics Research Mentoring Award
 - [2] 2018 AAS Chambliss Astronomy Student Achievement Award
 - [3] 2017 Barry M. Goldwater Scholar Honorable Mention
 - [4] 2017 National Science Foundation Research Experience for Undergraduates: Northern Arizona University
 - [5] 2017 USF Undergraduate Research Conference's Excellence in Research Award
 - [6] USF Undergraduate Research Scholar
 - [7] USF Honors Scholarship
 - [8] Florida Bright Futures Scholarship
-

STUDENTS MENTORED

Graduate Students

- [1] Lishan Shi (PSU Institute for Computational and Data Sciences – co-advised with Prof. Joel Leja)
- [2] Elijah Matthews (PSU Institute for Computational and Data Sciences – co-advised with Prof. Joel Leja)

Undergraduate Students

- [1] William Keck (PSU '28)
 - [2] Aidan Rowland (PSU '27)
 - [3] Aidan Groenendaal (PSU '26 → REU at Northwestern → Masters student at DePauw University)
 - [4] Lennon Nichol (PSU '26 → PSU postbac scholar)
 - [5] Ana Christina Scigliani (PSU '25 → PSU postbac scholar)
 - [6] Angelina Estadt (PSU '25 → PhD student at the University of Delaware)
 - [7] Brock Ewing (BU '25)
 - [8] Angel Morales (BU '25)
-

TEACHING EXPERIENCE

Instructor of Record

- [1] Penn State University – AST 237W Astronomy Communications – Fall 2025
- [2] Boston University – CC 212 Core Natural Science II – Spring 2023
- [3] Boston University – CC 111 Core Natural Science I – Fall 2022

Guest Lecturer

- [1] Penn State University – Ast 585 Graduate Course in SETI – 6 lectures across Fall 2026

Teaching Assistant

- [1] Boston University – AS 101 The Solar System – 7 semesters
 - [2] Boston University – AS 100 Cosmic Controversies – 1 semester
 - [3] Boston University – AS 102 The Astronomical Universe – 2 semesters
 - [4] Boston University – AS 105 Alien Worlds – 1 semester
 - [5] Boston University – AS 107 Life Beyond Earth – 1 semester
 - [6] Boston University – AS 202 Principles of Astronomy I – 1 semester
 - [7] Boston University – AS 203 Principles of Astronomy II – 1 semester
 - [8] University of South Florida – AST 4721L Astrophysics Laboratory – 1 semester
-

HIGH PERFORMANCE COMPUTING EXPERIENCE AND COMPUTING SKILLS

I have extensive experience (>200,000+ Service-Unit hours) in high-performance computing on various clusters: The Massachusetts Green High Performance Computing Center, The Roar Supercomputer (PSU),

Monsoon (NAU), TACC Stampede, and CIRCE (USF).

Languages: Python, Fortran90, R, and SQL

Software Packages: Prospector, piXedfit, FSPS, sedpy, GADGET-2, Arepo, TensorFlow.

Paradigms: Stellar population synthesis, simulation-based inference, magnetohydrodynamics modelling, N-body simulations, generative adversarial networks, autoencoders.

OBSERVING EXPERIENCE

* indicates that data were taken by me on-site or remotely.

- [1] The 11m Hobby-Eberly Telescope. Instruments: LRS2 & HPF - 35 hours
 - [2] The 1.8m Perkins Telescope.* Instruments: PRISM - 6 hours
 - [3] The 4.4m Lowell Discovery Telescope.* Instruments: LMI, DeVeney Spectrograph - 5 hours
 - [4] The Allan Telescope Array (radio).* Beam-forming mode - 5 hours
-

INVITED SCIENTIFIC TALKS

- [1] **Curtis, O.,** et al. “A Light in the Dark: Unveiling Delayed Star Formation Histories Within Cosmic Voids.” Institute for Gravitation and the Cosmos Neighborhood Meeting, Penn State University, April 2nd, 2026. Oral Presentation.
- [2] **Curtis, O.,** et al. “A Light in the Dark: Unveiling Delayed Star Formation Histories Within Cosmic Voids.” Tea Talk, California Institute of Technology, March 23rd, 2026. Oral presentation.
- [3] **Curtis, O.,** et al. “Void Galaxies and Active Galactic Nucleus Activity in ZOBOV-identified TNG300 Voids from $z = 3$ to $z = 0$.” Tea Talk, Carnegie Observatory, March 23rd, 2026. Oral presentation.
- [4] **Curtis, O.,** et al. “When Galaxies Glow with Industry: A Search for Dyson Sphere Waste Heat from Galaxy-Spanning Civilizations.” PANOSSETI All Hands Meeting, University of San Diego, March 18th, 2026. Oral Presentation.
- [5] **Curtis, O.,** et al. “When Galaxies Glow with Industry: A Search for Dyson Sphere Waste Heat from Galaxy-Spanning Civilizations.” Astrobiology Colloquium Series, University of California Riverside, March 13th, 2026. Oral Presentation.
- [6] **Curtis, O.,** et al. “Dyson Spheres, Black Holes, and Minds: A Look at the Dyson Minds 2025 Workshop.” IAUS 404: Advancing the Search for Technosignatures. March 4th, 2026. Oral presentation. <https://www.youtube.com/watch?v=pz6NCJ9dVDI>
- [7] **Curtis, O.,** et al. “Probing Galaxy Evolution in Cosmic Voids with the TNG300 Simulation and the HETDEX Survey.” Café-club Paper Talk. Laboratoire d'Astrophysique de Marseille, January 30th, 2026. Oral Presentation.
- [8] **Curtis, O.,** et al. “Overview of Extragalactic Waste Heat SETI.” Fall 2025 Penn State Extraterrestrial Intelligence Seminar Series, Penn State University, State College, Pennsylvania, September 25th, 2026. Oral Presentation.

- [9] **Curtis, O.,** et al. “Disentangling Technological Waste Heat from Extragalactic Dust.” The 2025 PSETI Symposium, The Penn Stater Hotel and Conference Center, State College, Pennsylvania, August 18th – 21th, 2025. Oral Presentation. https://psu.mediaspace.kaltura.com/media/t/1_yb9yss5f
 - [10] **Curtis, O.,** and Ciardullo, R. “Void Galaxies in the Spitzer/HETDEX Exploratory Large-Area (SHELA) survey.” 246th Meeting of the American Astronomical Society, Anchorage, Alaska, June 8th – 12th, 2025. Oral Presentation.
 - [11] **Curtis, O.,** et al. “Voids and Void Galaxies in the TNG300 Simulation.” The Co-evolution of the Cosmic Web and Galaxies Across Cosmic Time, The Kavli Institute for Theoretical Physics, Santa Barbara, California, February 6th – 9th, 2023. Oral Presentation.
https://www.youtube.com/watch?v=AnXapqui_R4
 - [12] **Curtis, O.,** et al. “Voids and Void Galaxies in the TNG300 Simulation.” Physics and Astronomy Seminar Series, Tufts University, October 22nd, 2021. Oral Presentation.
-

PROFESSIONAL SERVICE

- [1] **2026 Penn State Department of Astronomy Undergraduate Curriculum Committee Member**
 - [2] **2025 Penn State Extraterrestrial Intelligence Center Symposium, State College, PA, August 18–21, 2025** – LOC Chair, SOC Member
 - [3] **Penn State Extraterrestrial Intelligence Center Seminar Series** – Organizer Fall 2024 - present
 - [4] **2025 Dyson Minds Workshop, Cambridge, MA, June 3–4, 2025** – Organizing committee member for an interdisciplinary workshop funded by Penn State, MIT, and Harvard
 - [5] **Physics Pedagogy Journal Club** – Organized and ran a weekly journal club in Spring 2022 at BU focused on physics education research and how to incorporate these ideas into our classrooms.
 - [6] **Graduate Student Representative** – Liaison between BU graduate students and faculty for the 2021-2022 academic year
-

PUBLIC OUTREACH

- [1] **Astronomical Society of Harrisburg (ASH) Star Party** – Between the nights of June 21st - 22nd I volunteered as a speaker and telescope operator at ASH’s yearly star party.
- [2] **Penn State AstroFest** – I volunteered at AstroFest 2025 and 2026, running educational demonstrations and planetarium shows to over a thousand guests over 4 nights.
- [3] **Public Observing Nights** – For 15 clear nights a year over 6 years, I set up telescopes and managed the observing session at Boston University’s Judson B. Coit Observatory’s public open nights.
- [4] **Skype a Scientist** – Since Spring 2019, I have participated in the Skype a Scientist program. I have talked with over 25 K-12 classrooms across the country, giving mini-lessons on space-based topics and talked to them about life as an astronomer.

- [5] **USF Engineering EXPO** – I organized USF's Society of Physics Students to perform multiple 45-minute shows at USF's annual Engineering EXPO, a 3 day event that brings together thousands of Tampa Bay public school students. Years performed: 2016, 2017, and 2018.
-

PROFESSIONAL DEVELOPMENT

- [1] **Teaching evaluation, PSU Grove Center for Excellence in Teaching Education** – Incorporated feedback from Grove Center and astronomy teaching faculty Ana Matković during Fall 2025 for my course AST 237W Astronomy Communications.
- [2] **BU's Center for Teaching & Learning's Inclusive Pedagogy Workshop** – Attended the seminar series of dialogue-based inclusive teaching practices from June 11–13, 2024.
- [3] **Teaching evaluation, BU Core Curriculum** – Incorporated feedback from BU Core Curriculum Master Lecturer Robin Stevens during three lectures of CC 212 Core Natural Sciences II in Spring 2023.
-

Research Publications

Link to ADS Library: <https://ui.adsabs.harvard.edu/user/libraries/yIWWhdzqTJOIPUolGK-r1w>

- [1] **Curtis, O.**, et al. "Luminosity Functions and Mass-Size Relations for Void Galaxies in the Complete SDSS DR7." *The Astrophysical Journal*. (submitted.)
- [2] **Curtis, O.** et al. "The $\hat{G}$ Infrared Search for Extraterrestrial Civilizations with Large Energy Supplies. V. When Galaxies Glow with Industry." *The Astrophysical Journal*. (submitted.) [10.48550/arXiv.2608.12458](https://arxiv.org/abs/10.48550/arXiv.2608.12458)
- [3] Garner, R., et al. (incl, **Curtis, O.**) "Mapping the Stellar Fossil Record of M101 with HETDEX: Spatially Resolved Ages and Metallicities." *The Astrophysical Journal*. (submitted.)
- [4] Moon, J. et al. (incl, **Curtis, O.**) "HETDEX [OII] galaxies at $z \leq 0.48$: Volume-limited samples and their power spectra." *The Astrophysical Journal*. (submitted.) [10.48550/arXiv.2607.08453](https://arxiv.org/abs/10.48550/arXiv.2607.08453)
- [5] Mentuch Cooper, E., et al. (incl, **Curtis, O.**) "HETDEX Public Data Release 1: Source Catalog 2 and Datacubes from ~ 90 sq. degrees of Integral-Field Optical Spectroscopy." *The Astrophysical Journal*. [10.3847/1538-4365/ae6068](https://arxiv.org/abs/10.3847/1538-4365/ae6068)
- [6] Cleri, N., et al. (incl, **Curtis, O.**) "RUBIES: The Evolution of the Ionization Parameter from $0 < z < 9$." *The Astrophysical Journal*. (submitted.) [10.48550/arXiv.2605.30410](https://arxiv.org/abs/10.48550/arXiv.2605.30410)
- [7] **Curtis, O.**, et al. "The Dyson Minds 2025 Workshop: SETI Around Black Holes." *Publications of the Astronomical Society of the Pacific*. 138.4 (2026): 046001. doi: [10.1088/1538-3873/ae5a02](https://arxiv.org/abs/10.1088/1538-3873/ae5a02)
- [8] Burnham, E., et al. (incl., **Curtis, O.**) "It's More Complicated Than You Think: A Forward Model to Infer the Recent Star Formation History, Bursty or Not, of Galaxy Populations." *The Astrophysical Journal*. 1001.2 (2026): 205. doi: [10.3847/1538-4357/ae562d](https://arxiv.org/abs/10.3847/1538-4357/ae562d)
- [9] Lujan Niemeyer, M., et al. (incl., **Curtis, O.**) "Ly α Intensity Mapping in HETDEX: Galaxy-Ly α Intensity Cross-power Spectrum." *The Astrophysical Journal*. 999.2 (2026): 177. doi: [10.3847/1538-4357/ae3a98](https://arxiv.org/abs/10.3847/1538-4357/ae3a98)

- [10] **Curtis, O.**, et al. "Void Galaxies and Active Galactic Nucleus Activity in ZOBOV-identified TNG300 Voids from $z=3$ to $z=0$." *The Astrophysical Journal*. 998.2 (2026): 325. doi: [10.3847/1538-4357/ac2f48](https://doi.org/10.3847/1538-4357/ac2f48)
- [11] McDonough, B., **Curtis, O.**, and Brainerd, T.G. "Measuring Scaling Relations: Fitting Technique Matters." *The Astrophysical Journal Letters*. 986.2 (2025): L32. doi: [10.3847/2041-8213/ade13c](https://doi.org/10.3847/2041-8213/ade13c)
- [12] **Curtis, O.**, McDonough, B., and Brainerd, T. G. "Density Profiles of TNG 300 Voids across Cosmic Time." *The Astrophysical Journal*. 985.2 (2025): 244. doi: [10.3847/1538-4357/adcebf](https://doi.org/10.3847/1538-4357/adcebf)
- [13] McDonough, B., **Curtis, O.**, et al. "Intrinsic and Environmental Effects on the Distribution of Star Formation in TNG100 Galaxies." *The Astrophysical Journal*. 978.1 (2024): 67. doi: [10.3847/1538-4357/ad9747](https://doi.org/10.3847/1538-4357/ad9747)
- [14] **Curtis, O.**, McDonough, B., and Brainerd, T. G. "Properties of Voids and Void Galaxies in the TNG300 Simulation." *The Astrophysical Journal* 962.1 (2024): 58. doi: [10.3847/1538-4357/ad18b4](https://doi.org/10.3847/1538-4357/ad18b4)
- [15] McDonough, B., **Curtis, O.**, and Brainerd, T. G. "Resolved Star Formation in TNG100 Central and Satellite Galaxies." *The Astrophysical Journal* 958.1 (2023): 19. doi: [10.3847/1538-4357/acfe0b](https://doi.org/10.3847/1538-4357/acfe0b)
- [16] **Curtis, O.**, Brainerd, T. G., and Hernandez, A. "Cosmic voids in GAN-generated maps of large-scale structure." *Astronomy and Computing* 38 (2022): 100525. doi: [10.1016/j.ascom.2021.100525](https://doi.org/10.1016/j.ascom.2021.100525)
- [17] Womack, M., **Curtis, O.**, et al. "The Visual Lightcurve of Comet C/1995 O1 (Hale–Bopp) from 1995 to 1999." *The Planetary Science Journal* 2.1 (2021): 17. doi: [10.3847/PSJ/abd32c](https://doi.org/10.3847/PSJ/abd32c)
 a. Software Release: **Curtis, O.**, et al. "ICQSplitter: Python Tool for Handling Visual or CCD Magnitudes of Comets v3.0," *Zenodo*, (2020) doi: [10.5281/zenodo.3628044](https://doi.org/10.5281/zenodo.3628044)
- [18] **Curtis, O.**, and Brainerd, T. G. "Fast generation of large-scale structure density maps via generative adversarial networks." *Research Notes of the AAS* 4.6 (2020): 90. doi: [10.3847/2515-5172/ab9e01](https://doi.org/10.3847/2515-5172/ab9e01)
- [19] Chandler, C. O., **Curtis, O.**, et al. "SAFARI: Searching asteroids for activity revealing indicators." *Publications of the Astronomical Society of the Pacific* 130.993 (2018): 114502. doi: [10.1088/1538-3873/aad03d](https://doi.org/10.1088/1538-3873/aad03d)

MANUSCRIPTS IN PREPARATION

In order of completion estimate

* Indicates a direct mentee

- [1] Shi, L.,* **Curtis, O.**, et al. "Millions of Galaxies But No Time: Rapid Inference of Galaxy Properties with Neural Density Estimators." (in preparation.)

PUBLIC TALKS

- [1] **Curtis, O.** "A Brief History and Current Search for Extraterrestrial Intelligence Research." Cherry Springs State Park, Potter County, Pennsylvania, June 21st, 2025. Oral Presentation, ~150 guests.
- [2] **Curtis, O.** "A tour of the Galaxy." Judson B. Coit Public Observatory Night, Boston, Massachusetts, April 19th, 2023. Oral Presentation, ~40 guests.

Press Releases

- [1] Cost, B. "[Scientists think alien civilizations could be using 'Dyson Spheres' to siphon energy from black holes.](#)" *The New York Post* (2026).
 - [2] Starr, M. "[JWST Just Examined Two Stars Suspected of Harboring Dyson Spheres. Here's What It Found...](#)" *ScienceAlert* (2026).
 - [3] MacDonald, F. "[Experts Met at MIT to Discuss The Possibility of Alien Tech Around Black Holes. Here's What Was Discussed.](#)" *ScienceAlert* (2026).
 - [4] Michael, J. "[Here's a look at the Penn State festival that kicks off after Arts Fest booths close.](#)" *The Centre Daily Times* (2025).
-

CONTRIBUTED TALKS AND POSTERS

* Indicates a direct mentee

- [1] Groenendaal, A.,* **Curtis, O.**, et al. "Proof of Concept: Lunar Occultations as an RFI Rejector." 2025 Penn State Undergraduate Research Exhibition, 321 Boucke Building, State College, Pennsylvania, April 14th – 16th, 2025. Poster.
- [2] Nichol, L.,* **Curtis, O.**, et al. "A Real piece of Sky: Chromatic Atmospheric Effects and the NEID Spectrograph." 2025 Penn State Undergraduate Research Exhibition, 321 Boucke Building, State College, Pennsylvania, April 14th – 16th, 2025. Poster.
- [3] Scigliani, A.,* Wright, J. T., Tusay, N., and **Curtis, O.** "Demystifying The Random Transiter." 245th Meeting of the American Astronomical Society, January 12th – 16th, 2025. Poster.
- [4] McDonough, B., **Curtis, O.**, et al. "Exploring IllustrisTNG simulations to derive observationally comparable star formation rates and metallicities." Recipes to Regulate Star Formation at All Scales: From the Nearby Universe to the First Galaxies, Baltimore, Maryland, April 15th – 19th, 2024. Workshop.
- [5] **Curtis, O.** and Brainerd, T. G. "Fast Generation of Large-Scale Structure Density Maps via Generative Adversarial Networks." 236th Meeting of the American Astronomical Society, Virtual Conference, June 1st – 3rd, 2020. Interactive Poster Presentation.
- [6] N. Lastra, **Curtis, O.**, et al. "Best Secular Lightcurve for Comet Hale-Bopp and Implications for Dust Production Rates." American Physical Society March Meeting, Los Angeles, California, March 5th – 9th, 2018. Poster Presentation.
- [7] **Curtis, O.**, et al. "SAFARI: Searching Asteroids for Activity Revealing Indicators." 232nd Meeting of the American Astronomical Society, Denver, Colorado, June 3rd – 7th, 2018. Interactive Poster Presentation.
- [8] Womack, M., Lastra, N., **Curtis, O.**, et al. "The Secular Lightcurve and Photometric Evolution of C/1995 O1 (Hale-Bopp)." 49th American Astronomical Society Annual Division of Planetary Science Meeting, Provo, Utah, October 15th-20th, 2017. Interactive Poster Presentation.

- [9] Harrington, O., Womack, M., **Curtis, O.**, et al. “Correlation Between Cometary Gas/Dust Ratios and Heliocentric Distance.” 49th American Astronomical Society Annual Division of Planetary Science Meeting, Provo, Utah, October 15th-20th, 2017. Poster Presentation.
-