Andy Nilipour

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EDUCATION

Harvard University, Cambridge, MA — September 2026 –
- Ph.D. in Astronomy

University of Cambridge, Cambridge, England — October 2025 – Present
- M.Phil. in Physics, funded by the Churchill Scholarship
- Advisor: Dr. Boris Bolliet

Yale University, New Haven, CT — August 2020 – May 2025
- B.S. in Astrophysics (with Distinction) & Mathematics, Certificate in Japanese
- *Summa cum laude,* GPA: 4.00

International Christian University, Mitaka, Tokyo, Japan — August 2023 – June 2024
- Middlebury in Japan, funded by The Richard U. Light Fellowship for Language Study in East Asia

RESEARCH EXPERIENCE

Massachusetts Institute of Technology Haystack Observatory, Westford, MA — June 2024 – Present
Research Assistant, Advisors: Drs. Kazunori Akiyama (MIT) and Paul Tiede (CfA)
- Developed a Julia-based software suite of regularized maximum likelihood (RML) methods for the Event Horizon Telescope (EHT)

National Astronomical Observatory of Japan, Mitaka, Tokyo, Japan — August 2023 – Present
Research Assistant, Advisors: Drs. Kazunori Akiyama (MIT), Shiro Ikeda (ISM), Mareki Honma (NAOJ), Kotaro Moriyama (IAA)
- Investigated the effectiveness of the optimal transport distance as a regularizer for RML reconstruction of EHT movie data

National Radio Astronomy Observatory, Socorro, NM — May 2023 – November 2024
NRAO NSF REU Intern, Advisors: Drs. Juergen Ott (NRAO), Brian Svoboda (NRAO), and David Meier (NMT)
- Measured the physical and kinematic properties of molecular clouds in the Milky Way Galactic bar region with ALMA

Berkeley SETI Research Center, Berkeley, CA — June 2022 – July 2023
Breakthrough Listen NSF REU Intern, Advisors: Drs. James Davenport (UW) and Steve Croft (UCB)
- Constrained technosignature candidate searches in scheduled observations and archival data using geometric signaling and receiving frameworks, utilizing high-precision astrometric and photometric data from Gaia Data Release 3

Yale Department of Physics, New Haven, CT — November 2020 – May 2025
Research Assistant, Advisor: Drs. Nikhil Padmanabhan and Farnik Nikakhtar
- Measured the 1D Ly-α forest power spectrum from the SDSS eBOSS quasar catalogue using the quadratic maximum likelihood estimator
- Used neural networks to learn the evolution of the linear point of the BAO feature in the two-point correlation function
- Developed new methods to reconstruct the cosmic displacement field in comparison with standard Lagrangian Perturbation Theory

AWARDS & FELLOWSHIPS

- **American Astronomical Society Chambliss Astronomy Achievement Student Award** — 2025
- **Churchill Scholarship** for master's degree study at the University of Cambridge — $75k, 2025-26
- **Yale College Russell Henry Chittenden Prize** to the senior in the natural sciences ranking highest in scholarship — $25k, 2025
- **Yale Astronomy George Beckwith Prize** to the undergraduate most proficient in some branch of astronomy — $500, 2025
- **Ezra Stiles College Richard B. Sewall Cup** for outstanding scholarly achievement — 2025
- **Yale Science & Engineering Association Senior Distinction Award** for outstanding undergraduate achievement — 2025
- **Ezra Stiles College Richter Fellowship** for summer research — $1k, 2024
- **Yale Summer Experience Award** for summer research — $4k, 2024
- **Richard U. Light Fellowship** for study abroad in East Asia — $71k, 2023-24
- **NSF REU Fellowship** at the National Radio Astronomy Observatory — $9k, 2023
- **Phi Beta Kappa** Junior Inductee — 2022
- **NSF REU Fellowship** at the Berkeley SETI Research Center — $9k, 2022

FIRST-AUTHOR PUBLICATIONS

- **Nilipour, A.**, Moriyama, K., Ikeda, S., Akiyama, K., Mareki, H. "Optimal Transport Regularized VLBI Dynamic Reconstruction." In prep for submission to *Astronomy and Astrophysics*
- **Nilipour, A.** & Akiyama, K. "VLBISkyRegularizers: Regularized Maximum Likelihood Methods for VLBI Reconstruction in Julia." In prep for submission to the *Journal of Open Source Software*

- **Nilipour, A.**, Ott, J., Meier, D., Svoboda, B., et al. "Turbulent Pressure Heats Gas and Suppresses Star Formation in Galactic Bar Molecular Clouds." *The Astrophysical Journal* 977, 37 (2024)
- **Nilipour, A.**, Davenport, J., Croft, S., Siemion, A. "Signal Synchronization Strategies and Time Domain SETI with Gaia DR3." *The Astronomical Journal* 166, 79 (2023)

OTHER PUBLICATIONS

- Davenport, J., Sheikh, S., Farah, W., **Nilipour, A.**, et al. "Real-time Technosignature Strategies with SN 2023ixf." *Research Notes of the AAS* 7, 120 (2023)

INVITED TALKS

- **Penn State Extraterrestrial Intelligence Center Seminar (April 2024, Centre County, PA):** "Signal Synchronization Strategies and Time Domain SETI"

CONTRIBUTED TALKS

- **JuliaCon 2025 (July 2025, Pittsburgh, PA):** "Regularized Maximum Likelihood Methods for Black Hole Imaging"
- **National Astronomical Observatory of Japan VLBI Colloquium (February 2024, Mitaka, Tokyo, Japan):** "Feeding the CMZ: Gas Accretion Flows in the Galactic Bar"
- **National Radio Astronomy Observatory Research Symposium (August 2023, Socorro, NM):** "Feeding the Central Molecular Zone"
- **241st Meeting of the American Astronomical Society (January 2023, Seattle, WA):** "Signal Synchronization Strategies and Time Domain SETI with Gaia DR3"
- **Berkeley SETI Research Center Symposium (August 2022, Berkeley, CA):** "Signal Synchronization Strategies and Time Domain SETI with Gaia DR3"

POSTER PRESENTATIONS

- **246th Meeting of the American Astronomical Society (June 2026, Anchorage, AK):** "Cosmic Displacement Field Analysis with Convolutional Neural Networks"
- **245th Meeting of the American Astronomical Society (January 2025, National Harbor, MD):** "Turbulence in Galactic Bar Molecular Clouds"
- **Black Hole Explorer Japan Workshop (June 2024, Mitaka, Tokyo, Japan):** "Optimal Transport Regularized Black Hole Movie Reconstruction"
- **242nd Meeting of the American Astronomical Society (June 2023, Albuquerque, NM):** "Linear Point Standard Ruler Estimation with Neural Networks"
- **NASA CT Space Grant Consortium Fall Grants Expo (November 2022, Hartford, CT):** "Bouchet Low-Earth Alpha/Beta Space Telescope (BLAST)"
- **240th Meeting of the American Astronomical Society (June 2022, Pasadena, CA):** "One-dimensional Lyman-α forest power spectrum estimate from eBOSS"

AWARDED OBSERVING TIME

- **VLA Semester 2025A (Co-I)**: 92.9 hours at Priority A; D and C configuration (ID: VLA/25A-294)

ACTIVITIES

NAOJ Mitaka Open House Day Volunteer August 2023 – September 2023

- Assisted with the development and presentation of an interactive Milky Way 21cm line exhibit in Japanese, including the construction of a simple horn antenna

Yale Undergraduate Aerospace Association (YUAA), Team Leader September 2021 – May 2025

- Leader of the cosmic ray detector team of the YUAA CubeSat project, which has a projected launch date in fall 2025 and will detect variations in the Van Allen radiation belt, with the primary objective of mapping the boundaries of the South Atlantic Anomaly

WORK EXPERIENCE

Demonstrator for Physics 1A (First-Year) Practical Laboratory October 2025 –
Peer Tutor for Japanese at the Yale Center for Language Study November 2024 – May 2025
Teaching Fellow for Elementary, Intermediate Japanese January 2023 – May 2025
Grader for Discrete Mathematics, Ordinary Differential Equations August 2022 – May 2025

SKILLS

- **Data Analysis Experience:** Event Horizon Telescope (EHT), Atacama Large Millimeter/sub-millimeter Array (ALMA), Cosmological N-body simulations (Quijote, HADES, AbacusSummit)
- **Astronomical Data Software:** CAMB, CLASS, Comrade, eht-imaging, CASA, CARTA, GNU Radio, Astropy
- **Computational**: Python (PyTorch, JAX), Julia, Git, Qiskit, MATLAB, C#

- **High Performance Computing Cluster Allocations**: Yale Grace, Breakthrough Listen blpc0, NRAO NMASC, MIT Engaging, EHT Cloud, NAOJ Sparse 2

MEMBERSHIP

- **Event Horizon Telescope Collaboration** 2023 – Present
- **Phi Beta Kappa** 2022 – Present
- **American Astronomical Society** 2021 – Present

PRESS

- **The Economist**: *Ideas for finding ET are getting more inventive* 18 January 2023
- **YaleNews**: *Searching for extraterrestrial life – by keeping an eye on exploding stars* 31 July 2023

REFERENCES

Nikhil Padmanabhan, Associate Professor of Physics and Astronomy, Yale University, nikhil.padmanabhan@yale.edu
Héctor Arce, Professor of Astronomy, Yale University, hector.arce@yale.edu
Juergen Ott, Research Scientist, National Radio Astronomy Observatory, jott@nrao.edu
Kazunori Akiyama, Research Scientist, Massachusetts Institute of Technology Haystack Observatory, kakiyama@mit.edu
James Davenport, Research Assistant Professor of Astronomy, University of Washington, jrad@uw.edu