

SNEH PANDYA

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SUMMARY

I am a fourth-year Ph.D. candidate in the Department of Physics at Northeastern University and a junior researcher at the NSF Institute for Artificial Intelligence and Fundamental Interactions (IAIFI). My research interests broadly lie at the intersection of machine learning and cosmology, with a particular focus on particle cosmology and weak gravitational lensing, where I utilize techniques such as differentiable programming/simulations and ML-accelerated Bayesian inference. Prior to pursuing my Ph.D., I applied machine learning techniques to astrophysical problems, including the estimation of supermassive black hole masses.

EDUCATION

Northeastern University

2021-Present

Ph.D., Physics

Advisors: Jim Halverson & Jonathan Blazek

Expected Graduation: May 2026

University of Illinois at Urbana-Champaign

2017-2021

B.S., Physics, Minors in Mathematics & Astronomy

GPA: 3.79/4.00

Treasurer of Sigma Nu Fraternity

PAPERS

S. Pandya*, J. Halverson. On the Generality and Persistence of Cosmological Stasis. *Submitted to Physical Review D*. arXiv:2408.00835.

S. Pandya*, Y. Yang, N. V. Alfen, J. Blazek, R. Walters. Learning Galaxy Intrinsic Alignment Correlations. ICLR 2024 Data-centric Machine Learning Research. arXiv:2404.13702.

S. Pandya*, P. Patel*, F. O., J. Blazek. E(2) Equivariant Neural Networks for Robust Galaxy Morphology Classification. NeurIPS 2023 Machine Learning for the Physical Sciences. arXiv:2311.01500.

S. Pandya*, J. Lin*, D. Pratap, X. Liu, M. Kind, V. Kindratenko. AGNet: Weighing Black Holes with Deep Learning. Monthly Notices of the Royal Astronomical Society, 2022. arXiv:2108.07749

S. Pandya*, J. Lin*, D. Pratap, X. Liu, M. Kind. AGNet: Weighing Black Holes with Machine Learning. NeurIPS 2020 Machine Learning for the Physical Sciences. arXiv:2011.15095

WORK

Department of Energy SCGSR Fellow

August 2024 - February 2025

Fermilab

Batavia, IL

- Working on augmenting symmetry-aware equivariant neural networks to be robust to distributional shifts in data quality and adversarial attacks, utilizing optimal transport theory and domain adaptation techniques.

SPIN Intern & NSF REU Fellow

August 2019 - May 2021

National Center for Supercomputing Applications

Urbana, IL

- Utilized HAL supercomputing cluster to accelerate neural network training time, execute data simulation pipeline to expand training data set, and create informative visualizations for a general audience.

SCHOOLS & WORKSHOPS

IAIFI PhD Summer School and Workshop (Organizer)	August 2024
IAIFI PhD Summer School and Workshop (Organizer)	August 2023
IAIFI PhD Summer School and Workshop	August 2022
Princeton Deep Learning Theory Summer School	July 2021

CONFERENCES & PRESENTATIONS

echoIA LILAC Workshop @ Harvard, <i>Lightning Talk</i>	2024
IAIFI Workshop @ MIT, <i>Poster</i>	2024
Tufts University, <i>Oral Presentation (Invited)</i>	2024
Fermilab Surveys Meeting, <i>Oral Presentation</i>	2024
Neural Information Processing Systems (NeurIPS) Workshop, <i>Poster</i>	2023
Mathematical Physics Days, <i>Oral Presentation (Invited)</i> (Video)	2021
Illinois Astrofest, <i>Poster (1st Place)</i>	2021
Neural Information Processing Systems (NeurIPS) Workshop, <i>Poster</i> (Video, Poster)	2020
Illinois Undergraduate Research Symposium, <i>Poster</i> (Video, Poster, Press)	2020

OUTREACH

Northeastern University, <i>Seminar</i> , “Machine Learning, Neural Networks, & All That”	2022
Urbana High School, <i>Lecture</i> , “Black Holes & AI”	2020
John Hersey High School (JHHS), <i>Lecture</i> , “Black Holes & AI”	2020

AWARDS & RECOGNITION

Fiddler Innovation Undergraduate Fellowship Award	2021
<i>National Center for Supercomputing Applications</i>	<i>Urbana, IL</i>
· \$1500 awarded to undergraduate students showing outstanding contributions during the Summer 2020 REU Inclusion program. The Fiddler Fellowship award is part of a \$2 million-dollar endowment from Jerry Fiddler and Melissa Alden to the University of Illinois in support of student interdisciplinary research initiatives through the Illinois eDream Institute at NCSA.	

SERVICE & TEACHING

International Conference on Learning Representations (ICLR)	2023
Reviewer for the ICLR-DMLR workshop	
Conference on Neural Information Processing Systems (NeurIPS)	2022, 2023
Reviewer for NeurIPS-AI4Science workshop	
International Conference on Machine Learning (ICML)	2022
Reviewer for the ICML-AI4Science workshop	
Department of Physics	2021-2023
<i>Northeastern University</i>	<i>Boston, MA</i>
· Teaching assistant, Physics for Life Sciences Lab / Physics for Engineering Lab	
· Teaching assistant, Physics for Engineering Discussion	
· Teaching assistant, Graduate Computational Physics	
· Teaching assistant, Undergraduate Computational Physics	

Other: photographer, concert-goer, washed-up tennis player, record-collector