Anjali Nambrath

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Education

Massachusetts Institute of Technology June 2021
B.S. in Physics & Mathematics, Minor in French. GPA: 4.8/5.0

Selected coursework: Quantum Information Science, Quantum Mechanics III, Stochastic Processes, Algebra, Electromagnetism II, Nonlinear Dynamics: Chaos, Signals and Systems, Machine Learning

Research experience

MIT Center for Theoretical Physics Undergrad researcher Jan. 2020 - present

- Working with Dr. Katelin Schutz to understand axion gegenschein in the dark matter halo
- Identifying potential astrophysical sources of radio waves for a gegenschein survey

Hen Lab – MIT Hadronic Physics Group Undergrad researcher Nov. 2017 - present

- Analyze electron-deuterium scattering data from CLAS to test energy reconstruction methods
- Compared neutrino energy reconstruction methods for the Deep Underground Neutrino Experiment (DUNE)
- Calculated scintillator and photomultiplier efficiency for the Backward Angle Neutron Detector (BAND)
- Developed a laser-based calibration system to ensure measurement stability for BAND

Fermi National Accelerator Laboratory SULI research intern June 2019 - Aug. 2019

- Simulated experimental data for DUNE using the GENIE Monte Carlo event generator
- Explored and verified the efficacy of reconstruction smearing matrices with electron data from CLAS

Winslow Group – MIT Neutrino & Dark Matter Group Undergrad researcher Jan. 2019 - May 2019

- Modeled behavior of magnetic shielding material for the ABRACADABRA axion detector
- Maintained and machined components for the ABRACADABRA dilution refrigerator

Thomas Jefferson National Accelerator Facility Undergrad researcher June 2018 - Aug. 2018

- Constructed scintillator bar and photomultiplier modules for BAND
- Assembled and installed BAND and its electronics in Jefferson Lab Hall B

Teaching

MIT Educational Studies Program Teacher (Spark, Splash, HSSP) 2018 - present

- 6 one-hour sessions on relativity and black holes ("Black Holes!") for over 150 students
- 3 one-hour sessions on the Standard Model ("The Standard Model!") for 50 students
- 6-week course on quantum computing ("Quantum Computing!") for 40 students
- 6-week course on the history of science ("History of 20th Century Science") for 30 students

MIT Physics Department Teaching assistant Jan. 2021

Teaching assistant for Computational Data Science in Physics, taught by Prof. Philip Harris. Taught and developed material for recitations twice a week and provided support on weekly data science projects.

MIT Mathematics Department Undergraduate teaching assistant Fall 2020

Teaching assistant for Quantum Computing, taught by Prof. Peter Shor. Assembled lecture notes, moderated online lectures, conducted weekly office hours, and graded weekly problem sets.

MIT Physics Department Grader and tutor 2018 - 2020

Graded weekly problem sets for one semester of Physics III, one semester of Statistical Mechanics, one semester of Relativity, and one semester of Quantum Physics I. Tutored Physics III student for one semester.

Selected awards

National Science Foundation Graduate Research Fellowship 2021

Berkeley Fellowship for incoming graduate students at UC Berkeley 2021

Semifinalist for Fulbright India Student Research award ..... Jan. 2021

Caltech FUTURE of Physics program for outstanding undergraduate women in physics ..... Oct. 2020

John Reed UROP Fund for undergraduate research at MIT 2020

Cathy M. Comeau UROP Fund for science research at MIT 2020

January Scholars in France for excellence in French Studies ..... Jan. 2020

Burchard Scholar for excellence in the humanities at MIT 2019

APS Division of Nuclear Physics CEU Fellowship ..... Oct. 2018

Paul E. Gray UROP Fund for undergraduate research at MIT 2018

Publications

Electron Beam Energy Reconstruction for Neutrino Oscillation Measurements submitted to *Nature*
M. Khachatryan, A. Papadopoulou, A. Ashkenazi, F. Hauenstein, **A. Nambrath**, et al.

Laser Calibration System for Time of Flight Scintillator Arrays Nucl. Inst. Methods A 973 (2020)
A. Denniston et al.

The CLAS12 Backward Angle Neutron Detector (BAND) Nucl. Inst. Methods A 978 (2020)
E.P. Segarra et al.

Presentations and posters

IAIFI Internal Seminar (invited) February 2021
Open Data Science in Physics Courses (with P. Harris, K. Morey, M. Szurek, J. Chongsathapornpong)

APS Divison of Nuclear Physics yearly meeting October 2020
Benchmarking neutrino energy reconstruction with electron-deuterium scattering (abstract)

MIT PRISM (departmental undergraduate conference) August 2020
Benchmarking neutrino energy reconstruction with electron-deuterium scattering

MIT Family Weekend Physics Open House (invited) October 2018
Neutrons, Nuclei, and Neutrinos: BAND and Electrons for Neutrinos

Fermilab and Argonne National Lab summer undergraduate poster session August 2019
Studying the use of e- data for DUNE energy reconstruction (poster)

APS Divison of Nuclear Physics yearly meeting October 2018
Testing and constructing BAND, a backward angle neutron detector (poster)

Community involvement

Member of MIT OpenCourseWare Advisory Committee ..... Fall 2020 –

Member of MIT Physics Dept.'s Values Committee ..... Spring 2020 –

MIT Associate Advisor to four first-years ..... Fall 2020 –

Counselor for MIT Physics Pre-Orientation Program ..... Fall 2020

Volunteer for MITVote Get Out The Vote efforts ..... Spring 2020

Board member of MIT Undergraduate Womxn in Physics ..... Spring 2019 – Spring 2021

Editor of MIT Undergraduate Research Journal ..... Fall 2017 – Spring 2019

Leadership

MIT Society of Physics Students Outreach Chair, President May 2018 –

- Interface between department leadership and students on issues such as mentorship and advising, equity and inclusion, teaching and instruction, and community building.
- Organized three Boston-area undergraduate conferences with 80+ attendees each, monthly faculty dinners, student town halls, weekly study breaks, and joint events with Harvard SPS.

HackMIT Organizing Team Marketing Director Sept. 2017 - May 2019

- Organized HackMIT (for 1200+ college students) and Blueprint (for 250+ high school students)
- Successfully managed six-person design team and developed event identity and branding assets

MIT Shakespeare Ensemble Actor, Producer, Publicity Designer Sept. 2017 - Spring 2020

- Participated in 11 student-run productions, oversaw six tech departments as a producer (*Rumors*, 2019)

Languages

- **Programming/markup:** LaTeX, Python, C++/ROOT, numpy/PyTorch
- **Written/spoken:** English (fluent), French (advanced), Malayalam (advanced)