# Anindita Maiti

Curriculum Vitae

## Contact

Dana Research Center 237, 110 Forsyth St., Boston, MA 02115, USA
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## Education

**Northeastern University** – Boston, USA 2017-2023
PhD Candidate (Physics)
Advisor: James Halverson

**The NSF AI Institute for Artificial Intelligence and Fundamental Interactions** – Boston
PhD Student 2020-2023

**Indian Institute of Technology Bombay** – Mumbai, India 2012-2017
Integrated Bachelor and Master of Technology (Engineering Physics) with Honors (Physics)
Advisor: Urjit Yajnik

## Research Interests

Foundational Machine Learning ↔ Theoretical High Energy Physics.
Theoretical Physics, Applied Maths for Machine Learning Theory.
Machine Learning for String Phenomenology, Effective Field Theories.
Machine Learning for Quantum Many-body Physics, Quantum Computations.

## Preprints & Publications

M. Demirtas, J. Halverson, **A. Maiti**, K. Stoner, M. D. Schwartz, "*Locality and Non-Gaussianity in Neural Network Field Theories*", (to appear).

**A. Maiti**, K. Stoner, and J. Halverson, "*Symmetry-via-Duality: Invariant Neural Network Densities from Parameter-Space Correlators*", [arXiv:2106.00694v1], Machine-Learning in Theoretical Physics & Pure Mathematics (to be published by World Scientific).

J. Halverson, C. Long, **A. Maiti**, B. Nelson, G. Salinas, "*Gravitational waves from dark Yang-Mills sectors*", JHEP **05** (2021), 154, [arXiv:2012.04071].

J. Halverson, **A. Maiti**, and K. Stoner, "*Neural Networks and Quantum Field Theory*", Mach. Learn. Sci. Tech. **2** (2021) no. 3, 035002, [arXiv:2008.08601].

## In-Progress

"*Reinforcement Learning Exploration of Chiral Gauge Theories*" - with James Halverson.

## Seminars, Talks, Colloquia

**Theoretical Physics for Machine Learning**, Aspen Center for Physics Feb 2023
**New Frontiers in Machine Learning and Quantum**, Perimeter Institute Nov 2022
**IPPP Seminar**, Institute for Particle Physics Phenomenology, Durham University Nov 2022
**Oxford Dalitz Seminar in Fundamental Physics**, U. Oxford Nov 2022
**Machine Learning @ Computer Laboratory Seminar Series**, U. Cambridge Oct 2022
**UCI Physics Astro/Particle-ML Seminar Series**, UC Irvine Oct 2022
**UCSB Joint HEX-HET Seminar Series**, UC Santa Barbara Oct 2022
**Particle Theory Seminar**, UC Riverside Oct 2022
**Theoretical Particle Physics & Cosmology Seminar**, King's College London Oct 2022
**Mathematics Seminar**, City, University of London Oct 2022
**Theoretical Physics Seminar**, Uppsala University Oct 2022
**Majorana-Raychaudhuri Seminar Series**, INFN & University Salerno, Italy & PAMU, Indian Statistical Institute, Kolkata, India Sept 2022
**Journal Club**, The NSF AI Institute for A. I. and Fundamental Interactions Sept 2022
**Computational Algebra Seminar Series**, University of Nottingham, UK Sept 2022
**Pehlevan Research Group Journal Club**, Harvard University [slides] Aug 2022

**Poster Session: Summer Workshop 2022**, The NSF AI Institute for Artificial Intelligence and Fundamental Interactions Aug 2022

**Parallel Session: String Phenomenology 2022**, University of Liverpool [slides] Jul 2022

**Short Talks: A Deep-Learning Era of Particle Theory**, Mainz Institute for Theoretical Physics, Johannes Gutenberg University [slides] June 2022

**Lightning Talks on Discovering Latent Structure in Artificial and Physical Systems**, The NSF AI Institute for Artificial Intelligence and Fundamental Interactions [slides] May 2022

**Lightning Session: IAIFI-AIMLAC Workshop**, The NSF AI Institute for Artificial Intelligence and Fundamental Interactions [slides] Mar 2022

**String Data 2021**, University of Witwatersrand & University of Cape Town [slides] Dec 2021

**QFT Research Seminar**, Institute for Theoretical Physics - Münster (WWU) [slides] May 2021

**Joint High Energy Theory and Machine Learning Seminar**, Heidelberg University, LMU Munich and Northeastern University [slides] May 2021

**Journal Club**, The NSF AI Institute for A. I. and Fundamental Interactions [slides] Feb 2021

**Seminar Series on String Phenomenology** [slides] Oct 2020

**Gong Show: String Data 2020**, CERN [slides] Dec 2020

**Gong Show: Strings, Geometry, and Data Science**, Simons Center for Geometry and Physics, Stony Brook University [slides] Jan 2020

## Awards & Honors

**Travel Grants**: "New Frontiers in Machine Learning and Quantum" Workshop by Perimeter Institute (Nov 2022); Northeastern University Dept. of Physics (Summer 2022); Northeastern University PhD Network (Summer 2022).

**Dean's Graduate Student Excellence Award in Research**: Northeastern University College of Science (Spring 2021).

**Lawrence Award for Graduate Academic Excellence**: Northeastern University Dept. of Physics (Spring 2018).

**Indian Academy of Sciences Summer Research Fellowship**: Indian Academy of Sciences, (Summer 2014).

## Summer Schools

- IAIFI Summer School, Aug 2022, The NSF AI Institute for Artificial Intelligence and Fundamental Interactions.
- Theoretical Advanced Study Institute in Particle Theory (TASI), June 2021, CU Boulder.
- Deep Learning Theory Summer School at Princeton, Jul 2021, Princeton University.

## Teaching Experience

Teaching Assistant – Northeastern University, Boston, Massachusetts

PHYS 7325: Quantum Field theory 1 (Fall 2020, Fall 2019)
PHYS 5115: Quantum Mechanics (Spring 2020, Spring 2019)
PHYS 3601: Classical Dynamics (Fall 2018)
PHYS 2305: Thermo and Statistical Mechanics (Spring 2018)
PHYS 1155: Physics Lab for Engineering 2 (Fall 2017)
PHYS 3600: Advanced Physics Lab (multiple semesters)
Undergraduate Physics lab (multiple semesters)

Teaching Assistant – IIT Bombay, Mumbai, India

PH 117: Undergraduate Physics lab (Spring 2017)
EP 215: Undergraduate Electronics lab (Fall 2016)

## References

(1) Dr. James Halverson, (*Email: j.halverson@northeastern.edu*),
Associate Professor, Dept. of Physics, Northeastern University,
The NSF AI Institute for Artificial Intelligence and Fundamental Interactions.

(2) Dr. Fabian Ruehle, (*Email: f.ruehle@northeastern.edu*),
Assistant Professor, Dept. of Physics, Northeastern University,
The NSF AI Institute for Artificial Intelligence and Fundamental Interactions.

(3) Dr. Brent Nelson, (*Email: B.Nelson@northeastern.edu*),
Associate Dean and Associate Professor, Dept. of Physics, Northeastern University,
The NSF AI Institute for Artificial Intelligence and Fundamental Interactions.

## Technical skills

**Programming languages**: Python, C, C++, Mathematica, Matlab, Pytorch.
**Software**: LaTeX, Git.

## Professional Service Activities

Outreach to High School Students: Presented HEP-th research at Northeastern. (Jul 2022)

Member, Early Career and Equity Committee: The NSF AI Institute for Artificial Intelligence and Fundamental Interactions. (Jan 2021 - Dec 2022)

Member, Graduate Student Council: Northeastern University College of Science. (Sept 2020 - Aug 2022)

Coordinator & Initiator, Graduate Women in Physics Society: Northeastern University Dept. of Physics. (Sept 2021 - Present)

Referee: NeurIPS 2022 workshop on Machine Learning and the Physical Sciences; NeurIPS 2021 workshop on Machine Learning and the Physical Sciences; 'Foundations of Physics' Journal; NeurIPS 2020 workshop on Machine Learning and the Physical Sciences.

Volunteer & Co-organizer: The 1st International Electronic Conference on Mathematics and Applications (May, 2023); String Phenomenology 2020 (Northeastern University).