

# Anindita Maiti

maiti.a@northeastern.edu • Department of Physics, Northeastern University, 110  
Forsyth St., Boston, MA 02115

## Education

- 2017 – 2023    **Northeastern University**, Boston, Massachusetts, USA  
*Doctor of Philosophy in Physics Candidate*  
Advisor: James Halverson.
- 2020 – 2023    *PhD student:* **The NSF AI Institute for Artificial Intelligence and Fundamental Interactions**, Boston, Massachusetts, USA.
- 2012 – 2017    **IIT Bombay**, Mumbai, India  
*Integrated Bachelor and Master of Technology in Engineering Physics*  
Advisor: Urjit Yajnik. (*Graduated with Honors in physics*).

## Research Interests

Neural Networks for Quantum Field Theories. Quantum Field Theories for Neural Networks. Machine Learning for Effective Field Theories & String Theory. Physics for Machine Learning. String Theory. Machine Learning for Physics.

## Publications

- A. Maiti**, K. Stoner, and J. Halverson, *Symmetry-via-Duality: Invariant Neural Network Densities from Parameter-Space Correlators*, [[arXiv:2106.00694v1](#)] (in press).
- 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](#)].

## Ongoing Projects

- Locality & Non-Gaussianity in Neural Network Field Theories* - with James Halverson, Keegan Stoner, Matthew D. Schwartz (ongoing)
- RL Exploration of Chiral Gauge Theories* - with James Halverson (ongoing)

## Invited Conference Talks and Colloquia

Oct 2022	TBA <b>UCI Physics Astro/Particle-ML seminar series</b> , <i>UC Irvine</i>
Oct 2022	TBA <b>Mathematics Seminar</b> , <i>City, University of London</i>
Oct 2022	TBA <b>Theoretical Physics Seminar</b> , <i>Uppsala University</i>
Sept 2022	TBA <b>Majorana-Raychaudhuri seminar series</b> , <i>INFN &amp; University Salerno, Italy &amp; PAMU, Indian Statistical Institute, Kolkata, India</i>
Sept 2022	Non-perturbative Non-Lagrangian Neural Network Field Theories <b>Computational Algebra Seminar Series</b> , <i>University of Nottingham, UK</i>
Aug 2022	Neural Networks and Quantum Field Theories <b>Journal Club: Pehlevan Research Group</b> , <i>Harvard University</i>
June 2022	Non-Gaussianities in Neural Network Field Theories <a href="#">[Slides]</a> <i>Short Talk, Workshop: A Deep-Learning Era of Particle Theory</i> , <i>Mainz Institute for Theoretical Physics, Johannes Gutenberg University</i>
Dec 2021	A Tale of Symmetry and Duality in Neural Networks <a href="#">[Slides, Video]</a> <i>Plenary Session Talk, String Data 2021</i> , <i>U. of Witwatersrand &amp; U. of Cape Town</i>
May 2021	NN-QFT Correspondence and Symmetries via Duality <a href="#">[Slides]</a> <b>QFT Research Seminar</b> , <i>Institute for Theoretical Physics - Münster (WWU)</i>
May 2021	NN-QFT Correspondence and Symmetries <a href="#">[Slides]</a> <b>Joint High Energy Theory &amp; Machine Learning Seminar</b> - <i>Heidelberg University, LMU Munich and Northeastern University</i>
Oct 2020	The NN-QFT Correspondence <a href="#">[Slides, Video]</a> <b>Seminar Series on String Phenomenology</b>
Feb 2021	The NN-QFT Correspondence <a href="#">[Slides]</a> <b>Journal Club</b> , <i>The NSF AI Institute for Artificial Intelligence and Fundamental Interactions</i>
Jan 2020	RL Exploration of Chiral Gauge Theories <a href="#">[Slides]</a> <i>Gong Show Talk, Strings, Geometry, and Data Science</i> , <i>Simons Center for Geometry and Physics</i>

## Contributed Talks

Nov 2022	TBA <b>Oxford Dalitz Seminar in Fundamental Physics</b> , <i>Oxford University</i>
Sept 2022	Neural Networks as Non-perturbative Field Theories <b>Journal Club</b> , <i>The NSF AI Institute for Artificial Intelligence and Fundamental Interactions</i>
Aug 2022	Where Neural Network Meets Fundamental Physics <i>Poster</i> , <b>Summer Workshop 2022</b> , <i>The NSF AI Institute for Artificial Intelligence and Fundamental Interactions</i>
Aug 2022	Where Neural Network Meets Fundamental Physics <i>Lightning Talk</i> , <b>Summer School 2022</b> , <i>The NSF AI Institute for Artificial Intelligence and Fundamental Interactions</i>
July 2022	Neural Network Field Theories <a href="#">[Slides]</a> <i>Parallel Session Talk</i> , <b>String Phenomenology 2022</b> , <i>University of Liverpool, UK</i>
May 2022	Non-Gaussianities of Neural Network Field Theories <a href="#">[Slides]</a> <i>Lightning Talk</i> , <b>Discovering Latent Structure in Artificial and Physical Systems</b> - Internal Workshop, <i>The NSF AI Institute for Artificial Intelligence and Fundamental Interactions</i>
Mar 2022	Symmetries and Dualities in Neural Networks / Field Theory Correspondence <a href="#">[Slides]</a> <i>Lightning Talk</i> , <b>IAIFI-AIMLAC Workshop</b> , <i>The NSF AI Institute for Artificial Intelligence and Fundamental Interactions</i>
June 2021	Neural Networks - QFT Correspondence <a href="#">[Slides]</a> <i>Gong Show Talk</i> , <b>TASI 2021</b>
Dec 2020	Output Dimension Effects in Untrained NN <a href="#">[Slides]</a> <i>Gong Show Talk</i> , <b>String Data 2020</b> , <i>CERN</i>

## Awards and Honors

Summer 2022	Travel Grant (Northeastern University Dept. of Physics)
Summer 2022	Travel Grant (PhD Network, Northeastern University)
Spring 2021	Dean's Graduate Student Excellence Award in Research (Northeastern University College of Science)
Spring 2018	Lawrence Award for Graduate Academic Excellence (Northeastern University Dept. of Physics)

Summer 2014 Indian Academy of Sciences Summer Research Fellowship (Indian Academy of Sciences)

## Professional Service Activities and Outreach

**High School Outreach:** Presenting Theoretical High Energy Physics research at Northeastern University to high school students (Jul 2022)

**Referee:** NeurIPS 2021 workshop on Machine Learning and the Physical Sciences; Foundations of Physics; NeurIPS 2020 workshop on Machine Learning and the Physical Sciences

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

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

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

**Volunteer & Co-organizer:** The 1st International Electronic Conference on Mathematics and Applications (May, 2023)

**Volunteer:** Contributed to organization of String Phenomenology 2020, Northeastern University

## Teaching

**Northeastern University**, Boston, Massachusetts

Teaching Assistant    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)

Instructor    PHYS 1155: Physics for Engineering 2 (Fall 2017); Advanced Physics Lab - PHYS 3600; Undergraduate Physics lab - PHYS 1148, 1152, 1156; College of Professional Studies Physics Lab - PHYS 1201, 2201

**IIT Bombay**, Mumbai, India

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

## Technical skills

**Programming languages**

Python, C, C++, Mathematica, Matlab, Pytorch

**Software**

L<sup>A</sup>T<sub>E</sub>X, Git

**References**

- (1) Professor James Halverson,  
Dept. of Physics, Northeastern University,  
The NSF AI Institute for Artificial Intelligence and Fundamental Interactions