

Anirban Bairagi

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Education

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| Institut d'Astrophysique de Paris, CNRS & Sorbonne Université <i>PhD in Astrophysics, Statistics and Machine Learning</i> | <i>Jan 2023 – June 2026</i> Simons Foundation |
| Indian Institute of Technology Kharagpur <i>B.S.-M.S in Physics</i> | <i>July 2017 – April 2022</i> CGPA: 8.55/10 |

- **Coursework:** General Relativity, Astrophysics, Mathematics, Statistics, Deep Learning

Experience

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| Technical Consultant <i>TCG Digital</i> | <i>Calcutta, India</i> <i>June 2022 – Dec 2022</i> |
| <ul style="list-style-type: none">◦ Automated end-to-end monthly analytics pipeline in Python, from SQL data extraction to final analysis, reducing manual workload and turnaround time for client reporting.◦ Performed data-driven workforce analytics on leave patterns in a major U.S. supermarket chain, enabling optimized staffing strategies that reduced revenue loss due to understaffing and overtime costs by X◦ Reduced the loss incurred by the pharmaceutical companies by 80% due to insufficient and excessive supply of diagnostic kits in different countries of Europe using XGBoost. | |
| Caltech SURF - LIGO <i>California Institute of Technology</i> | <i>Pasadena, CA</i> <i>June 2003 – Aug 2003</i> |
| <ul style="list-style-type: none">◦ worked on LIGO laser beam tracking using Convolutional Neural Networks under the guidance of Prof. Rana Adhikari, Dr. Yehonathan Drori and Dr. Tega Edo at Caltech.◦ simulated beam spots images considering micro roughness of the mirror and CCD noises◦ developed a Convolutional Neural Network (CNN) model which can be used to predict the beam position from the CCD images with sub pixel accuracy and a maximum error of less than 40 micron. | |
| MITACS Globalink Research Fellow <i>Western University</i> | <i>London, Ontario</i> <i>June 2003 – Aug 2003</i> |
| <ul style="list-style-type: none">◦ Created a framework to simulate Continuous Gravitational Wave (CGW) signals from theory.◦ Built a pipeline for CGW detection using CNN.◦ Inferred signal parameters using Markov-Chain Monte-Carlo. | |

Publications

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| Gravitational Waves Detection and Glitch Classification using CNN 🔗 <i>Anirban Bairagi</i> | <i>2020</i> <i>Royal Astronomical Society</i> |
| LIGO Laser Beam Tracking 🔗 <i>Anirban Bairagi, Yehonathan Drori, Tega Edo, Rana Adhikari</i> | <i>2021</i> |
| How many simulations do we need for simulation-based inference? 🔗 <i>Anirban Bairagi, Benjamin Wandelt, Francisco Villaescusa-Navarro</i> | <i>2025</i> <i>Submitted to A&A</i> |
| PatchNet: GPU is not limitation anymore for Cosmological inference <i>Anirban Bairagi, Benjamin Wandelt</i> | <i>draft in prep.</i> |

Technical Skills

Languages: Python, Cython, Mathematica, MATLAB, C, SQL, HTML, CSS, Arduino
Frameworks/Libraries: Pytorch, TensorFlow, Keras, OpenCV, YOLO, Numpy, Pandas, Scikit-learn, Matplotlib, Seaborn, Chainconsumer
Tools: Weights and Biases, Git, Linux, CMake