

Anirban Bairagi

📍 Paris 75014, France ✉ bairagi@iap.fr ☎ +33 753402595 🌐 anirbanbairagi.github.io/portfolio/
in anirban-bairagi 🐙 anirbanbairagi

Education

Institut d'Astrophysique de Paris, CNRS & Sorbonne Université

Jan 2023 – June 2026

PhD in Astrophysics, Statistics and Machine Learning

Simons Foundation

- **Advisor:** Dr. Benjamin Wandelt

Indian Institute of Technology Kharagpur

July 2017 – April 2022

B.S.-M.S in Physics

CGPA: 8.55/10

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

Experience

Technical Consultant

Calcutta, India

TCG Digital

June 2022 – Dec 2022

- 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 85%.
- Reduced the loss incurred by the pharmaceutical companies by 72% due to insufficient and excessive supply of diagnostic kits in different countries of Europe using LDA and XGBoost.

Caltech SURF - LIGO

Pasadena, CA

California Institute of Technology

June 2003 – Aug 2003

- Simulated laser beam spot images incorporating mirror micro-roughness and CCD sensor noise to mimic real-world optical imperfections in the LIGO detector.
- Developed a Convolutional Neural Network (CNN) to infer beam position from noisy CCD images with sub-pixel accuracy ($\leq 40 \mu m$) to mitigate noise from the detector signal due to misalignment of mirrors.

MITACS Globalink Research Fellow

London, Ontario

Western University

June 2003 – Aug 2003

- Modeled Continuous Gravitational Wave (CGW) signals from non-precessing triaxial neutron stars.
- Built a real-time CGW detection algorithm using Convolutional Neural Network (CNN), enabling prompt identification of potential electromagnetic counterparts.
- Performed Bayesian inference on the signals using Markov Chain Monte Carlo (MCMC) to obtain robust posterior distributions for astrophysical parameters.

Publications

Gravitational Waves Detection and Glitch Classification using CNN [🔗](#)

2020

Anirban Bairagi

Royal Astronomical Society

LIGO Laser Beam Tracking [🔗](#)

2021

Anirban Bairagi, Yehonathan Drori, Tega Edo, Rana Adhikari

How many simulations do we need for simulation-based inference? [🔗](#)

2025

Anirban Bairagi, Benjamin Wandelt, Francisco Villaescusa-Navarro

Submitted to A&A

PatchNet: GPU is not limitation anymore for Cosmological inference

Anirban Bairagi, Benjamin Wandelt

draft in prep.

Technical Skills

Languages: Python, Cython, Mathematica, MATLAB, C, SQL, HTML, CSS, Arduino

Machine Learning: XGBoost, Deep Learning, CNN, YOLO, Diffusion models, Normalizing flows, Transformers

Frameworks/Libraries: Numpy, Pandas, Scipy, Scikit-learn, Matplotlib, Pytorch, TensorFlow, Keras, OpenCV

Tools: Weights & Biases, Git, Linux, CMake