Shivesh Mandalia

Nationality:	British	Residence:	London, UK	Relocate:	Yes, worldwide
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Profile

PhD graduate in High Energy Physics with 5 years experience in scientific research. Proven track record with publications of high impact showcasing an expertise in statistical modelling and programming. Effective communicator, with the ability to work in a collaborative environment or individually. Interested in challenging quantitative researcher roles.

Skills

Coding:	**Python** and **C++** (5 years experience), Linux, Bash, LaTeX (LaTeX), Git, Mathematica, Excel
Expertise:	**Statistical Modelling**, Data Science, Hypothesis Testing, Monte Carlo (MC) Simulation, Markov Chain MC
Reading:	*"Options, Futures, and other Derivatives"*–Hull, *"Mastering Python for finance"*–Ma, Financial Times, Finimize, q-fin arXiv

Professional Experience

2015 - 2019 | **PhD Researcher** | **Madison, WI, USA**

IceCube Neutrino Observatory

- Joined an international collaboration "IceCube" to research particles called neutrinos.
- Set world-leading constraints on certain Quantum Gravity models by analysing big data taken at IceCube.
- Introduced novel statistical techniques utilising Markov Chain MC (MCMC) for Bayesian inference, providing strong statistical consistency with classically drawn inferences.
- Wrote the analysis pipeline in Python using SciPy and MCMC packages (see GitHub).
- Delivered weekly presentations (28 in total) to the collaboration.

Coding: Python (SciPy), HTCondor (CPU cluster) **Achievements**: Nature Physics Publication

2018 - 2019 Oct - Mar | **Research Fellowship** | **Batavia, IL, USA**

Fermi National Accelerator Laboratory (Fermilab)

- Invited as a world-expert to upgrade the foremost neutrino MC simulation at Fermilab (GENIE).
- Updated a deprecated physics model (PYTHIA6) to the contemporary C++ based model (PYTHIA8).
- As the primary developer and liaison between the GENIE and PYTHIA teams, ensured communication across parties and mutual understanding of the scope, goals, and progress of this project.

Coding: C++ (STL), Bash **Achievements**: PYTHIA8 will be available in GENIEv4

2015 Jun - Aug | **Research Intern** | **Geneva, Switzerland**

The European Organization for Nuclear Research (CERN)

- Developed a classification technology in C++, to be used in algorithms to identify and characterise "jets" in high energy particle collisions, which are basically cones of collimated particles.

Coding: C++ (STL, ROOT), Bash **Achievements**: Presented written assessment to the collaboration

Education

2011 - 2019 | **PhD + MSci honours in Physics** | **London, UK**

Queen Mary University of London

PhD Thesis: *"Searching for Quantum Gravity with Neutrinos, Optical Module Beam Test at Fermilab and Hadronization Model studies for IceCube"*

– Presented and advertised my work in 2 seminars and 6 conferences.

- Designed, commissioned, simulated and built a digital twin of the IceCube experiment at the Fermilab Test Beam Facility for R&D on the next generation IceCube-Upgrade. Wrote the simulation in C++ (see GitHub).
- Analysed the collected data in pandas, and demonstrated the principle of a new type of particle identification technology using signal analysis, improving reconstruction algorithms for the IceCube-Upgrade.

▷ Taught modules "Introduction to C++ programming" and "Radiation detectors".

Coding: Python (pandas, SciPy), C++ (Geant4) **Achievements**: 3 Publications (see website)

2004 - 2011 | Havering Sixth Form College: A2 level Physics (A), Maths (A*) & Royal Liberty School: 11 GCSE (3A*, 6A, 2B)