

Employment

Imperial College London

Aug 2023 - Present

Research Associate

Member of the LHCb Collaboration

- Conducting new analysis in beauty flavour physics to measure the CKM matrix element related to the beauty-up quark.
- Involved in the analysis of the performance of the LHCb RICH detectors.

Education

University of Oxford

Oct 2019 – Oct 2023

DPhil Candidate in Particle Physics

First-Year Course Result: 92%

- Ranked 2nd out of 20 among the first-year Particle and Accelerator DPhil students.
- **Relevant Coursework:** Advanced Quantum Mechanics (100%), Electroweak (93%), Quantum Chromodynamics (78%), Symmetries (87%).

The University of Manchester

Sep 2015 – Jun 2019

MPhys (Hons) Physics

First year Result: 74.3% Second Year result: 86.7% Third Year result: 85.2%

- Graduated with **First Class Honors** (82%) – (ranked top 10%)
- **Relevant Modules:** Lagrangian Dynamics (91%), Introduction to Nuclear and Particle Physics (91%), Mathematical Fundamentals of Quantum Mechanics (93%), Particle Physics (92%).

Relevant Research Experience

DPhil Project – University of Oxford

Oct 2019 – Oct 2023

Measurement of the Pion Charge-Exchange Differential Cross Section on Argon with the ProtoDUNE Detector

Supervisors: Dr. Xianguo Lu, Dr. Farrukh Azfar

- **Thesis Topic:**
 - a. Derived the energy-dependent correction function to reduce the bias in the shower energy reconstruction.
 - b. Developed a kinematic fitting algorithm from scratch to improve the neutral pion reconstruction in LArTPC.
 - c. Performed the first pion-argon differential cross-section measurement in ProtoDUNE-SP.

- **Transverse Kinematic Imbalance:** Predicted the muon neutrino CCQE-like transverse kinematic imbalance sensitivity for the DUNE ND-GAr detector using GiBUU.
- **MINERvA Data Preservation:** Contributed to the development of the MINERvA Analysis Toolkit (MAT), including reorganizing the systematic uncertainty C++ classes.

MPhys Project – The University of Manchester

Sep 2018 – Jun 2019

Studying cosmic muon scattering in MicroBooNE

Supervisors: Prof. Justin Evans, Dr. Andrew Furmanski

- This project focused on testing how the detector behaves by analyzing cosmic muon scattering events using both MicroBooNE data and Monte Carlo simulations.
- Tested standard packages for the reconstruction of proton tracks through event displays.
- Investigated the hits of each reconstructed track to improve the reconstruction performance.

Conferences and Seminars

XIX International Workshop on Neutrino Telescopes - [Parallel talk](#), Feb. 2021 (remote)

APS April Meeting 2021 - [Parallel talk](#), Apr. 2021 (remote)

Opportunities with Atmospheric Neutrinos (OWAN21) - [Talk](#), Nov. 2021 (London, UK)

Elementary Particle Physics Seminars, University of Warwick - [Seminar](#), May. 2023 (Warwick, UK)

Elementary Particle Physics Seminars, Lancaster University - [Seminar](#), May. 2023 (Lancaster, UK)

Cavendish HEP Seminars, University of Cambridge - [Seminar](#), May. 2023 (Cambridge, UK)

DUNE Collaboration Meeting, Fermilab - [Plenary talk](#), May. 2023 (remote)

HEP Seminars, Imperial College London - [Seminar](#), Jan. 2024 (London, UK)

HEP Seminars, The University of Liverpool - [Seminar](#), Feb. 2024 (Liverpool, UK)

Publications

- DUNE Collaboration, V. Hewes, et al., Deep Underground Neutrino Experiment (DUNE) Near Detector Conceptual Design Report, [Instruments 5 \(2021\) 4, 31](#)
- MINERvA Collaboration, Ben Messerly, et al., An Error Analysis Toolkit for Binned Counting Experiments, [EPJ Web Conf. 251 \(2021\) 03046](#).

Teaching

College Tutor (2020 – 2021)

- As a college tutor of the 3rd undergraduate B4 Particle and Nuclear Physics module at the University of Oxford.