

Education:

- **D. Phil. candidate (Particle Physics)**, University of Oxford, 2020 – present
- **M. Sc. Mathematical and Theoretical Physics**, University of Oxford, 2019 – 2020
Distinction (1st class)
- **B. Sc. Applied Physics**, National Technical University of Athens, 2014-2019
Excellent (1st class)

Projects:

- **D. Phil. thesis (in progress), “Search for Heavy Neutral Leptons in the MINERvA detector”**. HNL are hypothesised heavy neutrinos with masses $\mathcal{O}(\geq 0.1 - 1 \text{ GeV}/c^2)$. I am searching for a signal signature $HNL \rightarrow \mu + \pi$ in the MINERvA detector for HNL below the kaon mass, exploiting the high-energy, high-exposure NuMI flux.
- **BeamHNL generator**. I developed in conjunction with my supervisor, Dr. Xianguo Lu, a detailed simulation of HNL production, propagation, and decay in accelerator neutrino beamlines. This is now part of the popular GENIE neutrino event generator, used widely by neutrino experiments to generate Monte Carlo samples. The generator is easily configurable, experiment-agnostic, and supports multiple tuning options depending on the user’s needs. See Publications.
- **MSc dissertation, “Massive neutrinos in the formation of large-scale structure”**. I studied how to constrain the sum of active neutrino masses using cosmological measurements in the early and late Universe, by examining the effect of neutrino mass on various cosmological parameters.
- **BSc thesis, “Conformal symmetry in cosmology”**. I used the “embedding space” formalism to derive the 3-point correlator of fields with arbitrary spin, which has applications in constraining the higher-moment spectra from the cosmic microwave background. I applied this to the case of 3 spin-2 fields, which can constrain the non-Gaussianity of the primordial density fluctuations. [Manuscript \(in Greek\)](#)
- **CERN summer student project (2018)**. I worked on analysing CERN North Area test beam data to develop a new clustering algorithm for the Micromegas muon trackers that form part of the ATLAS New Small Wheel. The algorithm extended reconstruction to the realistic case of multiple clusters per tracking plane and obtained the best-fit track using a Hough transform.

Publications:

- K.-J. Plows and X.-G. Lu, Modeling heavy neutral leptons in accelerator beamlines, [Phys. Rev. D 107\(2023\) 055003](#).
- K.-J. Plows on behalf of the MINERvA collaboration, MINERvA medium-energy physics results (proceedings at ICHEP 2022), [PoS ICHEP2022 557](#).

Conferences and seminars:

- Invited talk, *Modelling Heavy Neutral Leptons in GENIE: the BeamHNL module*, Path to Dark Sector Discoveries at Neutrino Experiments workshop (06/Jun/2023: Fort Collins, CO, USA)
- Talk, [Modelling Heavy Neutral Leptons in Accelerator Beamlines](#), UK HEP Forum 2022 (23/Nov/2022: Abingdon, UK)
- Talk, [Beam-produced Heavy Neutral Lepton simulation in GENIE](#), International School of Nuclear Physics, 43rd Course (21/Sep/2022: Erice, Italy)
- Talk (on behalf of the MINERvA collaboration), [MINERvA medium-energy physics results](#), ICHEP 2022 (07/Jul/2022: Bologna, Italy)

- Talk, [*Heavy Neutral Lepton Search at MINERvA*](#), New Perspectives 2022 (21/Jun/2022: remote) -- **awarded 2nd place prize for Best Talk**
- Talk (on behalf of the MINERvA collaboration), [*Medium-Energy era results from MINERvA*](#), Lake Louise Winter Institute 2022 (23/Feb/2022: Lake Louise, Canada)
- Talk, *Benchmarking GiBUU theory cross-sections with the MINERvA ME flux*, IHEP: JUNO atmospheric neutrino interaction meeting (01/Apr/2021: remote)

Teaching:

2022-23: I have tutored students taking the C4 Particle Physics module of the Oxford MSc in Physics.