**Project title:**Future flavour physics

**Principle supervisor:**Dr Malcolm John

**Possible co-supervisors:**Dr Donal Hill, Dr Sneha Malde, Dr Lei Li

**Consumables expenses:**none if working on a personal laptop, £500 for personal

computing if not.

**Abstract:**

The Oxford flavour physics group is a world class university group in both its scope and vision. Our predominant activity is on the LHCb experiment at CERN (Geneva), which is in its final year of running before undergoing its first major upgrade for the 2020s. We also lead the British involvement in the BESIII experiment at IHEP (Beijing), where we drive analyses of D mesons that help understand the B-meson decays at LHCb. Furthermore with are heavily involved with the hardware development of future silicon vertex detectors and particle identification systems for LHCb upgrades and other future flavour physics facilities.

The successful candidate will have the opportunity to join this group with the exact topic to be tuned to the interests of the candidate in discussions with the candidate. The choice will be from the following (1) Using a fast simulation package to design an optimal for a future silicon vertex for LHCb (2) Use machine learning algorithms to optimise the selection of B mesons using the current LHCb dataset (3) Develop the CP-tagging algorithms at the BESIII experiment and a measurement the coherence in certain D0 decays. In all cases, good programming experience is needed as well as a working knowledge of English. Previous experience with large-data analysis packages like ROOT or r-python would be an advantage.