The mining sector plays a central role in economic development but is also a major user of scarce resources. Important environmental aspects must therefore be carefully considered to ensure mineral beneficiation processes adhere to sustainability principles. A methodology to assess potential environmental impacts, known as Life Cycle Assessment (LCA), is a well developed tool, but the challenge remains on how to best adapt it and what data to use to apply it effectively to mining and mineral processing operations.

While some pioneering studies in the literature have highlighted the importance of coupling process simulators with LCA, applications of such approach in mineral processing are scarce. Indeed, the limited use of LCA in the mining industry contrasts with its wide applicability in other industrial sectors. In particular, detailed inventory information required for LCA studies is project-specific and usually not readily available.

In this project, process simulation will be coupled to the LCA methodology to develop a robust and holistic framework to assess the potential environmental impact of mineral beneficiation operations. Advanced modelling tools will be implemented and used to generate detailed inventory information, allowing a larger number of scenarios to be assessed and thus contributing to overcoming the limitations of generic databases. The framework developed will be used to identify areas of opportunity for energy and water use reduction that lead to optimal mineral processing circuits.

This project is available for students who apply for Imperial College scholarships or other international scholarship schemes. Previous experience with the LCA methodology and/or mineral processing modelling is highly desirable.

The successful candidate will join the Advanced Mineral Processing Research Group. For more information please contact Pablo Brito-Parada (p.brito-parada@imperial.ac.uk)