

A UROP perspective by Margot Lippold

Summer 2025 (undertaken in the Department of Earth Science and Engineering, Imperial College London)

Margot was a 2nd year undergraduate at Imperial College London in 2024-25: BSc Physics, Department of Physics

UROP title: Lunar Blasting Dynamics: Simulating Regolith Displacement for Mining and Landing Systems

My passion for space mining began even before I arrived at Imperial, as it perfectly merges my three passions: physics, engineering, and space. When I discovered that Imperial offered a Horizons course in this very subject, I knew I had to get involved. My curiosity didn't stop at the classroom. I was eager to contribute to the field first-hand. I reached out to the professor, expressing my enthusiasm and asking if we could develop a UROP project for the summer.

He accepted, and together we defined a research project: simulating an underground explosion on the Moon to investigate the feasibility of using blasting for lunar mining. I was thrilled. Not only did it align perfectly with my love for simulation and desire to develop my technical skills, but it was also a novel piece of research.

During the UROP, I quickly learned that true research requires a higher level of problem-solving and intellectual independence as the questions you ask yourself don't often have answers readily available on the internet. Furthermore, I loved meeting the rest of the team that similarly shared a passion for the space industry and discussing everything from lunar regolith to asteroids. Finally, I significantly increased my skills in high-fidelity computational modelling, learning to build, run, and debug complex simulations to solve a real-world engineering problem.

This UROP has solidified my ambition to work in the aerospace sector, specifically in applying advanced numerical simulation to the challenges of space exploration.