



REP Project Proposal Form 2024

ONE Planet Undergraduate Research Experience Placement (REP) Scheme
Placement title: Revitalising Food Waste: A Solution to Mitigate Water Pollution
One Planet Research Theme: Climate & Climate Change <input type="checkbox"/> Earth System Processes <input checked="" type="checkbox"/> Anthropocene <input checked="" type="checkbox"/> Environmental Informatics <input type="checkbox"/>
Supervisor: Prof J Girón Hernández School/Department: Applied Sciences Department University: Northumbria University;
Team Dr P Gentile - School of Engineering, Newcastle University Prof Edward M Fox - Applied Sciences Department, Northumbria University
Placement Description: Humans are significantly transforming the Earth's ecosystem by generating waste that leads to contamination of land surface and water, among other environmental problems. Pollution of water with organic materials, such as food scraps and leftovers when improperly disposed of or not effectively managed, is of particular concern. Indeed, as these materials break down, they consume oxygen, leading to decreased oxygen levels in aquatic environments, which can harm aquatic life. Additionally, the release of nutrients can fuel algal blooms, leading to eutrophication and the degradation of water quality. In this project, the student will investigate the revalorisation of food Industry biowaste through the development of innovative and low-cost green methods. Briefly, the REP has the following objectives: 1) extraction of biocompounds from foodwaste streams (e.g. cocoa or coffee bean pod shells); and 2) physico-chemical characterisation of the obtained biocompounds for tailoring their potential application in different industry, such as biomedical, nutraceutical and food. This project offers an opportunity for enthusiastic applicants, with some awareness of environmental challenges, to gain substantial laboratory experience and enhance their technical and analytical skills by utilising the latest techniques and equipment
Timescale: Weeks 1-2: Literature review on revalorisation of food biomass for extracting biocompounds, technologies, laboratory safety inductions and planning of experiments; Weeks 3-6: Extraction of biocompounds from selected food waste biomass and their physico-chemical characterisation (metabolomics analysis, TGA, FTIR spectroscopy)
Itemised Budget for the Project: Chemicals for green extraction of biocompounds (enzymes ,KOH, NaOH, ethanol): £150. Metabolomics analysis available at Northumbria University: £450.00 (£30 per sample). FTIR, TGA, are free of charge.
Prerequisites: BSc Food Science, BSc Food Science and Nutrition, BSc Agriculture, BSc Chemical Engineering, BSc Chemistry. BSc Environmental Sciences. For more information, please contact Prof J Giron (joel.l.g.hernandez@northumbria.ac.uk) and Dr P Gentile (Piergiorgio.Gentile@newcastle.ac.uk).