Research Experience Placement (REP) Scheme Project

Project Supervisors:
Dr Olena Riabinina (olena.riabinina@durham.ac.uk)

Host Organization and Department (if applicable):
Department of Biosciences, Durham University

Project Title:
Species-specific floral smell preferences of bumblebees

Project Description:
Background. Bumblebees are agriculturally important pollinators, but are currently declining in abundance in the UK and around the world, in part due to climate change (Soroye et al. 2020). Understanding these declines requires research on the biology and ecology of these species. Bumblebees are thought to be generalists, pollinating a variety of flower species. However, our preliminary observations conducted in Durham in summer 2020 indicate that different bumblebee species prefer different plants (see also Sikora et al. 2020). Bumblebees have been a preferred insect model for neuroethology and sensory neuroscience, and a wealth of earlier work has focussed on the importance of visual cues and nectar/pollen reward for foraging honeybees and bumblebees (Latty and Trueblood 2020). In contrast, the importance of floral smells is less well known, although some works report the essential role of flower volatiles in bumblebees' floral choice (Galen and Kevan 1983; Suchet et al. 2011; Haber et al. 2019). T**his project will investigate olfactory preferences of local bumblebees to naturally-occurring floral volatiles.** **Aims.** 1) To **collect and identify bumblebees** and the **plants** they forage on, to establish plant preferences for local bumblebee species; 2) Collect **floral volatiles** from the plants identified in Aim1; to be later analysed by GC/MS in the lab of our collaborators at Wuerzburg University, Germany. This project will suit a curious, enthusiastic and independent student who is able to drive the project forward. We expect that the data of this project will contribute to a publication.

Skills and Career-Development Opportunities:
The student will acquire knowledge and skills in: **1)** insect chemical ecology and neuroethology; **2)** collection of volatiles gas chromatography/mass spectrometry analysis; **3)** identification of bumblebees and plants; **4)** writing up project report.

Wider context of research:
This project is entirely fieldwork- based, and the collected data may be analysed by student on a computer (at home or in the Department). The field-work needs to be conducted locally in Durham, thus it is very likely that it will be allowed to go ahead.

Project Timeframe:
The start date is flexible and will be agreed with the student. Weeks 1-2: Exploring Durham and nearby villages for best collection places. Learning to collect and identify bumblebees and plants. Learning to take notes about the collected samples. Weeks 3-4: Collection of bees and flower volatiles. Shipment of first samples to Germany for analysis.

Weeks 5-6: Learning to analyse GC/MS data. Continue with collection of bees and volatiles. Weeks 7-8: Finalising data analysis and writing up report.