

2023_46_ESE_Roberts: Mapping pollutants and biodiversity throughout drainage basins

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This multidisciplinary project will combine geophysical techniques, geomorphology, ecology, and environmental monitoring to map pollutants and explore their role in moderating ecology of drainage basins. We will focus on the Thames basin where a new inventory of more than 25,000 chemical measurements show that its drainage network carries a diverse suite of anthropogenic pollutants such as pesticides, pharmaceuticals, herbicides, veterinary and illegal drugs. These chemicals can accumulate in toxic concentrations that adversely impact biota. Point sources of pollutants can often be identified from well-designed monitoring programmes (i.e., carefully chosen monitoring sites downstream of sewer overflow vents). However, identifying provenance of diffuse and hitherto unidentified sources, which disperse and mix as they travel through drainage networks, from sparse samples is challenging. The PhD candidate will make use of state-of-the-art inverse models to quantify contaminant source concentrations throughout basins and their relationships to biodiversity. We expect that this project will have significant societal impact and will give the candidate opportunities to engage with environment agency stakeholders.

The project would suit a quantitative natural scientist (e.g. Earth Science, ecology) or chemist interesting in developing computational, mathematical, natural science and monitoring skills. We expect that there will be opportunities to develop field and laboratory skills. The PhD candidate will be given support to develop these skills and will work with large active groups of ecologists, Earth scientists and chemists.

Please contact gareth.roberts@imperial.ac.uk for more details.

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