

**PROJECT TITLE:** Sensory and cognitive ecology of speciation across habitat gradients

**Project Science Theme:** Evolution and Biodiversity Through Space and Time

**Project keywords:** Adaptation, behaviour, brains, speciation, vision

**Lead Institution:** University of Bristol

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### **Project aims and methods:**

Behavioural evolution often plays a key role in speciation, but we know little about how this is manifest in sensory and neural systems. A handful of studies have linked specific neural changes to divergence in host or mate preferences. However, the degree to which brains are adapted to local environmental conditions, and whether this contributes to reproductive isolation between closely related species, remains largely unknown. Using Neotropical butterflies as case studies, we have recently demonstrated that closely related species show consistent patterns of neural and sensory divergence when exposed to micro-habitats defined by light environments, forest structure and resource distribution. Visual systems show particularly dynamic patterns of divergence, suggesting the abundance of light, and complexity of visual information, has critical importance for many behavioural strategies. Depending on the candidate's interests, this project will extend this work in a number of potential ways: i) using genomic approaches to test whether convergence in sensory systems is underpinned by molecular convergence; ii) using comparative neuroanatomy to identify key pathways under divergent selection; iii) using behavioural assays to test for functional correlates of adaptive brain composition, and to explore whether hybrid fitness deficits are in part explained by neural and behavioural disruption.

### **Useful recruitment links:**

For information relating to the research project please contact the lead Supervisor via:

[s.montgomery@bristol.ac.uk](mailto:s.montgomery@bristol.ac.uk)

### **Bristol NERC GW4+ DTP Prospectus:**

<https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/>

### **How to apply to the University of Bristol:**

<http://www.bristol.ac.uk/study/postgraduate/apply/>

**The application deadline is Monday 13 January 2025 at 2359 GMT.**