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## PhD Studentship on foraging biomechanics in leaf-cutter ants

The Evolutionary Biomechanics Laboratory invites applications for a research studentship in the field of animal biomechanics, leading to the award of a PhD degree. The position is open to all students, UK or international, who fulfil the eligibility criteria, and is fully funded for 4 years.

For this position, we are seeking an enthusiastic, kind, open, and curious candidate with a background in natural sciences, biomechanics, mechanical engineering, physiology, physics or related fields. You must hold a Master's degree (or have equivalent research experience) in biological, physical or engineering sciences. More information about who we are and the work that we do can be found on [the group's website](#).

The aim of the project is to study the foraging performance and behaviour of leaf-cutter ants from a mechanical perspective. Leaf-cutter ants are the prime consumer of plant material and the principal insect pest of agriculture throughout the Neotropics. Key to their remarkable success is their ability to harvest fresh plant material in order to grow fungi as crops, which has driven the evolution of an extensive polymorphism, i.e. adult workers differ substantially in size. This polymorphism has been suggested to enable an efficient exploitation of a variety of food sources through an associated task-specialisation. For example, smaller workers tend to cut softer leaves and carry lighter loads, whereas larger workers cut tough materials and carry heavy loads. However, the rules which govern such a size-dependent division of labour have remained unclear, and direct evidence for an increase in colony fitness through the development of a polymorphic worker caste is scarce. The approach of our work is to investigate the extent to which the complex foraging behaviour of leaf-cutter ants can be explained by biomechanical constraints on foraging. The overall goal is to link variations in mechanical performance with worker size, foraging performance, and food source-specific variations in foraging behaviour.

The details of the PhD are open for discussion. To give but a few possible examples, it may focus on the biomechanics of cutting, biomechanics of load-carrying on different slopes, or on variations of metabolic and mechanical costs

London, November  
2022

with size and foraging environment, i.e. directly assess mechanical efficiency. The concrete aims, the overall goal and the methodological approaches will be developed together with the interested candidate to fit their interest and skills. The project will likely involve both experimental and theoretical approaches, and will be conducted in a collaborative multi-disciplinary group at Imperial College London, which studies animal biomechanics using a range of methods, including theoretical and computational mechanics, experimental physiology, and computer vision & machine learning tools which enable automated analysis of complex behavioural data. Our team also works in close collaboration with other labs in the UK and abroad. The successful applicant will work in a supportive team, and have the opportunity to present results at national and international conferences.

For further details on the studentship and for general inquiries, contact Dr David Labonte directly ([d.labonte@imperial.ac.uk](mailto:d.labonte@imperial.ac.uk)), and include an up-to-date CV.