# 2023 Oxford University Museum of Natural History Undergraduate Bursary Scheme

## Project: Microtomography as a tool in reconstructing complex arthropod morphologies and behaviours

### Project summary

Until recently, it was impossible to study and visualise several arthropod morphologies and behaviours, due to technical limitations and the destructive nature of most available techniques. The development of microtomography brought about a revolution in the field, allowing organisms to be examined non-destructively at micron-level detail.

Project supervisor Leonidas-Romanos Davranoglou has created the most extensive microtomographic 3D dataset of charismatic extant and extinct arthropods, which provides an untapped resource for the study of animal biomechanics, behaviour, and evolution.

In this project, the student will reconstruct and visualise unique animal morphologies of their choosing, ranging from mating devises, to sound-producing organs, hunting morphologies, and jumping mechanisms.

### Project details

In order to accomplish this project, the student will:

* Reconstruct and visualise the 3D morphology of a range of charismatic extant arthropod specimens of their choosing, as well as amber fossils.
* Take high-quality imaging of morphologies using a state-of-the-art stereomicroscope, aided by other techniques (e.g. SEM).
* Get a grasp of CT-scan reconstruction software and other imaging techniques (often used in biomedical or palaeontological investigation).
* Learn basic principles of arthropod morphology and evolution.
* [Depending on the student’s interest and progress] Prepare, beyond the physical stay at OUMNH, a manuscript on the findings of the project to be submitted to a scientific journal.

### Selection criteria

#### Essential

* Attention to detail
* High motivation and enthusiasm for nature
* Ability and interest in interpreting anatomical data
* Ability to work with novel software
* Care when using microscopes and camera equipment
* Patience and ability to work on repetitive tasks
* Ability to work without close supervision and as part of a team

#### Desirable

* Basic understanding of entomology and/or palaeontology
* Interest in photography
* Ability to write clearly

### Outcomes for the intern

* Opportunity to mine an incredible 3D dataset of morphological, biomechanical, and palaeontological significance under the close supervision of OUMNH’s researchers and collection managers.
* Experience in handling and photographing palaeontological samples.
* Experience in interpretation, morphology, and classification of a wide diversity of CT-scan data and physical arthropod specimens.
* Particularly valuable experience for students seeking a career in biomedicine, microscopy, anatomy, biomechanics, or systematics.
* Experience in manuscript-writing for scientific publications.