

Thesis-Topics 2024 - Evolution of Locomotion (Bachelor, Master BEE)

Bachelor or Master thesis: 1. Evolution and allometric scaling of sprint speed or jumping performance in arthropods

Supervisors: Dr. Jonas Wolff; Prof. Peter Michalik; external: Dr. David Labonte (Imperial College London)

Background: The ability to move fast is an important ecological trait. How sprint speed and jumping performance evolves and scales with body mass is well established for vertebrates, such as mammals, but poorly known for invertebrates.

Question: How does sprint speed / jumping performance vary across taxa and ecological niches? How does sprint speed scale with body mass from tiny mites to heavy tarantulas or beetles?

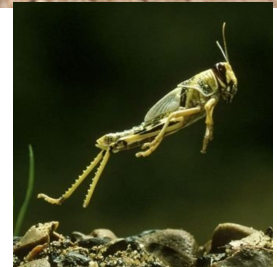
So far this is barely known to science - and you could change that!

Start: any time 2024

- Tasks:**
- field collection and identification of multiple species of a chosen arthropod group (e.g. arachnids, carabid beetles, hemiptera, orthoptera)
 - high speed video recordings of chosen locomotor mode (running OR jumping)
 - video tracking analyses and calculation of performance parameters
 - phylogenetic comparative analysis of performance parameters

Why should I take this topic?

- work with diverse species - get fascinated by biodiversity
- learn to use high speed video, digital video analysis and phylogenetic comparative methods
- learn about variation and evolution of locomotor traits and their effect on ecological functions
- work in a young, interdisciplinary team



Bachelor thesis: 2. Kinematics of the backwards bungee-jumps of sac spiders

Supervisors: Dr. Jonas Wolff; Dr. Daniele Liprandi; Prof. Gabriele Uhl

Background: Sac spiders (Clubionidae) are median-sized nocturnal arboreal hunting spiders found across the globe. When attacked by a predator, they exhibit an interesting escape strategy: they jump backwards and stop their fall with a silken dragline.

Question: How fast and how powerful is the escape jump? Which legs are used to propel the body and how? How is the fall controlled with the dragline? *So far this is not known to science - and you could change that!*

Start: mid March 2024 or later

- Tasks:**
- collecting and rearing clubionid spiders
 - filming escape jumps with a high speed video camera and perform a video tracking analysis
 - describing the behaviour and kinematics of the jumps and dragline-based bracing

Why should I take this topic?

- document an interesting behaviour of a poorly-known yet abundant spider species for the very first time
- learn to use high speed video and video tracking methods
- learn about animal locomotion, kinematics and defensive strategies in invertebrates
- work in a young, interdisciplinary team



Caught your interest? Please contact

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