Honours Projects 2021

Diving in the dark: morphological diversity of subterranean beetles

Immerse yourself in the strange world of Australia's cave dwelling, subterranean beetles and learn sophisticated methods to research their morphological diversity and explore how this morphological diversity may have evolved.

This project will train you in cutting-edge morphometric methods, the statistical analysis of shape, and give you experience in museum collections.

Supervisor: Dr Emma Sherratt (Quantitative Morphology Group, North Terrace)
Co-supervisor: Prof Steve Cooper (SA Museum)

Relevent citations:

- Leys, R., Watts, C. H., Cooper, S. J., & Humphreys, W. F. (2003). Evolution of subterranean diving beetles (Coleoptera: Dytiscidae Hydroporini, Bidessini) in the arid zone of Australia. Evolution, 57(12), 2819-2834.
- Guzik, M. T., Cooper, S. J. B., Humphreys, W. F., & Austin, A. D. (2009). Fine-scale comparative phylogeography of a sympatric sister species triplet of subterranean diving beetles from a single calcrete aquifer in Western Australia. Molecular Ecology, 18(17), 3683-3698.

Research areas: evolutionary biology, entomology, morphometrics, anatomy, insects

Recommended honours enrolment: Honours in Evolution and Palaeobiology

Hopping vs Running: comparative muscular architecture of rabbits and hares

Challenge yourself to research the specialist muscular architecture of the rabbit and hare to understand how an animal adapts to hopping or fast, cursorial running.

Two projects available: 1) the forelimb of rabbits and hares- a stabilising system; 2) the hindlimb of rabbits and hares – a force-generating system.

These projects will hone your dissection skills to make precise, quantitative comparisons of limb anatomy in two species with different modes of locomotion. This project will be spread across Roseworthy and North Terrace campuses.

This research is part of an Australian Research Council Future Fellowship grant to Emma Sherratt (FT190100803).

Supervisor: Dr Emma Sherratt (Quantitative Morphology Group, North Terrace)
Co-supervisor: Dr Rachel Norris (School of Animal and Veterinary Sciences, Roseworthy)

Research areas: comparative anatomy, biomechanics, evolutionary biology,

Recommended honours enrolment: Honours in Animal Science

What hare is this? Genetic diversity of Australia's invasive hares

Hares are more than giant rabbits; they are a species in their own right, adapted to fast running across wide-open spaces.

It might surprise you to know that we don't know what species of invasive hare is in Australia. Bring your curiosity to discover the identity of the Australia's lesser-known lagomorph (*Lepus* sp?). This project will use genetic methods to identify whether Australia's widespread populations of hares are one species, or a hybrid of two or more species brought with early European settlers.

This research is part of an Australian Research Council Future Fellowship grant to Emma Sherratt (FT190100803).

Relevant references:

- Stott, P. Factors influencing the importation and establishment in Australia of the European hare (Lepus europaeus). Australian Journal of Zoology 63, 46–30 (2015).

Supervisor: Dr Emma Sherratt (Quantitative Morphology Group, North Terrace)
Co-supervisor: Associate Professor Jeremy Austin

Research areas: genetics, evolutionary biology, mammology, molecular biology, taxonomy

Recommended honours enrolment: Honours in Evolution and Palaeobiology

Evolution of elongate, limbless body plans in sphenomorphine skinks

The loss of legs has evolved many times in the squamates, and with this is usually an elongate, slender body. This project will examine the vertebral column diversity using the sphenomorphine skinks as an excellent evolutionary experiment to test how and why this body form has evolved.

This project will train you in cutting-edge morphometric methods, the statistical analysis of shape, and give you experience in museum collections.

Relevant references:

- Sherratt, E., Coutts, F. J., Rasmussen, A. R. & Sanders, K. L. Vertebral evolution and ontogenetic allometry: The developmental basis of extreme body shape divergence in microcephalic sea snakes. Evol Dev 21, 135–144 (2019).
- Sherratt, E. & Sanders, K. L. Patterns of intracolumnar size variation inform the heterochronic mechanisms underlying extreme body shape divergence in microcephalic sea snakes. Evol Dev 22, 283–290 (2020).

Supervisor: Dr Emma Sherratt (Quantitative Morphology Group, North Terrace)
Co-supervisor: Professor Mark Hutchinson (SA Museum)

Research areas: evolutionary biology, comparative anatomy, herpetology, morphometrics

Recommended honours enrolment: Honours in Evolution and Palaeobiology