

Miriam Ashley-Ross

Professor of Biology at Wake Forest University

Winston-Salem, NC, US

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Biography

Ashley-Ross is an expert in how animals move, with special expertise in the biomechanics of fish and amphibians. She is a world expert in salamander locomotion, and a leader in the study of “fish out of water” or how some species of fish move on dry land. The Ashley-Ross lab studies the mechanistic basis of animal behavior and uses a variety of techniques in pursuit of answers to the question of how animals do what they do. Investigations usually start with the anatomy of the bones and muscles involved in the behavior, and progresses to high-speed video recording to quantify movement, and on to recording the patterns of muscle activity that produce the movement via a method called electromyography. While the uniting theme of the Ashley-Ross lab is understanding animal locomotion, individual students are encouraged to develop their own interests.

Currently, investigations include:

- + Exploring the evolution of tetrapod locomotion by quantifying underwater locomotion using the limbs in salamanders. The fossil evidence indicates that the appearance of the tetrapod limb and foot pre-dated the move to land and salamanders are the best available match as a model that approximates the posture of early tetrapods.
- + Examination of the biomechanics of prey capture and movement in tarantulas. These large, hairy, ground-dwelling spiders can capture small arthropods (such as crickets) in less than one-tenth of a second; how? Like other arthropods, spiders have to molt in order to grow. To do this, spiders roll over onto their backs to shed the old exoskeleton, and then have to flip back over onto their feet. Given the typical low-slung posture of spiders, how do they do it?
- + Understanding how many species of small fish are able to jump on land using a coordinated “tail flip” behavior, even though these fish lack any apparent anatomical specializations for terrestrial movement.

Ashley-Ross teaches Comparative Anatomy, Biomechanics, Comparative Physiology, and team-teaches Ecology and Conservation Biology of Coral Reefs with Miles Silman. In this latter course, students spend Spring Break on Lighthouse Reef, Belize, one of the most isolated and pristine atolls in the Caribbean Sea.

Areas of Expertise

Biomechanics of Animal Locomotion, Evolution of Animal Location, Comparative Physiology, Muscle Physiology, Comparative Anatomy

Education

Northern Arizona University

B.S. Zoology and Computer Science

University of California, Irvine
Ph.D. Biology

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