

# KINESIOLOGY: EXERCISE PHYSIOLOGY, PHD

This is a named option in the Kinesiology, PhD. (<https://guide.wisc.edu/graduate/kinesiology/kinesiology-phd/>) For more information, please see our program website (<https://kinesiology.education.wisc.edu/academics/grad-program/>).

Exercise Physiology is the study of the biological responses and adaptations to acute and chronic exercise. Research and graduate training at UW–Madison focuses on elucidating: 1) the physiological, biochemical and molecular mechanisms underlying these processes; and 2) the influence of exercise on health and disease.

Dr. Barnes focuses on how aging and exercise alter blood flow and blood pressure regulation. Her current projects focus on age-associated changes in cerebral blood flow, the sympathetic nervous system activity influences cerebral blood flow, and how these relate to the risk of cardiovascular disease and dementia. Dr. Diffie studies the regulation of contraction in skeletal and cardiac muscle and how this regulation is altered by perturbations such as exercise training, injury, or disease. Typical experiments involve measurement of contractile properties single skeletal muscle fibers and single cardiac myocytes and correlation of altered mechanical properties to changes in cell protein composition detected by biochemical and molecular biological techniques. Interaction with faculty and students from other departments (including Nutritional Sciences, Biochemistry, the School of Medicine, and the Institute on Aging) is encouraged by ongoing collaborative research efforts. The research of William Schrage's laboratory is focused on how blood flow is regulated in muscle and brain circulations. Specifically, Dr. Schrage is interested in how acute exercise or environmental stress like hypoxia influences blood flow and how this is impacted by obesity and metabolic syndrome. He measures blood flow using state-of-the-art technology including ultrasound and MRI. A key approach is to use pharmacologic tools to understand how blood flow is controlled, and how obesity changes which mechanisms change the ability to regulate blood flow under stress.

The Exercise Physiology named option of the PhD program is designed to prepare students for scholarly research and teaching. Students are prepared with advanced coursework in Exercise Physiology along with supporting coursework in Biochemistry, Physiology, Statistics, and other areas of Kinesiology (including Biomechanics, Motor Control and Behavior, and Sports Psychology). An important advantage of graduate study at UW–Madison is the exceptional selection of elective courses (>40 departments offer graduate courses in biological sciences). Minor coursework can be performed in Biochemistry, Nutritional Sciences, Physiology, Preventive Medicine, Cellular and Molecular Biology, Zoology, or other relevant fields. Students are intensively involved in conducting research throughout their graduate training and are expected to present research at national scientific meetings and publish their findings in peer-reviewed journals. Most PhD students have the opportunity to teach during their training. Graduates of the PhD program commonly pursue post-doctoral training and then establish independent research programs as university faculty members. Graduates occasionally pursue careers in industry or in clinical settings.