UNIVERSITY OF MARYLAND, BALTIMORE

Program in Physical Rehabilitation Science



Applied Physiology

Biomechanics

Epidemiology of Disability

Neuromotor Control

The Program in Physical Rehabilitation Science was established in 1999 in direct response to the dearth of scientists investigating the mechanisms, diagnoses, and treatment of physically debilitating and disabling medical conditions. The program derives its faculty from a core of scientists in basic and applied science disciplines and medical specialties who have diverse training and interests. Investigators in the program are among the leading scholars in their respective fields and are recipients of major research grants. By graduation, students have become highly productive scientists as exemplified by numerous journal article publications and scientific presentations. Many have obtained individual funding for their work before graduation. Our graduates hold assistant professorships and postdoctoral fellowships at highly esteemed academic and research institutions across the United States. Students admitted to the program are broadly trained in research methods, statistics, and scientific instrumentation. Students also complete coursework and a dissertation in one of four concentration areas: Applied Physiology, Biomechanics, Epidemiology of Disability, or Neuromotor Control.

Students in the Applied Physiology concentration focus their studies on the molecular, cellular, and systemic mechanisms underlying impaired bodily function. The concentration assimilates principles derived primarily from molecular and cellular biology, exercise physiology, pathological physiology, and pharmacology. Research is conducted in both wet and clinical laboratory settings. Both animal and human models are used for research.

Students in the Biomechanics concentration focus their studies on the forces generated by the body in response to movement and other perturbations. In a more general sense, the concentration involves the application of physics and mathematics to the analysis of human movement. Biomechanical instrumentation involves several methods of quantifying joint and ground reaction forces, and motion synergy and symmetry. Biomechanics research in the Program in Physical Rehabilitation Science is conducted in our specially instrumented laboratories.

Students in the Epidemiology of Disability concentration focus on studies that address the magnitude of disability in a population. Application of these studies is found in the fields of public health and health policies as they pertain to providing for individuals diagnosed with debilitating and disabling medical conditions.

Students in the Neuromotor Control concentration study the central and peripheral nervous systems and the mechanisms by which movement is controlled. Studies in this field employ both electrical and magnetically evoked stimulation of muscle contraction, as well as voluntary movement initiation, to understand movement characteristics in individuals with neurologically mediated movement impairment. The concentration is an assimilation of principles from neurology, motor control, neurobiology, and kinesiology.

Student Profiles

Todd Cade

Todd Cade graduated from the Program in Physical Rehabilitation Science in 2002. Assistant professor of physical therapy at Washington University in St. Louis, Cade completed his postdoctoral training at Washington University. Cade pursued research in oxidative metabolic insufficiency as a mechanism of fatigue-related disability in people infected with HIV. An author on the first paper describing oxidative metabolic insufficiency and functional aerobic impairment in adolescents with HIV infection, Cade went on to determine that much of the oxidative impairment suffered by individuals infected with HIV is the result of the medication regimen commonly used to control the progression of the infection. As a graduate student at the University of Maryland, Baltimore, Cade received the President's Award from the Mid-Atlantic Regional Chapter of the American College of Sports Medicine. By the time he graduated from the program in 2002, Cade had published or submitted eight articles and was the primary author on five of them.

Margaret Finley

During her doctoral training, Margaret Finley focused her research on propulsion mechanics and metabolic changes in manual wheelchair users in response to an exercise intervention. She also worked on the development of a tool to determine functional independence in this diverse population. Finley expanded her research to include the investigation of the secondary upper extremity pathologies common to this population. Through her laboratory research exposure, she had 15 abstracts accepted for presentation at national and international scientific conferences, eight as primary author. Based on Finley's research, information from a pilot project on the prevalence of shoulder pathology in wheelchair users was presented at the 2000 Combined Sections Meeting of the American Physical Therapy Association and the 5th Scientific Congress for the 2000 Paralympics Games in Sydney, Australia. Research assistant professor at the University of Maryland School of Medicine, Finley also completed her postdoctoral training at the University of Maryland after graduating from the Program in Physical Rehabilitation Science in 2003. Finley is now an Assistant Professor of Physical Therapy and Director of the Musculoskeletal Research Lab at the University of Indianapolis.

For More Information

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