Movement Science

PhD in Movement Science

The PhD in Movement Science is an interdisciplinary program designed to prepare students for productive research careers in academia and industry. The program offers training to investigators who seek to answer questions about human movement, its functions and dysfunctions. The program is organized around three core content areas: biocontrol (neuroscience), bioenergetics (exercise physiology), and biomechanics. Our students are trained to investigate and improve movement impairments in people with chronic diseases such as obesity, stroke, diabetes, neuropathy, Parkinson's disease, and low back pain.

The Movement Science Program is administered through the Program in Physical Therapy. Applicants come from a variety of academic backgrounds: physical therapy, exercise science, kinesiology, biomedical engineering, neuroscience, and occupational therapy. Students learn from, and collaborate with, scientists from multiple departments with colleagues in medicine, psychiatry, orthopedics, biomedical engineering, psychology, and biology.

Applicants must hold a baccalaureate degree from an accredited college or university. The majority of students hold a master’s degree but one is not required for admittance. All applicants should possess the knowledge and skills normally derived from courses in biology, calculus, chemistry, computer science, human anatomy, physics, physiology, and statistics. In exceptional cases, applicants with deficient prerequisites may be admitted on condition that these deficiencies will be made up in the first year. Applications for admission must be submitted by December 1. An interview day for selected applicants is held in January.

On average, students complete the degree in 4.5 years. Students work closely with their research mentor, generally working in the lab 15-20 hours a week in their first two years and full-time thereafter. Students complete required course work during the first two years.

Accepted students receive full tuition remission, a stipend, and health insurance. The Movement Science Program is supported by NIH training grant T32HD007434.

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Chair
Gammon M. Earhart
Professor
PhD, Washington University
Neural control of locomotion in people with Parkinson's disease

Professors
Catherine E. Lang
PhD, Washington University
Stroke recovery and rehabilitation, Neurorehabilitation

Michael J. Mueller
PhD, Washington University
Metabolic and movement factors in people with diabetes mellitus (DM)

Susan B. Racette
PhD, University of Chicago
Dietary and exercise interventions for health promotion and disease prevention

David R. Sinacore
PhD, West Virginia University
Diabetic foot disease, contributors to physical frailty in older adults

Linda R. Van Dillen
PhD, Washington University
Musculoskeletal pain problems in the low back, hip and neck

Dequan Zou
DSc, Washington University
Biomechanics modeling and computer simulation

Associate Professors
W. Todd Cade
PhD, University of Maryland, Baltimore
Mechanisms and treatments of metabolic diseases

B. Ruth Clark
PhD, St. Louis University
Promotion of nutrition and exercise in urban residents

Joseph W. Klaesner
PhD, Vanderbilt University
Rehabilitation engineering

Assistant Professors
Gretchen A. Meyer
PhD, University of California, San Diego
Mechanical and cellular contributors to skeletal muscle disease

Diana C. Parra Perez
PhD, Washington University
Physical activity and healthy diets and their role in preventing chronic disease and obesity
Degree Requirements

The Movement Science Program course work is divided into 35 semester units of required courses and 37 semester units of electives. Elective course work supports the interdisciplinary mission of the Movement Science Program. Students complete required course work during the first two years.

In addition to course work, the requirements to complete the PhD degree include:

• **Qualifying Examination:** Students will take their qualifying exams after two years of full-time study. Part One is a written exam to assess the knowledge about the three curriculum cores (biocontrol, bioenergetics, and biomechanics). Part Two requires the student to develop a research proposal pertinent to his or her projected area of dissertation research.

• **Laboratory Research:** Students will develop, implement, and complete original laboratory research appropriate for a doctoral dissertation.

• **Doctoral Dissertation:** Students will successfully defend an oral defense of their dissertation proposal, complete a written doctoral dissertation, and defend an oral presentation of the doctoral dissertation.

The student must complete all of the course requirements while classified as a "doctoral student." The student is considered a "doctoral candidate" after completion of the qualifying examinations.