Programs and Research for Medical Students

Gwendolyn A. Sowa, MD, PhD
Professor and Chair

rehabmedicine.pitt.edu
RESEARCH WITH THE DEPARTMENT OF PHYSICAL MEDICINE & REHABILITATION

The department is very proud to be ranked 1st in NIH funding to physical medicine and rehabilitation programs by well over $1M annually (2017, The Blue Ridge Mountain Institute). The rank is further proof of the value placed on research by the department’s administration and faculty. Our investigations follow the guidelines set by the NIH Roadmap: medical research should be designed to deepen our understanding of biology, stimulate interdisciplinary research teams, and reshape clinical research to accelerate medical discovery and improve people’s health.

Students of all levels and from a wide variety of departments and specialties have received valuable instruction from our faculty in the various laboratories and shared spaces in UPMC and the University of Pittsburgh. A number of students have presented at national conferences, and received awards and scholarships as a result of their work with our faculty.

The department is at the forefront of national rehabilitation trends in both basic and clinical research.

- Traumatic Brain Injury (TBI)
- Regenerative Medicine
- Neuroprosthetics
- Brain-Computer Interface (BCI)
- Assistive Technology
- Musculoskeletal Regeneration
- Cognitive Studies
- Stem Cell Research
- Spinal Cord Regeneration

A number of basic laboratory investigations have led to clinical investigations including:

- Development of advanced biomimetic upper limb prosthetics
- Electrical stimulation used to enhance regenerative capabilities in aged muscle
- Neuroprosthetics and sensorimotor functions
- Brain-computer interface studies to restore hand function
- Ultrasound used to determine rotator cuff changes associated with wheelchair propulsion

PMR RESEARCH EXPERTS

School of Medicine Associate Dean of Medical Student Research, and Chair of the Department of Physical Medicine & Rehabilitation, Gwen Sowa, MD, PhD, is an alumnus of the University of Wisconsin and the Rehabilitation Institute of Chicago. Dr. Sowa is internationally recognized for her research in degenerative disc disease, back pain, and the mechanisms of exercise-based treatments.

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School of Medicine Assistant Dean of Medical Student Research, Brad Dicianno, MD, an alumnus of the University of Pittsburgh, its School of Medicine, and this department’s residency program, is committed to matching interested medical students with the right PMR research investigations. As an SOM alum he is well informed of the requirements of the medical school research requirement.

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RESEARCH FACULTY AND RESEARCH INTERESTS

Fabrisia Ambrosio, PhD, MPT
Associate Professor (ambrosiof@upmc.edu)
  • Regenerative Medicine
  • Duchenne’s Muscular Dystrophy
  • Stem Cell Research
Dr. Ambrosio has gained international recognition for her work in regenerative rehabilitation. Her research uses molecular, cellular, and functional analyses to investigate the development of approaches to harness the body’s natural health capacity.

Corina Bondi, PhD
Assistant Professor (bondico@upmc.edu)
  • Traumatic Brain Injury
  • Neuropsychopathology
  • Neurotransmitters
Dr. Bondi’s current research focuses on therapeutic strategies, such as pharmacotherapies and environmental enrichment, to improve complex cognitive processing deficits and distinct neurobehavioral and neurochemical alterations relevant to psychiatric disorders after TBI.

Michael L. Boninger, MD
Professor and Vice Chair for Research (boninger@upmc.edu)
  • Adaptive Sports
  • Assistive Technology
  • Spinal Cord Injury (SCI)
  • Medical Research Careers
Dr. Boninger is the director of the University of Pittsburgh Model Center on Spinal Cord Injury, a National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR) Center of Excellence. He is world renowned for his research in SCI, assistive technology and neuroprosthetics, and related brain-computer interface technology.

Jennifer Collinger, PhD
Assistant Professor (collinger@pitt.edu)
  • Brain-Computer Interface
  • Neurorehabilitation
  • Assistive Technology
Dr. Collinger’s research is related to neurorehabilitation and BCI technology for individuals with motor impairments due to spinal cord injury and disease. Her groundbreaking work using BCI technology to translate thought to action has garnered international attention.
Brad Dicianno, MD
Associate Professor (dicianno@pitt.edu)
Assistant Dean of Medical Student Research
- Adaptive Sports
- Assistive Technology
  - Spina Bifida
- Spinal Cord Injury
- Telemedicine
Dr. Dicianno’s research interests focus on developing and studying interventions with complex disabilities resulting from conditions such as spina bifida, cerebral palsy, and SCI.

Lee Fisher, PhD
Assistant professor (lef44@pitt.edu)
- Neuroprosthetics
- Bioengineering
- Somatosensory System
Dr. Fisher’s current research interests involve the development of neuroprostheses for sensory and motor function to restore deficits after neural damage or disease.

Robert Gaunt, PhD
Assistant Professor (rag53@pitt.edu)
- Neuroprosthetics
- Functional Electrical Stimulation
- Sensory Motor Control
Dr. Gaunt is presenting investigating the integration of advanced technology with movement and sensory functions in upper limb neuroprostheses. The goal of this research is to produce an upper limb prosthetic that mimics the sensory and functional actions of a natural arm.

Amy Houtrow, MD, MPH, PhD
Associate Professor (houtrow@upmc.edu)
Vice Chair of Pediatric Medicine
- Sociological Impact of Disabilities
- Children with Disabilities
- Pediatric Rehabilitation Medicine
Dr. Houtrow recognizes the impact raising children with disabilities has on families and her research focuses on developing channels to improve delivery of medical services.

Anthony E. Kline, PhD
Professor (klineae@upmc.edu)
- Traumatic Brain Injury
- Antipsychotics and TBI
- Cognitive Recovery
Dr. Kline investigates various therapeutic strategies, such as pharmacotherapies and environmental enrichment, in an attempt to restore function and/or reduce TBI-induced deficits in rodents who have sustained motor and cognitive injury mimicking those seen in human TBI patients.
Michael Munin, MD  
Professor (muninmc@upmc.edu)  
Vice Chair of Clinical Program Development  
- Chemodenervation  
- Prosthetic Rehabilitation  
Dr. Munin is involved in industry-funded clinical research. Research that has included testing ultrasound-guided delivery of chemodenervation agents used to reduce the effects of spasticity.

Gwendolyn Sowa, MD, PhD  
Professor and Chair (sowaga@upmc.edu)  
Associate Dean of Medical Student Research  
- Intervertebral Disc Degeneration (IDD)  
- Molecular Biomarkers of Pain  
- Low Back Pain  
Dr. Sowa currently performs molecular laboratory-based, translational, and clinical research, investigating the effect of motion on inflammatory pathways and the beneficial effects of exercise on managing low back pain. She has won national and international recognition for her research of IDD and the development of biological and biomechanical therapies.

Michael Urbin, PhD  
Assistant Professor (m.urbin@pitt.edu)  
- Biomechanics  
- Neuropsychiology  
- Neuromodulation  
Dr. Urbin’s research program involves non-invasive stimulation techniques to study neural plasticity after neurological injury.

Amy Wagner, MD  
Associate Professor (wagnerak@upmc.edu)  
Director, Translational Research  
- Traumatic Brain Injury  
- Rehabilomics and Genetics  
- Gender and Recovery after TBI  
- Hormone Physiology and Inflammation  
- Neuroendocrine Dysfunction, Epilepsy, Mental Health, Cognition, and Behavior  
Dr. Wagner is investigating the impact of an individual’s genetics and biomarkers on deficit progression and the development of secondary injury after TBI. Her research is laying the groundwork for a “personalized medicine” approach to treatment and improving patient outcomes.

Lynn Worobey, PhD, DPT  
Assistant Professor (law93@pitt.edu)  
- Assistive Technology  
- Spinal Cord Injury  
- Biomechanics  
Dr. Worobey’s research focuses on maximizing function for individuals who utilize assistive technology in both a research and clinical setting.

Scan of brain injury
TRAINING AND RESEARCH OPPORTUNITIES AT THE DEPARTMENT OF PHYSICAL MEDICINE & REHABILITATION

Since 2000 department faculty have instructed more than 50 medical students in their various laboratories and centers across the university. The faculty support projects through several research mechanisms.

Medical Student Training
Disabilities Medicine prepares interested medical students for healthcare careers serving children and adults with disabilities. Disabilities Medicine encompasses the body of knowledge about disabilities at multiple levels of analysis: the biological basis of disability; recommended clinical practices; functional impacts of disability and its treatment; environmental, social, and community determinant of outcomes; and public health. This area of concentration (AOC) promotes the development of skills in person–and family-centered practice, collaborative decision-making, functional assessments, cultural competence, and chronic care delivery. Participants learn about community resources and policies that interact with healthcare to improve clinical and functional outcomes for people with disabilities. Students who participates in the AOC in Disabilities Medicine support the inclusion of individuals with disabilities in all aspects of community life. Dr. Betty Liu, MD, is the Director of the AOC.

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PM&R Interest Group allows students interested in the field of physiatry to learn more about the field, network with faculty and residents, and attend workshops and social events. The faculty director of this group is Dr. Brad Dicianno.

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Medical Student Research
Med Student Scholarly Projects are intended to expose students to the mechanics of scientific investigation, teach them how to develop a hypothesis, and how to collect, analyze, and interpret data to support it.

The Dean’s Summer Research Program (DSRP) is the major source of student (MS-1, MS-2) stipend support for summer research activity. The program is funded primarily by the dean and various NIH training grants. The program is directed by Drs. Don DeFranco and Gwen Sowa.

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Rehabilitation Research Experience for Medical Students (RREMS) is sponsored by the Association of Academic Physiatrists (AAP) and the Foundation for PM&R. This eight-week summer externship offers first-year medical students experience in scholarly research within the specialty of PM&R. The RREMS was developed for medical students with strong research interests. The program provides a structure research experience while exposing students to some of the most successful and respected faculty mentors in the field. In addition to working with experts in the field, the elected student receive a $4,000 stipend and paid travel to attend and present at the annual assembly.

https://www.physiatry.org/page/RREMS