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REHAB Profess

The Bridge Builder

*An old man, going a lone highway, came at the evening, cold and gray,
to a chasm, vast and deep and wide, through which was flowing a sullen tide,
the old man crossed in the twilight dim—that sullen stream had no fears for him;
but he turned, when he reached the other side, and built a bridge to span the tide.*

*“Old man,” said a fellow pilgrim near, “You are wasting strength in building here.
Your journey will end with the ending day; you never again must pass this way.
You have crossed the chasm, deep and wide, why build you the bridge at the eventide?”*

*The builder lifted his old gray head. “Good friend, in the path I have come,” he said,
“There followeth after me today a youth whose feet must pass this way.
This chasm that has been naught to me to that fair-haired youth may a pitfall be.
He, too, must cross in the twilight dim; good friend, I am building the bridge for him.”*

— Will Allen Dromgoole



By now, many of you have heard that our previous chair, Mike Boninger, has transitioned to a role as senior medical director for post-acute care, vice president for medical affairs within UPMC, a position that will continue to elevate the impact that rehabilitation medicine will have in our evolving health care system. Mike will also continue to support the Department of Physical Medicine and Rehabilitation in his role as vice chair for research. While Mike’s personal accomplishments have been many, what he will leave as his legacy is the countless careers that he has positively impacted locally and nationally. My own career has been one of them, and for that I will be forever grateful.

As I embark upon my own tenure as chair of our department, I am fortunate to inherit a strong department, with incredible breadth and depth in education, research, and clinical care. Our greatest challenge moving forward is to become leaders in the transformation of health care, not only within PM&R, but also as an example and resource for other fields trying to pursue what we already know: building interdisciplinary teams, collaboration, patient-centered individualized care, and innovations focused on improving function and quality of life. It is an exciting time, and if we proactively seize these opportunities and define new directions, our field will flourish. And so, I begin my foray into the task of bridge building. I can’t wait to see where it will lead us.

Gwendolyn Sowa, MD, PhD

Director, UPMC Rehabilitation Institute
Chair, Department of Physical Medicine and Rehabilitation

DEPARTMENT RESEARCH

The University of Pittsburgh Department of Physical Medicine and Rehabilitation is a Top 5 PM&R department receiving research funding from the National Institutes of Health (NIH). We also receive funding from the U.S. Department of Defense, VA Health System, Pennsylvania Department of Health, Foundation of PM&R, Paralyzed Veterans of America, and the Craig H. Neilsen Foundation. The following list highlights some of the ongoing investigations and training opportunities for physicians and scientists.

Spinal Cord Injury Research

Multichannel Microstimulation of Primary Afferent Neurons to Restore Proprioceptive Feedback

Primary Investigator: Michael Boninger, MD
Funding: NIH

We have demonstrated in previous research in cats that primary afferent microstimulation (PAMS) can recruit small populations of afferents from a variety of sensory modalities and that this stimulation can transmit meaningful activity to S1 motor nerves. Investigations will focus on characterizing the ability of PAMS to transmit sensory information to S1 motor nerves in anesthetized cats at various points of input, neural activity, and physical status. These experiments aim to test the ability of PAMS to predictably modify motor behaviors.

Spinal Root Sensory Feedback for Intramuscular Myoelectric Prostheses

Primary Investigator: Robert Gaunt, PhD
Funding: Defense Advanced Research Projects Agency (DARPA)

The goal of this multi-phase research is to develop a fully integrated upper limb prosthetic arm with sensory and motor capabilities that approach those of a natural limb. The technology will provide an unprecedented level of sensation and control not currently available in any prosthetic system, and will facilitate greater functional incorporation of upper extremity prosthetic devices into the lives of amputees.

Completed work on the initial phase of this project includes improved hand musculoskeletal model performance and development of a complete set of intramuscular EMG recordings from extrinsic hand muscles. The next phase will explore dorsal root ganglia stimulation as a means to restore somatosensation to upper limb amputees.

Telewellness Support Systems for Spinal Cord Injury

Primary Investigator: Brad Dicianno, MD, MS
Funding: Craig H. Neilsen Foundation

The iMHere (interactive Mobile Health and Rehabilitation) app is providing clinician guided self-management skills to patients with medical complications. iMHere is a low cost, efficient method for empowering individuals to be more independent in managing their own health. More information about iMHere research can be obtained at imhere.pitt.edu.

Brad Dicianno, MD, MS, was named a Pitt Innovator (2014) at the 10th annual "Celebration of Innovation" for the software that uses smartphone apps and a web-based portal to help individuals with disabilities and chronic conditions manage their self-care activities. It also provides a way for clinicians to triage and intervene quickly when problems arise.

Brain Injury Research

Sustained Attention and Executive Functioning After Brain Trauma

Primary Investigator: Corina Bondi, PhD
Funding: NIH

Traumatic brain injury (TBI) causes long-lasting cognitive impairments, as well as psychological consequences. Behavioral tests performed to date after experimental TBI have primarily focused on motor and spatial learning deficits and not on the complex attention impairments related to the frontal lobe, which are common in most brain injuries. By evaluating deficits of complex cognitive processes (sustained attention, executive function capabilities, and cognitive flexibility) after experimental TBI, we can address questions regarding altered neurotransmission responsible for such behavioral deficits. Integrating animal models of higher-order cognitive processing in the standard neurotrauma behavioral battery after TBI is vital to investigating complex cognitive problems and finding clinically relevant therapeutic targets.

Continued on Page 6

New Department Chair Appointed



Gwendolyn Sowa, MD, PhD, has been appointed chair of the Department of Physical Medicine and Rehabilitation at the University of Pittsburgh, and director of the UPMC Rehabilitation Institute. She is the associate dean of medical student research, and holds joint appointments in the Departments of Orthopaedic Surgery and Bioengineering. Dr. Sowa is the co-director of the Ferguson Laboratory for Orthopaedic and Spine Research. She succeeds **Michael Boninger, MD**, who has accepted the position of senior medical director for post-acute care and will remain in the department as the UPMC endowed vice chair of research.

“The department will continue to perform cutting-edge research, provide patient care and educational excellence, and develop innovative health-care models utilizing psychiatric philosophies. Using the multidisciplinary team approach to care, we can leverage the values that rehabilitation medicine brings to the table and improve patient outcomes throughout the system,” says Dr. Sowa.

Internationally recognized for her research in low back pain, Dr. Sowa currently performs molecular laboratory-based, translational, and clinical research, investigating the effects of motion on inflammatory pathways and the beneficial effects of exercise. Dr. Sowa also is investigating

the role of serum biomarkers in guiding individualized treatments for intervertebral disc degeneration and back pain. Her research is conducted at the Ferguson Laboratory for Orthopaedic and Spine Research, a 3,000 square-foot laboratory fully equipped to perform molecular assays and spinal biomechanical testing.

Dr. Sowa is actively involved in training future clinician-scientists, and is herself an alumnus of the Association of Academic Physiatrists’ Rehabilitation Medicine Scientist Training Program. In the 11 years since accepting her first assistant professorship, Dr. Sowa has mentored more than 75 students at all levels of education, and sponsored visiting research scholars from around the world. Dr. Sowa has authored and co-authored more than 60 original research publications, 35 book chapters and reviews, and over 200 national presentations related to research. Among the many awards she has received are the prestigious PASSOR Legacy Award (2014), AAPM&R President’s Citation Award (2010) and the AAP Young Academician Award (2009).

Dr. Sowa graduated cum laude from Lafayette College (1993) with a bachelor of science in chemistry. She went to the University of Wisconsin and received a doctorate in biochemistry in 1997, and a medical doctorate in 2000. She completed the Physical Medicine and Rehabilitation Residency at the Rehabilitation Institute of Chicago, Northwestern University in 2004.

AAPM&R Annual Meeting Contributions By Department Faculty

Several faculty are involved in courses and workshops at the 2016 AAPM&R Annual Assembly in New Orleans, La.

Michael Munin, MD: Session Director

General Rehabilitation Track

Course #408

Increased Regulations with Prosthetic Care = Increased New Referrals for Physiatrists

Neurological Rehabilitation Track

Table Trainer — Workshop #207

Ultrasound Guidance for Head and Neck Chemodeneration

Table Trainer — Workshop #219

Ultrasound Guidance for Chemodeneration Procedures: Upper Limb Muscles and Nerves.

Intensive Workshop — Table Trainer — IW812

Improving Focal Chemodeneration Skills to Treat Patients with Spasticity, Dystonia and Related Motor Disorders

Musculoskeletal and Sports Medicine Track

Course #136

Ultrasound as a PM&R Gamechanger: How US Did, Will, or Should Transform 4 Corners of Our Field

Natasa Miljkovic, MD, PhD: Session Director

Beth Stepanczuk, MD: Course Faculty

General Rehabilitation Track

Course #416

What is the Role of Physical Medicine and Rehabilitation in the World of Dementia?

Kentaro Onishi, DO: Course Faculty

Musculoskeletal and Sports Medicine Track

Course #109

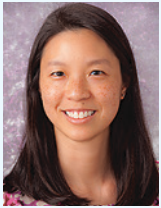
Debate in Popular Topics within Sports Medicine: The Role of Minimalist Footwear and Platelet-Rich Plasma in Management of Overuse Injuries

NEW CLINICAL ACTIVITIES

Integrated Spine and Sports Medicine Centers

UPMC Outpatient Center — Wexford

The newly opened UPMC Outpatient Center — Wexford is a collaboration between the Departments of Neurosurgery and Physical Medicine and Rehabilitation. The partnership offers a comprehensive multidisciplinary approach in diagnosing and treating neck and back pain, spine disorders, and spine injuries. The two specialties follow patients through diagnosis to rehabilitation, ensuring a comprehensive recovery after either appropriate nonsurgical treatment or postoperative care. The PM&R team is led by **Suehun Ho, MD**, who is an assistant professor in the department.



Comprehensive preoperative and postoperative care is the main advantage to the Neurosurgery-PM&R partnership. “Some patients do well without surgery and are able to be managed nonoperatively. For those patients who end up with surgery, having PM&R optimize patient care prior to surgery helps with their overall postoperative recovery. Prior to surgery, physiatrists can help patients identify their proper pain generators and maximize their nonoperative treatment with the use of therapies, medications, and injections if needed. Postoperatively, PM&R can help to guide the rehabilitation plan, as well as facilitate return to work or hobbies,” says Dr. Ho.



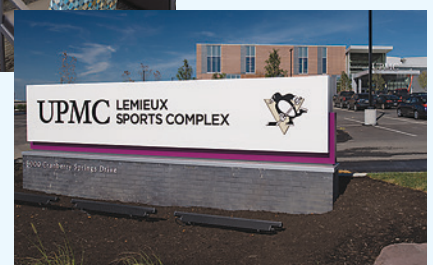
Dr. Ho completed the Pain Management Fellowship at the University of Michigan in 2006. She comes to Pittsburgh via an attending physician position with SUNY Upstate Medical University in Syracuse, N.Y.

UPMC Lemieux Sports Complex

The UPMC Lemieux Sports Complex houses exercise and sports venues, a sports medicine facility, and the headquarters for the 2016 National Hockey League Stanley Cup Champions, the Pittsburgh Penguins®. The center is named after retired Pittsburgh Penguin Mario Lemieux, founder of The Mario Lemieux Foundation, part owner of the Pittsburgh Penguins, and one of the best hockey players of all time.

The complex houses two ice rinks, 1,500 square feet of hockey skills training space, and a dedicated sports performance gym. The UPMC component includes exam rooms, MRI and digital x-ray machines,

on-site radiologists, and physicians specializing in orthopaedic surgery, physical medicine and rehabilitation, and primary care. Patients also have access to an internationally recognized concussion management and treatment program, sports-focused physical therapy and rehabilitation, and sports performance training.



PM&R Physicians Enhancing Sports Medicine

The UPMC Lemieux Sports Complex provides non-surgical regenerative medicine procedures that are performed by physiatrist **Kentaro Onishi, DO**.

“Disease-type largely guides the intervention decision. For example, if the patient has a partial intra-substance tear, then platelet-rich plasma (PRP) to help the body regenerate the torn tissue may make sense. On the other hand, if a tendon is scarred, other procedures are indicated,” says Dr. Onishi.



Because the Food and Drug Administration (FDA) “currently does not allow human tissues to be kept outside the patient for more than 24 hours, these are same-day procedures with less than 30 minutes between extraction and injection,” says Dr. Onishi, “In fact, extraction, solution preparation and injection are all completed in the same exam room.”

Dr. Onishi also is an expert in the FDA-approved Tenex procedure used to treat Achilles tendinopathy and plantar fasciopathy. “Tenex was formerly a surgical procedure, and is now done under ultrasound guidance in an



outpatient setting. The goal of the procedure is to mechanically separate the nearby fat pad from the chronically irritated and painful tendon. Doing this typically results in significant pain relief one to two days after the procedure,” explains

Dr. Onishi. “This is a particularly great procedure for the in-season athlete as it does not require going into the tendon itself, and does not predispose athletes to procedure-related tendon rupture.”

Dr. Onishi is an assistant professor in the Department of Physical Medicine and Rehabilitation, and assistant director of the ACGME-accredited Sports Medicine Fellowship. Dr. Onishi completed the ACGME-accredited Sports Medicine Fellowship at the Mayo Clinic in Rochester, Minn.

UPMC Rooney Sports Complex

The UPMC Rooney Sports Complex is a partnership between the Pittsburgh Steelers and UPMC, creating one of the leading sports medicine facilities in the country. Improvements were recently completed to expand the Steelers’ practice facilities and the concussion treatment space within the Sports Medicine Center. Both the Rooney and Lemieux centers provide a multidisciplinary approach to the delivery of sports medicine care.



Other physiatrists at the UPMC Rooney Sports Complex and UPMC Lemieux Sports Complex



Stephanie Giammittorio, DO
Primary Care Sports Medicine



Maria Twichell, MD
Sports Concussion

DEPARTMENT RESEARCH *Continued from Page 2*

Optimizing Environmental Enrichment to Model Preclinical Neurorehabilitation

Primary Investigator: Anthony Kline, PhD

Funding: NIH

Environmental enrichment (EE) is a non-invasive paradigm that promotes significant cognitive recovery and histological protection after experimental TBI and has the potential to mimic post-TBI clinical rehabilitation in the laboratory. A major shortcoming of the typical EE paradigm is that it consists of immediate and continuous exposure after TBI, which is inconsistent with the time frame of clinical rehabilitation after TBI.

To achieve an optimal clinically relevant model, exposure to EE after experimental TBI is delayed to mimic the real world situation of the TBI patient in a clinical environment. The goal is to determine the latest time point at which rehabilitation is still effective in improving motor and cognitive outcomes, and inducing neuroplasticity after moderate TBI. Further testing at specified intervals will assess the long-term effects of initial rehabilitation time point delays. The resulting model will significantly impact and advance rehabilitation research by providing insight into timing and therapeutic parameters that are clinically relevant.

Evaluating Causal and Inferential Association Across the Clinical Care Spectrum Between Extra-Cranial Injury and Suicidality After Moderate to Severe TBI

Primary Investigator: Amy Wagner, MD

Funding: NIH

Our previous works show that severe extracerebral injury (ECI) increases the propensity for suicidal endorsement (SE) over the long-term among TBI individuals who received inpatient rehabilitation. The goal of this project is to improve effectiveness of mental health monitoring, resource access, and treatment for individuals with TBI and ECI through early identification of those at greatest risk for SE and with the greatest need for more intensive follow-up services. In attaining this goal we believe intervention will improve health, function, and quality of life. Our long-term hypothesis is that identifying acute to chronic care recovery pathways will allow for personalized screening, triage, and treatment strategies to reduce SE, increase life role participation, and improve health-related life quality after TBI.

Musculoskeletal Research

The Anti-Aging Role of Klotho in Skeletal Muscle Regeneration

Primary Investigator: Fabrisia Ambrosio, PhD, MPT

Funding: NIH

Following an acute injury, young skeletal muscle initiates a highly effective regenerative response, which largely restores the original architecture of the damaged fibers. Increasing age, unfortunately, negatively affects the regenerative response to injury resulting in a considerable scar tissue deposition at the expense of functional contractile tissue. Much of this healing defect has been attributed to an age-related decrease in muscle stem cell (MuSC) functionality.

Research indicates that circulating factors, such as Klotho (anti-geronic gene), play a critical role in dictating skeletal muscle regenerative potential over time making the age-related decrease in MuSCs reversible. Understanding the role of Klotho in regenerating tissue will lay the groundwork for future studies in which muscle stimulation in geriatric populations may be used to prevent, delay or reverse age-related declines in muscle function through improved regenerative capacity.

Training

The Alliance for Regenerative Rehabilitation Research & Training

Primary Investigator: Michael Boninger, MD

Funding: NIH

Rehabilitation is the process of maximizing an individual's functional capacity after an illness or trauma. Regenerative medicine is the process of creating living, functional tissues to repair or replace tissue or organ function lost due to age, disease, damage, or congenital defects. Regenerative medicine has been shown to benefit from the application of targeted and specific mechanical stimuli, a mainstay of rehabilitation. Accordingly, the efficacy of rehabilitation interventions may be enhanced through the use of cellular and other regenerative therapies. We propose that the integration of these two disciplines, known as Regenerative Rehabilitation, will increase the efficacy of interventions designed to optimize independence and participation of individuals with disabilities. The overarching goal of the Alliance for Regenerative Rehabilitation Research & Training (AR3T) is to expand scientific knowledge, expertise, and methodologies across the domains of rehabilitation science and regenerative medicine, thus improving the lives of individuals with disabilities. These goals will be achieved through educational programs, pilot funding, collaborative opportunities, and training. Visit ar3t.pitt.edu for more information.

DEPARTMENT NEWS

Awards and Honors



Amy Houtrow, MD, PhD, MPH, associate professor and vice chair of pediatric rehabilitation medicine, is the recipient of the 2016 AAPM&R *Outstanding Council Service Award – Pediatric Rehabilitation/ Developmental Disabilities Council*.

The Awards Committee and Board of Governors, with the support of Member Council leaders, established these awards in order to recognize service and volunteerism of Council members who contribute to the success of the Academy, and who serve its membership in ways not limited to research, education, and product development.

Continuing Medical Education

The courses below are now available for continuing medical education credits by visiting UPMCPhysicianResources.com/Rehab.

REHAB GRAND ROUNDS

Difficulty Walking in an Adult with Cerebral Palsy

Beth Stepanczuk, MD;
Mary Schmidt, DO

Drs. Stepanczuk and Schmidt discuss walking difficulties in adult patients with cerebral palsy.



REHAB GRAND ROUNDS

Diagnosing Running Injuries: A Primer for Physiatrists

David Stone, MD; Tracy Knippel, MD;
Melissa Roscher, MD

Drs. Stone, Knippel, and Roscher discuss diagnosing running injuries with a focus on a clinical case study.



UPMC Video Rounds

Video Rounds is a series of informative and educational short videos created for physicians and covering a variety of medical and surgical disciplines, including:



Treating Lower Back Pain with Medial Branch Radiofrequency Ablation

Megan Cortazzo, MD



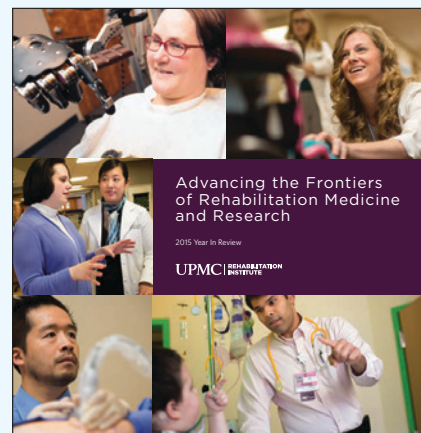
Early Mobility and Rehabilitation in the ICU: A Paradigm Shift

Julie Lanphere, DO

To view these and other Video Rounds, visit UPMCPhysicianResources.com/Rehab.

UPMC Rehabilitation Institute Annual Report

The first edition of the UPMC Rehabilitation Institute Annual Report is now available for viewing and download by visiting UPMCPhysicianResources.com/Rehab. The report highlights new research and clinical care programs within the UPMC Rehabilitation Institute and Department of Physical Medicine and Rehabilitation.



UPMCPhysicianResources.com/ Rehab



About the UPMC Rehabilitation Institute

- UPMC is ranked by *U.S. News & World Report* as one of the top hospitals in the country for rehabilitation.
- Stroke rehabilitation at the UPMC Rehabilitation Institute is certified by The Joint Commission.
- Our experts combine extensive clinical experience with advanced technology and research to offer our patients cutting-edge treatments.
- We are one of only seven institutions with both SCI and TBI Model System designations from the NIDRR.

A world-renowned health care provider and insurer, Pittsburgh-based UPMC is inventing new models of patient-centered, cost-effective, accountable care. It provides nearly \$900 million a year in benefits to its communities, including more care to the region's most vulnerable citizens than any other health care institution. The largest nongovernmental employer in Pennsylvania, UPMC integrates 60,000 employees, more than 20 hospitals, more than 500 doctors' offices and outpatient sites, and a 3 million-member Insurance Services Division, the largest medical and behavioral health services insurer in western Pennsylvania. Affiliated with the University of Pittsburgh Schools of the Health Sciences, UPMC ranks No. 12 in the prestigious *U.S. News & World Report* annual Honor Roll of America's Best Hospitals. UPMC Enterprises functions as the innovation and commercialization arm of UPMC, while UPMC International provides hands-on health care and management services with partners in 12 countries on four continents. For more information, go to UPMC.com.

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