Title of Program: Carolinas Rehabilitation Research Program

Dept/Center/Lab: Carolinas Physical Medicine and Rehabilitation (PM&R) Core Laboratory

Principal Mentor: Janet P. Niemeier, PhD, ABPP
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Summary Description:
Under the Direction of Dr. William Bockenek, Chief Medical Officer, and Dr. Janet P. Niemeier, Carolinas Rehabilitation has a nationally and internationally recognized program of research. Both physicians and residents are encouraged and mentored to participate in and develop their own research endeavors. Several CR faculty members hold joint appointments with the University of North Carolina.

Research is one of the three core missions of Carolinas Healthcare Systems (CHS), along with patient care and education. Carolinas Rehabilitation is actively involved in research and industry sponsored trials. The research faculty and staff at Carolinas Rehabilitation are nationally and internationally recognized for their scholarship, innovations, and productivity. Carolinas Rehabilitation research focuses on advancing the field and providing recovery enhancement for persons with traumatic and acquired brain injury, spinal cord injury, stroke, neuromuscular and neurodegenerative conditions, and other disorders resulting in disability. Carolinas Rehabilitation has also led their community, state, and region in providing supportive services and opportunities for community-dwelling persons with disabilities. Carolinas Rehabilitation researchers have received federal and state funding to develop and apply methodologies and innovative treatment interventions that translate into state-of-the-science patient care and improved patient outcomes. Carolinas Rehabilitation research has been selected to receive funding from the National Institute of Health (NIH), National Institute on Disability and Rehabilitation Research (NIDRR), NC Division of Health and Human Services, and Health Resources and Services Administration (HRSA) as well as from several private foundation and industry sponsored trials. Our research program is fully integrated into clinical care and resident education.

Researchers at PM&R value cross-field initiatives involving collaborative projects with the Department of Therapies, Cannon Research Center, Orthopaedics, Trauma, Neurology, Neuroscience Institute, Emergency Medicine, Behavioral Health and Dickson Advanced Analytics. The focus of our research projects include:

- Biomarkers that characterize persons with traumatic brain injury (TBI) and predict outcomes
- Neurobehavioral and cognitive participatory research intervention trials post-TBI and poly-trauma
- Gender differences among individuals with TBI and spinal cord injury (SCI)
- Healthcare disparities
- Benefits of and barriers to exercise in Parkinson's disease and TBI
- Gait and balance, especially in Parkinson's Disease, TBI, and Amyotrophic Lateral Sclerosis
- Healthcare innovation including use of body fixed sensors, dual-task interference, and development and scientific evaluation of patient/provider collaboration
- Complementary and alternative medicine (CAM) in TBI/SCI/Stroke
- Randomized controlled trials of treatments/devices for persons with disabilities due to illness or injury
- Consultants for use of biometric data (e.g., actigraph)

Within PM&R, Carolinas Department of Physical Medicine and Rehabilitation (PM&R) Core Laboratory focuses on scientific evaluation of innovative therapies furthering knowledge and treatments to enhance participation in the community following neurologic injury. The laboratory uses rigorous qualitative and quantitative research methods. Neurophysiologic techniques (e.g., computerized dynamic posturography, balance master, gait-rite portable walkway, body-worn inertial sensors) are used to examine motor control, epidemiology and pathophysiology with emphasis on Parkinson's disease, stroke, spinal cord and traumatic brain injury. Qualitative techniques (e.g., in-depth interviews, focus groups with patients, care-partners and family members) are used to characterize patient-centered care.

Expectations and Role of Student:
The successful student will be expected to bring enthusiasm, inquisitiveness, hard work, and passion. The student will be expected to learn well at least one aspect of an ongoing project in the laboratory, to frame and refine an important hypothesis; and to design and carry out experiments designed to confirm or refute the key hypothesis. The student will present oral and written summaries of research and will be required to prepare and present an abstract and paper summarizing findings.