The USC Division of Biokinesiology and Physical Therapy has a highly productive research program focused on biokinesiology, the integrative study of biological bases of human movement, both normal and disordered. This focus is meant to better understand how the human body adapts to growth and experience as well as to injury, disease and aging. The division's researchers collaborate with other USC scientists, as well as their regional and national counterparts, on innovative and interdisciplinary studies with 15 state-of-the-art laboratories and research centers:

**Applied Mathematical Physiology Laboratory**
Web: ampl.usc.edu
Investigator: Jason Kutch, PhD
**Research Focus:** Understanding brain and spinal cord networks controlling muscle fibers with neuro-imaging, electrophysiology and mathematical models; optimizing rehabilitation for restoring normal control of muscle in individuals with chronic pain

**Brain-Body Dynamics Laboratory**
Web: valerolab.org
Investigator: Francisco Valero-Cuevas, PhD
**Research Focus:** Biomechanics, neuromuscular control and clinical rehabilitation of human mobility, with an emphasis on dexterous hand function

**Clinical Biomechanics Orthopedic and Sports Outcome Research Laboratory**
Web: sites.usc.edu/coorlab
Investigator: Lori Michener, PhD, PT, ATC, SCS
**Research Focus:** Examine the diagnosis and treatment outcomes of upper quadrant disorders, and elucidate the mechanisms of shoulder disorders to facilitate the design of interventions to reduce shoulder pain and restore the ability to perform activities and participate at work, home and sports

**Clinical Exercise Research Center**
Web: sites.usc.edu/cerc
Investigator: E. Todd Schroeder, PhD
**Research Focus:** Health and rehabilitation using exercise as a stimulus to elucidate the mechanisms and define adjunctive therapy by which people will optimally adapt, heal and overcome debilitating disease or injury
Computational Neurorehabilitation and Learning Laboratory  
Web: sites.usc.edu/cnrl  
Investigator: Nicolas Schweighofer, PhD  
Research Focus: Computational neural models of motor skill learning and motivation; neuromodulation in motor learning and motivation; learning- and motivation-based adaptive practice schedules to enhance motor learning after stroke

Musculoskeletal Biomechanics Research Laboratory  
Web: sites.usc.edu/mbrl  
Investigators: Christopher Powers, PhD, PT, FAPTA; George Salem, PhD; and Kornelia Kulig, PhD, PT, FAPTA  
Research Focus: Root causes of musculoskeletal disorders and efficacy of selected interventions; biomechanical basis of functionally based exercises and principles governing their application in special populations

Development of Infant Motor Performance Laboratory  
Web: sites.usc.edu/dimpl  
Investigator: Barbara Sargent, PhD, PT, PCS, CEEAA  
Research Focus: Development of both typical and atypical human action during infancy and the rehabilitation of movement disorders in infants and children

Human Performance Laboratory  
Web: sites.usc.edu/hpl  
Investigator: Susan Sigward, PhD, PT, ATC  
Research Focus: Prevention and rehabilitation of knee injuries with emphasis on improving outcomes following anterior cruciate ligament reconstruction (ACLr) and understanding the relationship between athletic maneuverability patterns related to lower extremity injury

Infant Neuromotor Control Laboratory  
Web: sites.usc.edu/inclab  
Investigator: Beth Smith, PhD, PT, DPT  
Research Focus: The development of neural control of movement during infancy; evaluates interventions for neural and functional development in infants with or at risk for developmental delay

Locomotor Control Laboratory  
Web: lcl.usc.edu  
Investigator: James Finley, PhD  
Research Focus: Understanding how locomotion is controlled and adapted in both the healthy and injured neuromuscular system

Motor Behavior and Neurorehabilitation Laboratory  
Web: sites.usc.edu/mbnl  
Investigators: Carolee Winstein, PhD, PT, FAPTA and James Gordon, EdD, PT, FAPTA  
Research Focus: Brain behavior relationships in learning and execution of skilled movement behaviors; new methods for treatment of individuals with brain disorders; efficacy and effectiveness of standardized treatment approaches

Neuroplasticity and Imaging Laboratory  
Web: sites.usc.edu/nail  
Investigator: Beth Fisher, PhD, PT, FAPTA  
Research Focus: Central mechanisms underlying motor skill learning and motor control in non-disabled and brain injured individuals; physiological changes and neuroplasticity related to motor skill learning and rehabilitation; effectiveness of rehabilitation programs based on evidence of experience-dependent neuroplasticity

Neuroplasticity and Imaging Laboratory  
Web: sites.usc.edu/nail  
Investigator: Beth Fisher, PhD, PT, FAPTA  
Research Focus: Central mechanisms underlying motor skill learning and motor control in non-disabled and brain injured individuals; physiological changes and neuroplasticity related to motor skill learning and rehabilitation; effectiveness of rehabilitation programs based on evidence of experience-dependent neuroplasticity

Institute for Senior Golf Science  
Web: sites.usc.edu/golfscience  
Investigator: George Salem, PhD  
Research Focus: Developing safe, evidence-based and effective golf training programs for seniors to combat typical effects of aging, including decreased cardiovascular fitness, flexibility, muscular strength, endurance, power, reaction time, balance, mobility and cognition

Phillips-Fisher Center for Brain Repair and Rehabilitation  
Web: sites.usc.edu/phillips-fisher  
Investigators: Beth Fisher, PhD, PT; Michael Jakowec, PhD; Giselle M. Petzinger, MD; James Gordon, EdD, PT, FAPTA; Helena C. Chui, MD; and George Salem, PhD  
Research Focus: Enhancing the physical well-being and quality of life of humans with degenerative brain disorders by advancing the basic science, clinical research and rehabilitation associated with brain repair

FAST FACTS

- Our faculty members conduct research in the areas of musculoskeletal biomechanics, motor behavior and neural control, exercise science and muscle research and motor development.
- Last year, our faculty members received external funding of nearly $2 million from foundations and federal funding agencies, including the National Institutes for Health.
- Our faculty are involved in one of the fastest growing areas of physical therapy research: the role of exercise in preventing and treating chronic diseases, including Alzheimer’s disease, Parkinson’s disease and breast cancer.

CONTACTS FOR MEDIA

Yasmine Pezeshkpour  
Communications Specialist  
ypezeshk@usc.edu

John Hobbs  
Communications Manager  
john.hobbs@usc.edu

USC Division of Biokinesiology and Physical Therapy

1540 Alcazar Street, CHP 155
Los Angeles, CA 90089-9006
(323) 442-2900
pt.usc.edu