History of the Training Programs

NMPT T32

The Interdisciplinary Training in Rehabilitation and Neuromuscular Plasticity (NMPT) program is funded by the Eunice Kennedy Shriver National Institute for Child Health and Human Development. The program began in 2003 under the leadership of founder and director, Dr. Krista Vandenborne. Dr. David Fuller became the principal investigator in 2017 and led the third successful grant renewal in 2019.

NMPT Trainees and Program Leaders at the 2022 Symposium: (From left to right) Dr. Andy Judge, Vinicius Mariani, Nicole Stafford, Alessandra Norris, Michela Mir, Vivian Doerr, Brandon Parks, Tinu Olarewaju, Sebastian Barrutia, and Dr. David Fuller (PI).

This unique pre-doctoral training program brings together rehabilitation clinicians and basic scientists with a common interest in translational research in neuromuscular plasticity. To date, the interdisciplinary program has helped provide 50 trainees with the foundation and skills needed to become independent investigators and future leaders in rehabilitation.

BREATHE T32

Founded in 2017 by Dr. Gordon Mitchell, the National Heart, Lung and Blood Institute-funded Breathing Research and Therapeutics (BREATHE) Training Program combines strength in basic science and translational research to educate pre- and postdoctoral trainees in respiratory research. BREATHE trainees are guided by interdisciplinary mentoring teams focused on the respiratory neuromuscular system, emphasizing discovery of new knowledge and its translation to severe clinical disorders that compromise breathing capacity, stability and airway defense. In just 6 years and during a global pandemic, BREATHE has developed an internationally known program with a "unique focus, unlike any other" (NIH reviewer) that has enabled over 20 trainees to develop a deep appreciation for the realities of translational research. BREATHE's recent application for competitive renewal received a perfect score of 10, illustrating the value of this program.

BREATHE Trainees and Program Leaders at the 2022 Symposium: (From left to right) Wendy Olsen, Eleana Manousiouthakis, Claire DeLucia, Jeremy Prieto, Alexandria Marciante, Andrew D'Lugos, Emanuel Boutzoukas, Mia Kelly, Dr. Emily Plowman, and Dr. Gordon Mitchell (PI).

UF PHHP

UF | UNIVERSITY of FLORIDA

18th Annual
Neuromuscular Plasticity Symposium

UF | Department of Physical Therapy
College of Public Health and Health Professions
UNIVERSITY *of* FLORIDA

Thursday, March 23, 2023
4:00 - 6:00 pm

Earl and Christy Powell University House
University of Florida

2151 W University Ave,
Gainesville, FL 32603

Sponsored By:

Neuromuscular Plasticity Training Grant (T32 HD043730)
PI: Dr. David Fuller

BREATHE Training Grant (T32 HL134621)
PI: Dr. Gordon Mitchell

College of Public Health and Public Health Professions
Department of Physical Therapy

pt.phhp.ufl.edu

POSTERS

BIOMECHANICS/MOTOR CONTROL

1. **Barrutia, Sebastian**: "Development and Testing of a 3D-Printed Knee Exoskeleton to Assist Children with Crouch Gait" / **Mentor:** Dr. Daniel Ferris
2. **Goel, Jessica**: "An Investigation of Interference Between Electromagnetic Articulography and Electroglottography" / **Mentor:** Dr. Matthew Masapollo
3. **Kanjani, Priya**: "Respiratory Motor Control in Infants with Spinal Muscular Atrophy" / **Mentor:** Dr. Barbara K. Smith
4. **Milikin, Caroline**: "Swallowing Safety Profiles Across IDDSI Levels in Individuals following Cardiac Surgery" / **Mentor:** Dr. Emily Plowman
5. **Oberle, Grant**: "Auditory Feedback Control of Inter-articulator Coordination in Speech" / **Mentor:** Dr. Matthew Masapollo
6. **Olarewaju, Tinu**: "Segmental Trunk Control During Walking in Human Incomplete Spinal Cord Injury" / **Mentor:** Dr. Emily Fox
7. **Terry, Alyssa**: "Sensitivity and Specificity of Peak Cough Flow and Reflexive Cough Testing to Detect Dysphagia in ALS" / **Mentor:** Dr. Karen Hegland
8. **Tueth, Lauren (NMPT Guest Scholar - Washington University)**: "Gait and Balance Dysfunction in Individuals with Huntington's Disease" / **Mentor:** Dr. Gammon Earhart
9. **Wiele, Lauren**: "Swallowing Safety Profiles in Amyotrophic Lateral Sclerosis: Impact of Bolus Viscosity and Volume" / **Mentor:** Dr. Emily Plowman

BRAIN (STROKE) - HUMAN

10. **Adegbemigun, Oluwafemi**: "Effect of Backward Walking Training on Forward Walking Kinematics Post-stroke" / **Mentor:** Dr. Dorian K. Rose
11. **Boutzoukas, Emanuel**: "Effects of Combined Cognitive Training and Transcranial Direct Current Stimulation (tDCS) on Self-reported Everyday Function in Older Adults" / **Mentor:** Dr. Adam J. Woods
12. **Buzzanca, Katherine**: "Multifactorial Framework for Persisting Symptoms after Concussion" / **Mentor:** Dr. Jason Beneciuk
13. **Evans, Elizabeth**: "The Influence of Neuroinflammation on Post-Stroke Cognition: A Review of the Literature" / **Mentor:** Dr. Charles Ellis, Jr.
14. **Olsen, Wendy**: "Mapping Traditional and Novel Cardiovascular Dynamics During Hypoxia Induction for the Characterization of Cognitive Impairment" / **Mentor:** Dr. Nicholas J. Napoli

UF | UNIVERSITY of FLORIDA

Meet the T32 Trainees

Walter Sebastian Barrutia, BS
NMPT Trainee
Mentor: Dr. Daniel P. Ferris

Vivian Doerr, BS
NMPT Trainee
Mentor: Dr. Ashley Smuder

Anna Fusco, BS
NMPT Trainee
Mentor: Dr. David Fuller

Alexandria Marciante, PhD
BREATHE Trainee
Mentor: Dr. Gordon Mitchell

Alyssa Mickle, MS
BREATHE Trainee
Mentor: Dr. Erica Dale

Branden Nguyen, MS
BREATHE Trainee
Mentor: Dr. Ashley Smuder

Tinuade Olarewaju, PT, MSc
NMPT Trainee
Mentor: Dr. Emily Fox

Jeremy Prieto, BS
BREATHE Trainee
Mentor: Dr. Nicholas Napoli

Emanuel Boutzoukas, MS
BREATHE Trainee
Mentor: Dr. Adam Woods

Elizabeth Evans, MS
NMPT Trainee
Mentor: Dr. Charles Ellis, Jr.

Eleana Manousiouthakis, PhD
BREATHE Trainee
Mentor: Dr. Christine Schmidt

Vinicius Mariani, MSc
NMPT Trainee
Mentor: Dr. Leonardo Ferreira

Michela Mir, PhD
BREATHE Trainee
Mentor: Drs. Gordon Mitchell, and Emily Fox

Alessandra Norris, BS
NMPT Trainee
Mentor: Dr. Daniel Kopinke

Wendy Olsen, PhD, CCC-SLP
BREATHE Trainee
Mentor: Dr. Nicholas Napoli

2023 Guest Scholars

Carley Butler
Doctoral Student, Biomedical Engineering
Northwestern University, Chicago, IL
"Intracortical Inhibition in Elbow Flexor and Extensor Muscles in Humans with Tetraplegia"

Tara Fortino
Doctoral Student, Neurobiology and Anatomy
Drexel College of Medicine, Philadelphia, PA
"Engineering Spinal Interneurons for Repair of the Injured Cervical Spinal Cord"

Taylor Holmes
Doctoral Student, Exercise and Rehabilitation Science
Marquette University, Milwaukee, WI
"Longitudinal Analysis of Spontaneous Respiratory Recovery in Male and Female Rats Following Chronic Cervical Spinal hHemisection "

Lauren Tueth
Doctoral Student, Physical Therapy
Washington University, St. Louis, MO
"Gait and Balance Dysfunction in Individuals with Huntington Disease"

Meet the Speakers

Andrea Behrman, PhD, PT, FAPTA

University of Louisville, Neurological Surgery

Talk Title: Never Underestimate the Spinal Cord

Andrea Behrman, PhD, PT, FAPTA is a Professor in the Department of Neurological Surgery, University of Louisville, Louisville, KY. Her research focus is to develop and test therapeutic interventions promoting recovery after spinal cord injury in children and adults capitalizing on activity-dependent neuroplasticity and an understanding of the neurobiology of walking and motor control. The interventions studied and tested uniquely target recovery of pre-morbid movement patterns or development of movement patterns in contrast to use of compensation as a solution to sensorimotor deficits post-injury and achievement of functional goals. Dr. Behrman is the Director of the Kosair Charities Center for Pediatric NeuroRecovery and Co-Director of the Reeve Foundation NeuroRecovery Network. Both entities are committed to fast-tracking evidence-based, activity-based therapies into clinical practice. Her work has been funded by NIH, the Department of Defense, the VA Rehabilitation Research and Development Service, the Craig H. Neilsen Foundation, the Helmsley Charitable Trust, the Foundation for Physical Therapy, and the Florida Brain and Spinal Cord Injury Research Trust Fund.

Jane Kent, PhD

UMass Amherst, Kinesiology Department Chair

Talk Title: Muscle Fatigue and Mobility Function in Aging

Jane Kent, PhD is the Director of the Muscle Physiology Lab and the Kinesiology Department Chair at UMass Amherst. She received her B.A. and M.A. from California State University, Long Beach, and her Ph.D. from the University of Southern California. Dr. Kent specializes in skeletal muscle, fatigue, bioenergetics, aging, and magnetic resonance spectroscopy. Dr. Kent's primary interest is in the area of human skeletal muscle function and fatigue. In particular, her work examines the mechanisms of fatigue, and how these vary depending on age, gender, chronic health status, and habitual physical activity level. A related interest is an examination of the influence that fatigue has on functional capacity. She takes a state-of-the-art, integrated approach to understand human muscle function from the cell to the organism. The main problem she is working on now is how to minimize the loss of mobility and health that occur in old age.

POSTERS

BRAIN (STROKE) - HUMAN

15. **Prieto, Jeremy**: "Instability of Neural Oscillatory Communication and its Link to Cognitive Task States" / **Mentor:** Dr. Nicholas J. Napoli

BRAIN AND BRAIN INJURY (STROKE) ANIMAL

16. **Vela, Angelique**: "Ultra-microelectrodes for Neural Interface Applications: High-resolution Electrical Stimulation and Recording" / **Mentor:** Dr. Kevin Otto

MUSCLE PLASTICITY - IMAGING AND/OR HISTOLOGY

17. **Awale, Pratiksha**: "Phosphocreatine Recovery Kinetics following Plantar Flexion Exercise in Young Boys with Duchenne Muscular Dystrophy" / **Mentor:** Dr. Sean Forbes

18. **Bellam, Prathyusha**: "Quantifying Fat Infiltration in Upper Extremity Muscles of Boys with DMD by Magnetic Resonance Imaging and Spectroscopy " / **Mentor:** Dr. Krista Vandenborne

19. **Kunnath Ravindranunni, Remya**: "Spine Bone Marrow Fat Fraction Increases with Age in Duchenne Muscular Dystrophy" / **Mentor:** Dr. Rebecca Willcocks

20. **Rock, Kelly**: "Quantitative Magnetic Resonance to Assess Respiratory Muscle Quality and the Relationship to Function in Men with Becker Muscular Dystrophy" / **Mentor:** Dr. Krista Vandenborne

MUSCLE PLASTICITY - MOLECULAR

21. **Baumfalk, Dryden**: "Effects of Exercise on Aortic Stiffness Associated with 5-Flurouracil in Rats" / **Mentor:** Dr. Ashley Smuder

22. **Cameron, Miles**: "Respiratory Muscle Pathology in Patients with Esophagogastric Adenocarcinoma" / **Mentor:** Dr. Andrew Judge

23. **Doerr, Vivian**: "The Role of Mitochondrial ABCB8 in Exercise-Induced Protection Against Doxorubicin Diaphragm Dysfunction" / **Mentor:** Dr. Ashley Smuder

24. **Mariani, Vinicius**: "Succinyl-CoA Impairs Contractile Properties of Permeabilized Fast and Slow Muscle Fibers" / **Mentor:** Dr. Leonardo F. Ferreira

25. **Nguyen, Branden**: "Concomitant Exercise Training During Doxorubicin Treatment in Rodents" / **Mentor:** Dr. Ashley Smuder

26. **Norris, Alessandra**: "Endogenous Regulation of Intramuscular Fat and Myogenesis through Hedgehog Signaling during Skeletal Muscle Regeneration" / **Mentor:** Dr. Daniel Kopinke

POSTERS

MUSCLE PLASTICITY - MOLECULAR

27 **Rana, Sabhya**: "Low Dose Ampakine CX717 Increases Ventilation in a Rat Model of Pompe Disease" / **Mentor:** Dr. David Fuller

28 **Schonk, Martin**: "Myofiber-specific FoxP1 Deletion Increases Muscle Mass and Protects Against Pancreatic Cancer-induced Muscle Atrophy" / **Mentor:** Dr. Andrew Judge

PAIN

29 **Rodgers, Logan**: "Joint Mobilization Induced Hypoalgesia in Musculoskeletal Pain Populations: An Umbrella Review" / **Mentor:** Dr. Joel Bialosky

SPINAL CORD-HUMAN

30 **Butler, Carley (NMPT Guest Scholar - Northwestern University)**: "Intracortical Inhibition in Elbow Flexor and Extensor Muscles in Humans with Tetraplegia" / **Mentor:** Dr. Monica Perez and Dr. Eric Perreault

31 **Manousiothakis, Eleana**: "Embedded 3D Printed Model of Human Spinal Cord Injury for the Study of the Impact of Extracellular Matrix Changes and Hypoxia on Cell Function" / **Mentor:** Dr. Christine Schmidt

32 **Mir, Michela**: "Changes in Respiratory Drive after Therapeutic Acute Intermittent Hypoxia in Humans with Chronic SCI" / **Mentor:** Dr. Emily Fox and Dr. Gordon Mitchell

33 **Pappas, Marc**: "The Association Between Caffeine Consumption and Acute Intermittent Hypoxia-Induced Changes in Breathing Function in Individuals with Chronic Spinal Cord Injury" / **Mentor:** Dr. Emily Fox

34 **Sutor, Tommy**: "Characterization of the Neuromuscular Drive to Breathe in Persons with Spinal Cord Injury" / **Mentor:** Dr. Emily Fox and Dr. Gordon Mitchell

35 **Vose, Alicia:** "Daily Acute Intermittent Hypoxia to Improve Swallowing Function in Persons with Chronic Spinal Cord Injury" / **Mentor**: Dr. Emily Fox and Dr. Gordon Mitchell

36 **Vose, Alicia:** "Acute Intermittent Hypoxia and Respiratory Strength Training to Improve Respiratory Function in Individuals with Chronic Spinal Cord Injury: Preliminary Outcomes" / **Mentor**: Dr. Emily Fox and Dr. Gordon Mitchell

37 **Williams, Todd:** "Transcutaneous Spinal Stimulation and Locomotor Rehabilitation: Gait Kinematic Changes in People with Chronic Spinal Cord Injury" / **Mentor**: Dr. Emily Fox

POSTERS

SPINAL CORD AND SPINAL CORD INJURY - ANIMAL

38 **Benevides, Ethan**: "A Novel Method to Stimulate Breathing: Chemogenetic Activation of Phrenic Motoneurons" / **Mentor:** Dr. David Fuller

39 **Berschel, Mackenzie**: "Spinal Microglial Phenotype After C2 Hemisection in Rats" / **Mentor:** Dr. Gordon Mitchell

40 **Budd, Lucas**: "Prolonged Red Light Disrupts Circadian Hormones Associated with Phrenic Neuroplasticity" / **Mentor:** Dr. Gordon Mitchell

41 **Burrowes, Kayla**: "Shorter Hypoxic and Inter-hypoxic Intervals Enhance Acute Intermittent Hypoxia-induced Phrenic Long-term Facilitation" / **Mentor:** Dr. Gordon Mitchell

42 **Deegan, Kyle**: "Histological Evaluation of Microglia in the Cervical Spinal Cord of a Rat Model of Pompe Disease" / **Mentor:** Dr. David Fuller

43 **Fortino, Tara (NMPT Guest Scholar - Drexel University)**: "Engineering Spinal Interneurons for Repair of the Injured Cervical Spinal Cord" / **Mentor:** Dr. Michael Lane

44 **Fusco, Anna**: "Detection of Neurodegeneration in the Injured Spinal Cord" / **Mentor:** Dr. David Fuller

45 **Holmes, Taylor**: "Longitudinal Analysis of Spontaneous Respiratory Recovery in Male and Female Rats Following Chronic Cervical Spinal Hemisection" / **Mentor:** Dr. Kristi Streeter

46 **Marciante, Alexandria**: "ApoE4 Undermines Phrenic Motor Plasticity in a Time-of-Day-Dependent Manner" / **Mentor:** Dr. Gordon S. Mitchell

47 **Mickle, Alyssa**: "Closed-Loop Electrical Epidural Stimulation Restores Ipsilesional In-Phase Diaphragm Activity in Spontaneously Breathing Rats after Acute C2-Hemisection" / **Mentor:** Dr. Erica Dale

48 **Thakre, Prajwal**: "Spinal NMDA Receptor Activation is Necessary to Initiate but not Maintain Ampakine-Hypoxia Induced Phrenic Motor Facilitation" / **Mentor:** Dr. David Fuller