

## **First Annual Musculoskeletal Collaboration Center Research Day**

**September 16, 2023**

Engineering Research Building, Virginia Commonwealth University

Thank you for joining the Musculoskeletal Collaboration Center (MC2) for its first annual Research Day. We are a research-intensive working group between the Departments of Orthopaedic Surgery and Biomedical Engineering at Virginia Commonwealth University (VCU). Our group is dedicated to advancing musculoskeletal knowledge through innovative research, education, and clinical practice. Please direct all inquiries to Jonathan Boyd at [jonathan.boyd@vcuhealth.org](mailto:jonathan.boyd@vcuhealth.org).

### **AGENDA**

Time	Event	Presenter	Location
7:15	<b>Poster setup and light breakfast graciously donated by the Institute for Engineering and Medicine</b>		Collaboration Hub
8:00	Welcome and Introductory Remarks	Jonathan Boyd, Ph.D.	ERB1313
8:10	“Healing trajectory of fractured bone and muscle tissues in spaceflight”	Nabarun Chakraborty, Ph.D., WRAIR	ERB1313 (Zoom)
8:30	“Science in Space: Does Space Travel Accelerate Aging?”	Henry Donahue, Ph.D.	ERB1313
8:45	“Contribution of Immune Cells to Bone Healing and Regeneration”	Rene Olivares-Navarette, DDS, Ph.D.	ERB1313
9:00	“Usability of Nerve Tape: A Novel Sutureless Nerve Coaptation Device”	Jonathan Isaacs, M.D.	ERB1313
9:15	BREAK		
9:30	“Driving Collagen Fiber Formation for Functional Musculoskeletal Repair and Replacement”	Jennifer Puetzer, Ph.D.	ERB1313
9:45	“Nerve Tape is an effective tool for small nerve repair”	Geetanjali Bendale, Ph.D.	ERB1313
10:00	“Advancements in Upper Limb Rehabilitation after Spinal Cord Injury”	Carrie Peterson, Ph.D.	ERB1313
10:15	“Transitioning Fields from PhD to Postdoc: Leveraging an Orthopaedic Research Background into New Research Areas”	Nicole Prince, Ph.D., Harvard Medical School	ERB1313 (Zoom)
10:30	Poster Session Begins		Collaboration Hub
11:45	Poster Awards	Jonathan Boyd, Ph.D.	ERB1313

## **POSTER PRESENTATIONS**

**POSTER 1:** Impact of Age of Spinal Cord Injury Onset on Peak Rotator Cuff Forces during Manual Wheelchair Propulsion. Zhao H., Cho, Y., Schnorenberg, A.J., Slavens, B.A., Peterson, C.L.

**POSTER 2:** DMP1 Lineage Connexin43 Deficiency Attenuates Decreases in Skeletal Muscle Strength and Fracture Callus Mineralization During Hindlimb Unloading. Evan G. Buettmann, Gabriel A. Hoppock, Lovell B. Abraham, Rachel C. DeNapoli, Jessica R. Cornthwaite, Joseph A. Denisco, Jerin Jose, Michael A. Friedman, Yue Zhang, Jolene J. Windle, Michael J. McClure, Henry J. Donahue

**POSTER 3:** Osteoblast-derived Matrix Vesicle small RNAs May Contribute to Retention of an Osteoprogenitor Cell Phenotype in Mature Bone. Anne Skelton, David J. Cohen, Zvi Schwartz, Barbara D. Boyan

**POSTER 4:** Developmental-like Slow Stretch Drives Hierarchical Fiber Formation in a Dose-and Organization-Dependent Way. Kelly R. Ott, Jennifer L. Puetzer

**POSTER 5:** ELISpot Quantification of anti-Isd and anti-Atl Plasma Cells. John Owen, Stephen Kates, Gowrishankar Muthukrishnan, David Topham, Edward Schwarz

**POSTER 6:** Reduction of Neutrophil Extracellular Traps Accelerates Inflammatory Resolution and Increases Bone Formation on Titanium Implants. Lais Morandini, Derek Avery, Benjamin Angeles, Paul Winston, Rebecca K. Martin, Henry J. Donahue, Rene Olivares-Navarrete

**POSTER 7:** Scaling a Generic Upper Limb Musculoskeletal Model to Represent Individuals with Paraplegia. Cho Y., Zhao H., Schnorenberg, A.J., Slavens, B.A., Peterson, C.L.

**POSTER 8:** Induced Pseudomembrane Enrichment in Long Nerve Allograft Reconstruction. Omar Protzuk, Mariam Samuel, Kristin Seward, Chris Keshishian, Geetanjali Bendale, Jonathan Isaacs

**POSTER 9:** Osteocyte-specific endocannabinoid receptor 1 (CB1) deficiency influences cancellous bone mass, but does not affect bone response to disuse. Rachel C. DeNapoli, Evan G. Buettmann, Jolene J. Windle, Aron H. Lichtman, Henry J. Donahue

**POSTER 10:** Effect of Cyclic Stretch in Engineered Ligaments Depends on Degree of Hierarchical Collagen Organization. Leia Troop and Jennifer L. Puetzer

**POSTER 11:** T cells Contribute to Macrophage Polarization and MSC Recruitment During Osseointegration. Derek Avery, Lais Morandini, Melissa Gabrieic, Luke Sheakley, Matthieu Peralta, Henry J. Donahue, Rebecca K. Martin, Rene Olivares-Navarrete

**POSTER 12:** Non-alcoholic fatty liver disease is associated with skeletal fragility in DIAMOND mice. Galen M Goldscheitter, Alexandra M Hooks, Mulugeta Seneshaw, Evan G Buettmann, Arun J Sanyal, Henry J Donahue

**POSTER 13:** Estrogen induced osteolysis in triple negative breast cancer mediated by estrogen receptor alpha 36. David J Cohen, Cydney Dennis, Jingyao Deng, Zvi Schwartz, Barbara D Boyan

**POSTER 14:** The Effect of Genetic Variability on Muscle Mass and Strength from Disuse. Jessica R. Cornthwaite, Michael A. Friedman, Henry J. Donahue

**POSTER 15:** Investigating the Role of Focal Adhesion Kinase in Hierarchical Collagen Fiber Formation for Musculoskeletal Repair. Tristan Strayer, Leia Troop, and Jennifer L. Puetzer

**POSTER 16:** Axial Compression of Tibia Increases Marrow Macrophage and T-Cell Subsets in a Load-Dependent Manner. Evan G. Buettmann, Lais Morandini, Joseph A. Denisco, Jerin Jose, Galen Goldscheitter, Michael A. Friedman, Henry J. Donahue, Rene Olivares-Navarrete

**POSTER 17:** Unraveling the Role of Advanced Glycation End-Products in Age-Related Human Meniscus Degeneration. Austin G. Gouldin, Nirav K. Patel, Gregory J. Golladay, Jennifer L. Puetzer

**POSTER 18:** Genetic Variation Affects the Magnitude of Bone and Muscle Loss from Disuse. Michael A. Friedman, Jessica Cornthwaite, John McKean, Zhane Davis, Gabriel A. Hoppock, Yue Zhang, Evan G. Buettmann, Steven Meas, Gabriella M. Daire, Charles R. Farber, Henry J. Donahue

**POSTER 19:** Hindlimb Unloading Induces Microarchitectural and Transcriptomic Changes in the Femur and Tibia in an Age- and Sex-Dependent Manner. Steven J. Meas, Michael A. Friedman, Gabriella M. Daire, Henry J Donahue

**POSTER 20:** Characterizing Nucleus Pulposus fluid shear stresses and deformation in response to interstitial fluid flow in healthy and degenerate microenvironments. Logan Petry, Joyce Xu, Priscilla Y Hwang

**POSTER 21:** Bolus Fentanyl Induces Prolonged Cardiovascular Dysregulation in SKH-1 Mice. Mackenzie Newman, Heather Connery, John Owen, Raymond Raylman, Jonathan Boyd

**POSTER 22:** RNA Sequencing Analysis of Muscle-Nerve Cross-talk in a Transwell Co-culture Model. James T Redden, Zvi Schwartz, Michael J. McClure