



UD Center for Biomechanical Engineering Research



CBER DAY

In conjunction with National Biomechanics Day

Thursday, April 7, 2016 | 8:00 am–4:00 pm



SCHEDULE

All events take place in the Harker ISE Lab, Commons Area unless otherwise noted.
221 Academy St, Newark, DE 19716

8:00-11:00 am | Lab Demos

at STAR Campus | 540 S College Ave, Newark, DE 19713

11:30 pm | Lunch & Poster set-up

12:30 pm | Welcome & Introductory Remarks

12:45 pm | Poster Session 1 (Odd #s)

2:00 pm | Break

2:30 pm | Poster Session 2 (Even #s)

3:45 pm | Awards Session



Welcome to the 13th annual "CBER Day" Biomechanics Research Symposium

- this year, we are trying something very different. For the morning sessions, CBER-affiliated researchers at the University of Delaware are hosting over 100 high school students in a wide array of biomechanics lab tours and demonstrations at the STAR Health Sciences Campus. Nine different labs are participating in this event. This activity is part of the nation-wide National Biomechanics Day being coordinated by the American Society of Biomechanics to promote the development of biomechanics as a standard component in high school curricula across the country.

For the afternoon sessions, our students and post-docs will present their cutting-edge biomechanics research in two poster sessions at the Harker Interdisciplinary Science and Engineering Center on the main campus.

Thank you to all participants, sponsors and guests and a special thank you to the researchers who have volunteered their time and talents to making sure that NBD at UD is a fun and meaningful experience for the high school students who participate. I especially want to acknowledge Elisa Arch who coordinated the morning sessions.

Michael H. Santare
Professor, Mechanical Engineering
Director, Center for Biomechanical Engineering Research



ASSISTIVE DEVICES

Realizing Gait Speed Transitions
with Coordination-Based Controller in Simulation

Duanyi Wei, Jill Higginson, Ioannis Poulakakis

Prosthetic Leg Force Sensor to Help Amputees Return
to Normal Balance

Garrett Davey

An Evaluation of a Model to Customize AFO Footplates
to Preserve Shank Progression with Limited Ankle Dorsiflexion

Bretta Fylstra, Elisa Arch

MR-Compatible Haptics: Novel Tools to Explore
the Neural Correlates of Robot-Assisted Motor Learning

Fabrizio Sergi

Model-Based Estimation of the Passive Stiffness of the Wrist

Andrea Zonnino, Fabrizio Sergi

BONE, CELL & CARTILAGE

Destabilization of the Medial Meniscus in Mice Induces Early,
Localized Chondrocyte Loss and Cartilage Damage

Michael David, Melanie Smith, Rachael Pilachowski, Avery White, Ryan Locke, Christopher Price

Elucidating Mechanisms of Tendon Damage by Measuring Multiscale
Unloaded Recovery Following Tensile Loading

Andrea Lee, Spencer Szczesny, Kristen Fetchko, Michael Santare, Dawn Elliott

Morphometric Changes Following Hip Joint Instability in Mice Using
Micro-Computed Tomography

Ryan Locke, Megan Killian

Chondro-Protective Effect of Zoledronate
on In-situ Chondrocytes Damaged by Interleukin-1

Mengxi Lu, Yilu Zhou, Shongshan Fan, Olivia Smith, Liyun Wang, X. Lucas Lu

CK2.3 Negatively Regulates Differentiation of Raw264.7
Monocyte/Macrophage Cells to Mature Multinucleated Osteoclasts

John Nguyen, Anja Nobe

Tribological Rehydration of Cartilage:
How Activity Keeps Joints Lubricated

Axel Moore, David Burris

Progressive Spinal Kyphosis in Perlecan Deficient Mice

Ashutosh Parajuli, Robert Morgan, Catherine Kirn-Safran, Liyun Wang

The effects of long-term soy supplements on male skeleton in mice

Jaimie Carlson, Shaopeng Pei, Chan Ho Jang, Changqing Wu, Liyun Wang

Two-month changes in mechanical properties and clinical outcomes
of achilles tendinopathy

Andrew Sprague, Pat Corrigan, Jennifer Zellers, Daniel Cortes, Karin Silbernagel

Analyzing Conjugation of Peptide CK2.3 to Quantum Dots
and its Cellular Uptake Into C2C12 Cells.

Vrathasha Vrathasha, Hemanth Akkiraju, Rebecca Noll, Jenna Deibert, Anja Nobe

Bone Bioreactor that Maintains Bone Cell Viability Ex Vivo

Aparna Swarup, Miho Maeda, Jeremy Bonor, Hemanth Akkiraju, Vrathasha Vrathasha, John Nguyen, Prashanth Moku, Anja Nobe

Isolation and Characterization of Primary Osteoblasts and Osteoclasts from Human Patients

Hilary Weidner, Hemanth Akkiraju, Anja Nobe, Mark Eskander, Debra Dibert

Underdevelopment in Trabecular Bone Microarchitecture in the Distal Tibia and Distal Femur of Ambulatory Children with Cerebral Palsy Becomes More Pronounced with Distance From the Growth Plate

Daniel Whitney, Harshvardhan Singh, Freeman Miller, Chrisotpher Modlesky

Intracellular Calcium Signaling of In-situ Chondrocytes Could Be Correlated with Tissue Stiffness

Yilu Zhou, Carolyn Hall, Mengxi Lv, Grace Gong, Kalani Picho, X. Lucas Lu

GAIT

Functional Electrical Stimulation During Walking Improves Ankle Moment in Children with Cerebral Palsy

Jeffrey Hoffman, Nicole Zabradka, Samuel Lee

Evaluating Associations Between Clinical and Gait Measures of Plantar Flexion Strength and Function

Sarah Colón, Elisa Arch, Karin Silbernagel

Changes in Corticomotor Drive to Plantarflexor Muscles Induced by Gait Training with Functional Electrical Stimulation Positively Influence Post-Stroke Gait Mechanics

Jacqueline Palmer, HaoYuan Hsiao, Stuart Binder-Macleod

The Role of Cortical Inhibition in Post-Stroke Walking Function

Chloe Gordon, Jacqueline Palmer, Haoyuan Hsiao, Susanne Morton, Stuart Binder-Macleod

Fall-Recovery Training of an Individual with Chronic Stroke: A Case Study on Kinematic Variables

Jamie Pigman, Benjamin Conner, Darcy Reisman, Jeremy Crenshaw

Work-Energy Profiles Identify the Body's Adaptions to Changing Walking Speed

Anahid Ebrahimi, Jill Higginson, Steven Stanhope

Using Acceleration to Detect Aberrant Loading Patterns

Nicole Ray, Adam Marmon, Joseph Zeni, and Brian Knarr

What Can a Basketball's Bounce Tell Us About the Surface-Floor Characteristics on Different Terrain?

Alex Razook, Mehis Viru, Martin Mooses

MOTOR CONTROL

Force Coordination in Uni- and Bidirectional Manipulation Tasks Performed in Different Directions

*Kaue de Lima, Patrick Morton, Mehmet Uygun, Paulo de Freitas, Slobodan Jaric
Zachary Adams, Thomas Buchanan*

Asymmetric Cortical Activity Between Limbs During Joint Loading

Yong Woo An, Andrea Di Trani, Aaron Struminger, Jochen Baumeister, Charles Buz Swanik

ORTHOPAEDICS

Lower Knee Flexor Muscle Forces During Gait Are Associated with 2nd ACL Injury in Young Female Athletes

Jacob Capin, Ashutosh Khandha, Ryan Zarzycki, Kurt Manal, Thomas Buchanan, Lynn Snyder-Mackler

Altered Stiffness Regulation Strategies Following Hamstring Strain Injury

Andrea Di Trani, N Geller, Charles Buz Swanik, Thomas Kaminski

The Effect of Surgical Approach on Gait Mechanics After Total Hip Arthroplasty

Joseph Zeni, Jr., Kathleen Madara, Hunter Witmer, Riley Gerhardt, James Rubano

Knee Contact Forces and Cost of Locomotion in Stride Length Controlled Walking Cases

Maria Nicholson, Jill Higginson, Brian Knarr

Validation of a Real-Time Adaptive Treadmill Controller as a Clinical Research Tool

Nicole Ray, Brian Knarr

Helical Versus Euler Angles for Describing Scapulothoracic Motion

Elizabeth Rapp, Tyler Richardson, James Richards

Evaluation of Glenohumeral Muscle Moment Arms of a New Musculoskeletal Model of the Shoulder

*Tyler Richardson, Robert Quinton, Brian Knarr, Stephanie Russo,
Jill Higginson, James Richards*

The Effect of Shoulder Plyometric Training on Amortization Time and Glenohumeral Joint Kinematics

Aaron Struminger, KA Swanik, Charles Buz Swanik, SJ Thomas, KC Huxel, JD Kelly



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