MUSCULOSKELETAL RESEARCH CENTER

MUSCULOSKELETAL RESEARCH CENTER at Washington University http://muscoloskeletalcore.wustl.edu

Vol 10 | Issue 2 | Mar 2018

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Avioli Musculoskeletal Seminar Series

Fridays @ 9am BJCIH Bldg. | 5th flr Allison Conf. Rm.

3/9	Durga Mohapatra, DP Dept. of Anesthesiology
3/16	Yael Alippe Bone & Mineral Diseases
3/23	Brendan Lee, MD, PhI Baylor College of Medicine, TX
3/30	Jie Shen, PhD Orthopaedic Surgery
4/6	Marja Hurley, MD Univ. of Connecticut, CT
4/13	Evan Buettmann Orthopaedic Surgery
4/20	Guilak Lab Orthopaedic Surgery
4/27	Abu-Amer Lab Orthopaedic Surgery



The Department of Orthopaedic Surgery at Washington University is recruiting for new faculty to join our research program in the broad area of musculoskeletal diseases and medicine. For more information, visit the main page of our <u>website</u>.

Winter Symposium 2018

Thank you to all who attended the 2018 Musculoskeletal Winter Symposium on February 22, 2018! There were over 100 attendees, talks from two P+F awardees, talks from four abstract submissions and the Keynote address by

Dr. Andre van Wijnen. There were 52 posters presented at the poster session. Congratulations to the 7 travel award winners (see photo below).

We hope you enjoyed the program and the opportunity to network with your colleagues. We continue to try

to improve the Symposium based on your feedback, so that it is very informative. Thank you for your participation and we look forward to seeing you again next year!









2018 MRC Symposium Travel Award Winners!

From left: Yongiia Li, Jeremy Eekhoff, Gaurav Swarnkar, Gabriel Mbalaviele (standing in for Chun Wang), Evan Buettman, Era Jain, Amanda Dicks, Yousef Abu-Amer (2018 Symposium Director)

Please remember to include reference to support from the Musculoskeletal Research Center in your abstracts and publications. Cite Grant # P30AR057235

from the National Institute Of Arthritis And Musculoskeletal And Skin Diseases.

Michael Harris, PhD

Assistant Professor of Physical Therapy, Orthopaedic Surgery, Mechanical Engineering

In the Harris lab, we combine computer simulation, imaging, and in-vivo biomechanics to investigate the joint-level geometric and mechanical contributors to pathways of osteoarthritis (OA) development (Fig 1). Our work centers on linking outward manifestations of pathology (e.g. functional deficits) with internal abnormalities (e.g. bone deformity, mus-



musculoskeletal investigation.

cle dysfunction). Our goal in doing so is to establish a chain of information that translates from researchers to clinicians (e.g. surgeons, physical therapists) for improved patient care.

Currently, our major focus is on muscle performance and joint mechanics in patients with developmental dysplasia of the hip (DDH).

DDH is a major etiological factor in hip OA, especially in adolescents and young adults. The common paradigm of DDH pathomechanics is that bony deformities of the acetabulum and proximal femur fail to provide a congruent surface for articular loading and instigate the metabolic cascades and mechanical injury leading to OA.

In a new project we are investigating a revised model of DDH that incorporates abnormalities in the surrounding muscle geometry, motion, and loading (Fig 2).

Our studies will provide new knowledge about how relationships between abnormal bone and muscle may be important factors in DDH pathomechanics, symptomatology, and structural damage.

Hip preservation surgeries for DDH can relive pain for many patients, but many others development additional symptoms and long-term results do not demonstrate an effective offset of OA. In a new MRC Pilot and Feasibility Award, we will clarify the effect of hip preservation on muscle performance, which is not currently part of postsurgical assessment, and how it is altered at the time patients are cleared for return to full activity. By quantifying muscle atrophy, mechanical moment arms, neuromuscular activation patterns, joint reaction forces, functional strength, and movement patterns we hope to clarify why some patients respond well to surgery and others do not, as well as inform optimized surgical techniques and postsurgical rehabilitation.

The Harris lab is housed in the Program in Physical Therapy's Movement Science Research Center at 4444 Forest Park Blvd. Please come by to see our motion capture system, instrumented treadmill, and to talk about biomechanics in the context of surgery, rehabilitation, OA, and regenerative medicine.

Fig 2. Revised model of DDH that considers bone-muscle relationships in the pathway to symptom development and structural damage.



Compounded by increased bony deformity and higher demand activities

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Core D-Animal Models

Symptomatic &

Structural disease

Abnormal articular loading



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