



Duke Orthopaedics

100 Years  
of Duke

# 2024 Departmental Research Day

May 9, 2024  
7:40 a.m. – 4:30 p.m.

**SYMPOSIUM • "100 YEARS OF DUKE" • FEATURED SPEAKERS**



**Benjamin Alman, MD**



**Tiffany Hilton, PT, PhD**



**Michael Iwama, PhD, MSc, BScOT**



**Richard 'Rick' Lieber, PhD  
Shirley Ryan AbilityLab**



**Todd McKinley, MD  
Indiana Univ. School  
of Medicine**



**Amy Pastva, PT, MA, PhD**



**James R. Urbaniak, MD**



**William J. Richardson MD**

**Duke Health Interprofessional Education Building  
311 Trent Drive, Suites 1225 & 1250  
Durham, NC**



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# RESEARCH DAY INFORMATION

## TARGET AUDIENCE

Faculty, Fellows, Residents, Postdoctoral Associates/Fellows, Students, Physician Assistants, Nurses, and countless learners Duke-wide.

## LEARNING OBJECTIVE

Discuss the information provided regarding ongoing research being developed in areas that may include the following: clinical research, populations, policy and implementation research, movement sciences, kinesiology and rehabilitation research, musculoskeletal bioengineering, regeneration and repair research, and cell, genetic, and developmental biology research.

## DUHS CME JOINTLY ACCREDITATION

The Duke University Health System Department of Clinical Education and Professional Development and Orthopaedic Surgery has planned and implemented this activity to advance patient care. The American Nurses accredit the Duke University Health System Department of Clinical Education and Professional Development.

Credentialing Center (ANCC), the Accreditation Council for Pharmacy Education (ACPE), and the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing education for the health care team.

## AMA PRA CREDIT

Physicians & Allied Health Professionals: This live activity is designated as a jointly accredited activity for a maximum of 6.0 AMA PRA Category 1 Credit(s), ANCC, JA Credit—AH. Physicians and allied health professionals should claim only the credit commensurate with the extent of their participation in the activity.

To receive CME credit, participants must attend the CME activity and log their attendance online or physically sign the attendance sheet. Texting attendance is not available for this one-day, non-recurring activity.

## DUHS CME CERTIFICATE

Following the event, participants will receive an email with a link from DUHS CME to complete an online evaluation and how-to instructions to download the certificate. For assistance, contact <https://ja.dh.duke.edu/content/contact-us>.

## DUHS CME DISCLAIMER

The information provided for the CME activity is for continuing education purposes only and is not meant to substitute for a healthcare provider's independent medical judgment regarding the diagnostic and treatment options for a specific patient's medical condition.



The following speakers and planning committee members have indicated that they have a financial relationship(s) to disclose. All relevant financial relationships listed for these individuals have been mitigated:

Albert Anastasio, MD  
-QPix Solutions-Paid Consultant  
Neill Li, MD  
-Checkpoint Surgical-Consultant  
Todd McKinley, MD  
-Innomed-Royalties for surgical instrument  
-Kiffik Biomedical-Chief Medical Officer medical condition.

### **DUHS CME DISCLOSURES**

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-Innomed-Royalties for surgical instrument  
-Kiffik Biomedical-Chief Medical Officer with Equity Stake  
Christian Pean, MD  
-RevelAi Inc.-Company Officer-Stock, Zimmer Biomet  
-Consultant, Smith & Nephew, Inc.-Consultant, Arhree, Inc.-Consultant  
William Richardson, MD  
-Stryker-Consultant for image guidance  
-BrainLab-Education  
-DePuy Spine-Education

The following speakers and planning committee members have indicated that they have no financial relationship(s) with ineligible companies to disclose.

Benjamin Alman, MD  
Kier Blevins, MD  
Todd Cade, PT, PhD, FAPTA  
Niall Cochrane, MD  
Leonardo Ferreira, PT, PhD  
Tiffany Hilton, PhD  
Kimberly Hreha, EdD  
Jay Levin, MD

Richard "Rick" Lieber, PhD  
Jason "Jake" Long, MD  
Neil McGroarty, MD  
Amy Pastva, PhD  
Flavia Penteado Kapos, PhD  
Patton Robinette, MD  
Sneha Rao, MD  
James Urbaniak, MD



# PODIUM PRESENTATIONS

IPE Suite 1250 | Thursday, May 9, 2024

## 8:05—8:10 AM

Welcome

Benjamin Alman, MD

Moderator: Steven Olson, MD

## 8:10—8:22 AM

Clinical and Radiographic Outcomes Following Vantage Total Ankle Arthroplasty

Neil McGroarty, MD

## 8:22—8:34 AM

Advancing Health Equity through Population Health, Policy, and Artificial Intelligence in Musculoskeletal Value-Based Care

Christian Pean, MD

## 8:34—8:46 AM

Association Between Muscle Balance and 3D Glenohumeral Morphology in Rotator Cuff Tear Arthropathy

Jay Levin, MD

## 8:46—8:58 AM

Precision Rehabilitation for Cardiometabolic Disease of Mice and Humans

Todd Cade, PT, PhD, FAPTA

## 8:58—9:10 AM: Break

## SYMPOSIUM - 100 YEARS OF DUKE

### 9:10—10:46 AM

Moderator: Benjamin Alman, MD

The First Direct Measurement of Human Skeletal Muscle Material Properties

Richard 'Rick' Lieber, PhD

Evolution of Orthopaedic Trauma Care Over the Past 100 Years

Todd McKinley, MD

Notable DPT Alumni Over the Past 100 years

Tiffany Hilton, PhD

The Science of DPT Research - Looking Ahead to 110 Years of Duke

Amy Pastva, PhD



Duke Orthopaedic National and International Leaders  
James Urbaniak, MD

Duke Orthopaedics - Changing Faces  
William Richardson, MD

A New Occupational Therapy Doctorate Program at Duke Helps Usher in the Next 100 Years  
Michael Iwama, PhD, MSc, BScOT

Most Important Advances in the Last 100 Years  
Benjamin Alman, MD

### **10:50–11:50 AM: Poster Session I [Suite 1225]**

Moderator: Julia Visgauss, MD

#### **12:00–12:12 PM**

Roger Mann Award: Younger Patients Undergoing Total Ankle Arthroplasty Experience Higher  
Complication Rates and Worse Functional Outcomes Scores  
Albert Anastasio, MD

#### **12:12–12:24 PM**

Building Pain Equity—A Population Health Approach  
Flavia Penteado Kapos, PhD

#### **12:24–12:36 PM**

Does Femoral Stem Design Influence Periprosthetic Fracture Incidence and Morphology in Total Hip  
Arthroplasty  
Niall Cochrane, MD

#### **12:36–1:20: Lunch Break**

Moderator: William Eward, DVM, MD

#### **1:30–1:42 PM**

Uncovering Age-Associated Changes of the Neuroimmune Response During Peripheral Nerve  
Regeneration to Enhance Nerve Surgery

#### **1:42–1:54 PM**

ACL Reconstruction with Slope Reducing Osteotomy  
Jason “Jake” Long, MD



**1:54–2:06 PM**

Associations of Vision Impairment with Cognitive Impairment Among Stroke Survivors in the Atherosclerosis Risk in Communities Study  
Kimberly Hreha, EdD

**2:06–2:18 PM**

Fasting and Fracture Healing  
Kier Blevins, MD

**2:30–3:30 PM: Break**

**2:30–3:30 PM: Poster Session II [Suite 1225]**

Moderator: Malcolm DeBaun, MD

**3:45–3:57 PM**

Intraoperative Cranio-Pelvic Traction: A Novel Technique for Correction of Neuromuscular and Syndromic Scoliosis  
Patton Robinette, MD

**3:57–4:09 PM**

Basic and Clinical Muscle Biology and Rehabilitation—from Molecule to Recovery  
Leonardo Ferreira, PT, PhD

**4:09–4:21 PM**

Clinical Outcomes of Nerve Wrapping in the Management of Compressive Neuropathies  
Sneha Rao, MD

**4:21–4:30 PM**

Poster Awards & Conclusion  
Benjamin A. Alman, MD

**4:30 PM**

Adjourn





## **ELEANOR BRANCH, DPT VISITING LECTURER**

**Richard L. Lieber, PhD**

**Chief Scientific Officer & Senior Vice President of Research  
Shirley Ryan AbilityLab, Chicago, IL**

Richard L. Lieber, PhD, oversees all research endeavors throughout the Shirley Ryan AbilityLab care system. He joined the organization (then the Rehabilitation Institute of Chicago, or RIC) in March 2014, bringing an extensive research focus on the science and physiology of skeletal muscle. Dr. Lieber is an established expert in the field, both nationally and internationally, and is a pioneer in conducting translational research, primarily in patients with spinal cord injury and children with cerebral palsy.

Dr. Lieber and Chief Medical Officer James Sliwa, DO, are responsible for implementing the “Research Accelerator Program” – a novel translational approach embedded in the Shirley Ryan AbilityLab medical and research enterprise and for demonstrating its tangible and cultural progress. To date, Drs. Lieber and Sliwa have enabled translational research with scientists and nearly 200 non-research staff across the hospital.

Dr. Lieber also led the design of Shirley Ryan AbilityLab’s Biologics Lab, in which studies of living human cells, tissues and fluids solve human problems, particularly in rehabilitation and recovery. The lab’s state-of-the-art equipment allows scientists to monitor living cells as they test various types. Shirley Ryan AbilityLab’s Biologics Lab is the only one in the world placed in a rehabilitation setting. It brings together biologists, physiologists, stem-cell biologists, and molecular biologists – all sharing ideas and expertise and speeding discoveries.

As Chief Scientific Officer, Dr. Lieber oversees the work of more than 200 researchers. Under his leadership, Shirley Ryan AbilityLab has more than 150 research studies and clinical trials underway, all of which will benefit its patient populations. The grant portfolio managed by Dr. Lieber comprises more than \$152 million. It spans major agencies such as the National Institutes of Health, the Department of Veterans Affairs, the Department of Defense, and the National Institute on Disability, Independent Living, and Rehabilitation Research.

Dr. Lieber’s specific area of expertise is studying the design and plasticity of skeletal muscle. Currently, he is developing state-of-the-art technical and biological approaches to understanding and solving painful and debilitating muscle contractures that result from cerebral palsy, stroke and spinal cord injury.

He has published more than 350 articles in scientific journals, from the more fundamental journals such as Biophysical Journal and the Journal of Cell Biology to the more applied-science publications such as the Journal of Hand Surgery, Clinical Orthopaedics and Related Research, and Archives of Physical Medicine and Rehabilitation.



Throughout his career, Dr. Lieber has won numerous prestigious awards, among them: Paul B. Magnuson Award from the U.S. Department of Veterans Affairs for Outstanding Achievement in Rehabilitation Research and Development, 2023; Elsass Foundation Research Prize in Cerebral Palsy, 2023; Fellow, American Institute of Medical and Biological Engineering (AIMBE), 2019; Kappa Delta Award, American Academy of Orthopaedic Surgeons, 2013; Giovanni Borelli Award, American Society of Biomechanics, 2007; The Göteborg University Medal, Sahlgrenska University Hospital, 2007; Fulbright Scholarship (Sweden), 2007; and Kappa Delta Young Investigator Award, American Academy of Orthopaedic Surgeons, 1994.

Before joining Shirley Ryan AbilityLab, Dr. Lieber was Professor and Vice Chairman of the Department of Orthopaedic Surgery at the University of California, San Diego (UCSD), and Principal Investigator of the San Diego Skeletal Muscle Research Center – an NIH-funded center designed to leverage muscle expertise on behalf of patients in the San Diego community. He earned his doctorate in Biophysics, with a minor in Electrical Engineering, from the University of California, Davis, where he also earned a BS in Physiology. He earned his MBA from the Rady School of Management at UCSD.

**Wednesday, May 8, 2024**

**J. LEONARD GOLDNER VISITING PROFESSOR**

6:30 – 7:30 AM

Precision Approaches for Multiply Injured Patients  
Interprofessional Education Building Room 1250  
Todd O. McKinley, MD

**Thursday, May 9, 2024**

**BRANCH LECTURE**

11:30 AM – 12:30 PM

Is it OK that Science is a Business?

Trent Semans Center – Great Hall

Richard L. Lieber, PhD “Rick”

Chief Scientific Officer & Senior Vice President of Research  
Shirley Ryan AbilityLab, Chicago, IL







**THIRTIETH ANNUAL  
J. LEONARD GOLDNER VISITING PROFESSOR  
Todd O. McKinley, MD**

Dr. McKinley is a Professor of Orthopaedic Surgery at Indiana University School of Medicine and an Adjunct Professor of Anatomy, Cell Biology, and Physiology

He was born and raised in Osage, Iowa, a rural community in north central Iowa. He attended the University of Minnesota and received a Bachelor of Aerospace Engineering and Mechanics. He worked for McDonnell Douglas as an engineer before rejoining medical school at the University of Minnesota. He chose Orthopaedic Surgery as a specialty and did his residency at the University of California at Davis in Sacramento, California. He was immediately interested in trauma as a resident. Following residency, he did a Research Fellowship at UC Davis focusing on the mechanical etiology of joint injuries leading to posttraumatic osteoarthritis. Following his research fellowship, he did a clinical fellowship in Orthopaedic Traumatology at the R. Adams Cowley Shock Trauma Center in Baltimore, Maryland.

He joined the University of Iowa faculty following his clinical fellowship in 1999. His clinical practice focused on trauma and expanded into young adult hip disorders, focusing on pelvic osteotomies. He has performed over 1000 periacetabular osteotomies. At Iowa, he became involved with a comprehensive research team that focused on the etiology and treatment of posttraumatic osteoarthritis. This has culminated in developing a novel therapy approved as an IND for human use to prevent PTOA by direct intraarticular treatment. Phase I testing on this has been completed.

In 2013, he moved to Indiana University to start a new orthopaedic trauma team at IUHealth Methodist Hospital, now expanding to nine surgeons. He was appointed the Director of Trauma Research at IUHealth Methodist and has developed a research team that includes five full-time research coordinators. He has received six extramural grants from the Department of Defense and the NIH and has published over 200 manuscripts. At Indiana, he began an extensive research program investigating Precision Medicine approaches for polytraumatized patients.

Since 2001, he has received continuous extramural funding from the CDC, NIH, and DOD. He is currently funded to study precision methods for polytrauma and nonunions. He has published over 120 manuscripts.

The J. Leonard Goldner Visiting Professorship is sponsored by the Sequoia Foundation, Family Endowment of J. Ollie Edmunds, Jr., MD. Doctor Edmunds completed an orthopaedic surgery residency at Duke in 1975, followed by Hand and Microvascular Surgery at Duke under J. Leonard Goldner, MD, in 1976. Doctor Edmunds is a Professor Emeritus at Tulane University School of Medicine, New Orleans, LA



# POSTER PRESENTATIONS

IPE Suite 1225 | Thursday, May 9, 2024

10:50–11:50 AM: Session I | 2:30–3:30 PM: Session II

## Category #1: Postdoctoral Research Fellow or Associate

Targeting Circulating Apolipoprotein E to Improve Aged Bone Healing

Mingjian Huang, PhD

Actin Polymerization Assay in Myofibrils Isolated from Skeletal Muscle

Swathi Chodisetty, Doctorate

ESM1 Promotes Lung Metastasis in Undifferentiated Pleomorphic Sarcoma

Eijiro Shimada, MD, PhD

Bioenergetics in Cultured Cells, and Human Muscle Fibers

Albino Schifino, Ph.D.

Treating Transection and Contusion Spinal Cord Injury with Neuroprotectant Drug, CN-105

Em Abbott, PhD

Elucidating the Cellular Mechanism of Injury-Induced Inflammation in Aging to Promote Bone Repair

Koji Ishikawa, MD, PhD

## Category #2: Undergraduate Research Student

Early Adolescent Genotoxic Stress Leads to a Reduction in Skeletal Muscle Stem Cells and Persistent Damage of the Niche

Cathy Yang, First Year Undergraduate

OBJECTIVE The Systematic Response of the Spleen in CD4+ T Cell Regulation and its Implications for Post-Traumatic Arthritis

Hansel Heres, Undergraduate

Prognostic Factors of Ambulation and Lower Extremity Motor Outcomes after Cervical Spinal Cord Injury

Jennifer Smith, N/A



Semi-automated 3D Distance Mapping of Conventional Non-weight-bearing CT scan with External Rotation Stress Demonstrates High Diagnostic Accuracy for Subtle Syndesmotic Instability  
Aaron Therien, MS, BS

Redefining Hallux Rigidus Classification through an Objective Hounsfield Unit Algorithm via Weightbearing Computed Tomography  
Emily Luo, BS

Investigating the Role of Exercise-Induced Muscle-Secreted Factors in Modulating Osteoarthritis  
Jing Xie, BSc

Analysis of Bone Morphometric Changes in Rabbit Knees Following Meniscus Injury  
Navjot Rehal, BME MS

The impact of social support on outcomes in Spine Surgery Patients: A Systematic Review and Meta-Analysis.  
Cristal Ortiz, BS, 2025

Exploring ApoE-Mimetic Peptide, CN-105, as a Potential Treatment to Improve Locomotion After Spinal Cord Injury  
Timothy Faw, PT, DPT, PhD

### **Category #3: Student Category-MD/DPT/OTD or Graduate Research**

Mid-Term Outcome of Endoscopic Proximal Hamstring Repairs  
Shannon Greenwood, Master's in Biomedical Sciences

Heterogeneity of the Fibro-Adipogenic Progenitors (FAPs) in the Mouse Rotator Cuff and Their Response to Massive Rotator Cuff Tear  
Helen Rueckert, B.S.

Fractures with Periosteal Damage Induce Long-Term Pain  
Jiaoni Li, PhD

Transient Exposure of Tissue-Engineered Cartilage Analogs to Synovial Fluid Hematoma After Ankle Fracture Is Associated With Chondrocyte Death and Altered Cartilage Maintenance Gene Expression  
Nicholas Allen, PhD Student



Charles Bonnet Syndrome: Clinician Screening Tips and Strategies for Symptom Management  
Stephanie Stellato, OTD-S

Predictors of Osteoporosis Screening in Menopausal Women after Distal Radius Fracture  
Jessica Welch, BS

Research Best Practices for Eye Stroke Vision Rehabilitation: A Qualitative Study  
April Burch, OTD-S

Heterotopic Ossification Following Primary Total Hip Arthroplasty: Prevalence, Risks and Outcomes  
Crystal Jing, BA

Semi-automated 3D Distance Mapping of Conventional Non-Weight-bearing CT scan with External Rotation Stress Demonstrates High Diagnostic Accuracy for Subtle Syndesmotic Instability  
Aaron Therien, MS, BS

Redefining Hallux Rigidus Classification through an Objective Hounsfield Unit Algorithm via Weightbearing Computed Tomography  
Emily Luo, BS

Investigating the role of exercise-induced muscle-secreted Factors in Modulating Osteoarthritis  
Jing Xie, BSc

Analysis of Bone Morphometric Changes in Rabbit Knees Following Meniscus Injury  
Navjot Rehal, BME, MS

The Role of Cathelicidin Antimicrobial Peptide in Bone Fracture Repair and Aging  
Tuyet Nguyen, BS

Support at Every Step: Spine Surgery Patient Navigators Enhance Quality of Care Support  
Dana Rowe, BA

The role of MRA in evaluating patients prior to revision hip arthroscopy: Is capsule thickness a reliable predictor of intraarticular adhesions?  
Austin Leonard, MS

Loss of PRDM16 in bone marrow stromal cells attenuates adiation-induced marrow adiposity  
Kiana Gunn, BS, Biochemistry & Molecular Biology



Predictive Modeling of Ultrasound Findings to Differentiate between Neuropraxia and Axonotmesis following Peripheral Nerve Injury: A Systematic Review and Meta-analysis.”

Jackson Cathey, BS

Investigating the Impact of Tissue Maturity on Cartilage Homeostasis in Inflammatory and Mechanical Stress Conditions

Vianna Martinez, BS

Modulation of the Mechanosensitive Ion Channel Transient Receptor Potential Vanilloid 4 (TRPV4) to Promote Meniscus Anabolism

A'anna Kelly, BS

Interplay of Humeral Torsion and Pitching Biomechanical Kinematics in Collegiate Pitchers

Hannah Zhao, SPT, CSCS, ERAC

Skeletal Muscle Contraction and Metabolic Phenotype in Myocyte-Specific ATF3 Knockout

Claudia Fornelli, PhD student

IDH Mutations in Chondrosarcoma: A Meta Analysis

Paula Viza Gomes, BS

Double Crush Syndrome in the Lower Extremity

KHUSHI PARIKH, BS

Hypoxia-Regulated Innervation During Cancer

Kira Gardner, BS in Biology

Yolk Sac Erythromyeloid Progenitors in Fracture Healing and Regeneration

Choiselle Marius, BS

Population Health Approaches to Orthopaedic Care: Early Results from a Collaborative Equity-Conscious Fragility Fracture Care Program

Lulla Kiwinda, BS

The Implications of Weightbearing Precautions After Minimally Invasive Osseous Interventions: A Scoping Review

Alex Bassil, BA



Effects of Hemarthrosis on Meniscus Repair and Post Traumatic Osteoarthritis Development

Allison Robinson, BS

Periprosthetic Joint Infection: Are Patients Still Better Off Than If Primary Arthroplasty Had Not Been Performed?

Justin Leal, BS

Complications Following Intramedullary Nailing of Proximal Humerus and Humeral Shaft Fractures – A Systematic Review

Kiera Lunn, BS

Exploring Versatile Applications of a Vacuum-Assisted Bone Harvester in Orthopedic Surgery.

Kevin Wu, BS

Short-term comparison of RSA for Fracture in Young Versus Elderly Patients

Kwabena Adu-Kwarteng, BA

Immune Profiling of Synovial Fluid After Ankle Fracture and Its Effects on Cartilage Tissue Analogs

Alexandra Hunter Aitchison, BS

Abduction Pillow Versus No Pillow: An Assessment of Efficacy for Managing Small Rotator Cuff Tears

Damon (DJ) Briggs, BS

Understanding Social Determinants of Return and Readmission During the Global Period

Bruno Valan, BS

The Efficacy of Major Peripheral Nerve Neuroma Surgery in Reducing Postoperative Opioid Use in Patients with Preoperative Opioid Use

Emmanuel Emovon, BS

Assessing Frailty with mFI-5 Aids in Surgical Olecranon Fracture Management

Harvey Allen, BS

The Discrepancy of Motor and Sensory Axon Counts in the Ulnar Nerve: A Systematic Review and Meta-Analysis

Christian Zirbes, BS

