



Duke Orthopaedics



2025 Departmental Research Day & Symposium

March 18, 2025

Event Program



JOIN US LIVE!



SYMPOSIUM • FEATURED SPEAKERS



Michael Bolognesi, MD
 Professor of Orthopaedic Surgery; Adult Reconstruction Division Chief; Duke University School of Medicine



Maggie Horn, DPT, MPH, PhD
 Associate Professor of Orthopaedic Surgery; Associate Professor in Population Health Sciences; Duke University School of Medicine



Christian Pean, MD, MS
 Executive Director for AI and IT Innovation; Assistant Professor of Orthopaedic Surgery; Duke University School of Medicine



Michael J. Pencina, PhD
 Chief Data Scientist, Duke Health; Vice Dean for Data Science; Duke University School of Medicine



Elizabeth Skidmore, PhD, OTR/L, FAOTA, FACRM
 Associate Dean for Research; Professor of Occupational Therapy; University of Pittsburgh

PRESENTATIONS

8:00-8:20 a.m. Breakfast

- 8:20-8:25 a.m. Welcome** • Benjamin Alman, MD
- 8:25-8:37 a.m. Distal Clavicle vs. Traditional and Congruent Arc Latarjet: Comparison of Surface Area and Glenoid Apposition with 3-Dimensional CT and MRI**
 Caroline Park, MD
- 8:37-8:49 a.m. Circulating Proteomic Profiles Associated with Decreased Tourniquet-Induced Ischemia**
 Jonathon Florance, MD
- 8:49-9:01 a.m. Targeting Stem Cells in Skeletal Muscle Repair and Regeneration**
 Shihuan Kuang, PhD
- 9:01-9:13 a.m. Artificial Intelligence for Automated Osteoporosis Screening on Extremity Radiographs**
 Joshua Helmkamp, MD

9:13-9:25 a.m. Break

- 9:25-10:10 a.m. Department Photo** • Outside of IPE
- 10:10-11:20 a.m. Poster Session I** • Suite 1225

12:50-1:30 p.m. Lunch

- 1:30-1:42 p.m. Decreasing Hip Offset in Total Hip Arthroplasty Results in Decreased Physical Function Scores**
 Patrick Kelly, MD
- 1:42-1:54 p.m. Complications in Adult Spine Deformity Surgery**
 Brett Rocos, MD
- 1:54-2:06 p.m. Clinical Outcomes After Pelvic Resection With And Without Reconstruction**
 Nicole Levine, MD

2:06-2:16 p.m. Break

2:16-3:26 p.m. Poster Session II • Suite 1225

- 3:26-3:38 p.m. Micro-CT Analysis of Commonly Utilized Tools for Articular Cartilage Defect Bone Marrow Stimulation**
 Lucy Meyer, MD
- 3:38-3:50 p.m. Developing a Novel Setting for Post-Acute Care: High-Intensity Home-Based Rehabilitation**
 Joshua Johnson, PT, DPT, PhD
- 3:50-4:02 p.m. Low Complication Rates in Olecranon Fracture Fixation with Dual Plating**
 Matthew Brown, MD
- 4:02-4:14 p.m. If Opportunity Doesn't Knock, Build a Door: Orthopaedic Fracture Care as a Potential Entry Point for Improved Primary Care Services**
 Amy Behman, MD
- 4:14-4:26 p.m. A Novel Fluoroscopic Sequence to Reveal Residual Elbow Instability Secondary to MCL Disruption**
 Alexandra Paul, MD

4:26-4:45 p.m. Award Announcements/Adjournment

11:20 a.m.-12:50 p.m. Symposium • "Big³: Big Ideas, Big Data & Big Analysis"

- Development of the Duke Total Joint Learning Health Unit: Data to Dissemination**
 Michael Bolognesi, MD; Maggie Horn, DPT, MPH, PhD
- Responsible Innovation in Health AI**
 Michael Pencina, PhD
- Automated Methods for Assessing Rehabilitation Intervention Fidelity**
 Elizabeth Skidmore, PhD, OTR/L, FAOTA, FACRM
- From Inequity to Innovation: Artificial Intelligence as a Bridge to Health Equity and Value-Based Surgical Care**
 Christian Pean, MD, MS

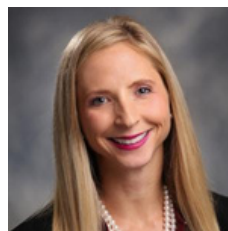
Featured Speakers



Big³ Big Ideas
Big Data
Big Analysis



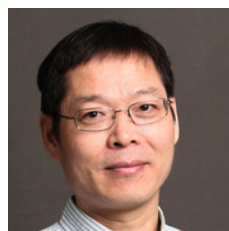
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Therapy; University of Pittsburgh

Basic

RNA-Sequencing and Global Proteomics of Diaphragm Weakness in Female Rats After Myocardial Infarction
Dryden Baumfalk, PhD

Mitochondrial Dynamics is Crucial for Successful Skeletal Muscle Regeneration
Candice Chen, PhD

Macrophages and ApoE: A Promising Target for Enhanced Regeneration in Aged Fracture Healing
Catharine Dietrich, BS

Optimized Methods for Handling Paraffin-Embedded Tissue Samples for Histological Analysis in Osteoarthritis
Austin Ennis, BS; Zixuan Dong, BS

Skeletal Muscle Isotonic Fatigue: Determinants and Relevance to Therapeutic Assessments
Leo Ferreira, PhD

The Role of Hypoxia and HIFs in Metastatic Cancer-Induced Bone Pain
Kira Gardner, BS

Loss of Prdm16 in Bone Marrow Stromal Cells Increases Cortical Bone Volume and Cortical Thickness
Kiana Gunn, BS

The Systematic Response of the Spleen in CD4+ T Cell Regulation and its Implications for Post-Traumatic Arthritis
Hansel Heres Verdera, BS

Improving Aged Fracture Healing by Neutralizing Circulating Apolipoprotein E
Mingjian Huang, PhD

Aging-Related Loss of Endothelial Fractalkine Impairs Bone and Muscle Repair
Koji Ishikawa, MD, PhD

Promoting Endothelial-Schwann Cell Migration and Axonal Regeneration with Hyaluronic Acid/Alginate Hydrogels Following Peripheral Nerve Injury
Crystal Jing, BA

Exploring the Role of Radiation-Induced Hypoxia in Sensory Neuron Alterations Within the Bone Microenvironment
Cheyenne Jones, BS

Metabolism-Guided Isolation of Muscle Stem Cells to Improve Transplantation Efficacy
David Lee, PhD

Macrophages Secrete THBS1 to Induce Col2a1-Expressing Cells in the Early Phase of Fracture Healing
Xinyi (Savanna) Ma, BS

Yolksac Erythromyloid Progenitors in Fracture Healing and Bone Regeneration
Choiselle Marius, BA

Differential Effects of Growth Factor BMP13 on Juvenile and Adult Cartilage
Vianna Martinez, BS

Investigating LCP1-Mediated Oncogenic Signaling in Chondrosarcoma Metastasis
Ariana Matarangas, Completing BS

Basic

A New Hope: Targeting Chondrosarcoma Metastasis with NF- κ B Inhibitor IKK-16
Aron Mebrahtu, BS, MS

Decoding Age-Related Signatures in Peripheral Nerve Regeneration: Exploring Cellular, Molecular, and Functional Dynamics
Amit Mohite, BS

Maresin 1 Rejuvenates the Aged Fracture Callus
Kristin Molitoris, MS

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

Advancing Peripheral Nerve Regeneration: The Role of Chitosan-Based Interventions in Cellular Microenvironments
Long Nguyen, BS

Development of an Extinction Therapy Approach for Osteosarcoma Using Eco-Evolutionary Principles
Maggie Hoey, BS; Katelyn Parsons, BS

Characterizing Metastatic Progression in Osteosarcoma Utilizing Exosomal Proteomics
Melanie Perez, BS

Development of a Rabbit Model of Meniscus Repair and Post-Traumatic Osteoarthritis
Allison Robinson, PhD Candidate

Identification of Non-Myogenic Mesenchymal Cell (NMMC) Populations That Contribute to Massive Rotator Cuff Muscle Tear Pathologies
Helen Rueckert, BS

ESM1 Promotes Metastasis in Undifferentiated Pleomorphic Sarcoma
Eijiro Shimada, MD, PhD

A Novel Polymer for Vertebral Augmentation
Stephanie Sipics, BS

Targeting LCP1 Mediated Metastasis in Chondrosarcoma with Oroxylin A
Ava Strohmeyer, BS

Investigating the Role of Histone Deacetylase-3 in Metastatic Undifferentiated Pleomorphic Sarcoma
Asjah Wallace, BA

Investigating the Role of Exercise-Induced Circulating Factors in Attenuating Osteoarthritis
Jing Xie, PhD candidate

Early Adolescent Genotoxic Stress Inhibits Skeletal Muscle Growth and Damages the Vascular Endothelial Satellite Cell Niche
Cathy Yang, BS

Notch Hyperactivation Reversibly Regulates Tumorigenesis of Liposarcomas in a Mouse Model
Ying Zhao, PhD

Clinical

Feasibility and Acceptability of Remote Ischemic Conditioning Plus Low-Intensity Resistance Training in Older Individuals with Mobility Impairment: A Pilot Study

Andrew Albright, BA

Understanding Applicant Preferences in Orthopaedic Surgery Residency

Adedotun Bello, BA

Surgeon Preferences in Early Onset Scoliosis: A Discrete Choice Experiment

Grant Cabell, MD

The Role of Patient Education in Improving Health Knowledge in Elective Spine Surgery

Sophia Cai

Targeted Muscle Reinnervation at the Time of Major Limb Amputation Reduces Long-Term Use and Dependence for Opioid Analgesic Therapy: A Multicenter Propensity-Matched Study

Jackson M. Cathey, BS

Immediate Post-Operative Pain Levels May Be An Indicator of Recovery That Can Be Used to Guide Surgeon Patient Interactions

Chad Cook, PT, PhD

Reasons for Patient No-Shows and Drop-Offs After Initial Evaluation in Physical Therapy Outpatient Care: A Qualitative Study

Chad Cook, PT, PhD

If Opportunity Doesn't Knock, Build a Door: Orthopaedic Fracture Care as a Potential Entry Point for Improved Primary Care Services

Alexandra Damron, PT, PhD

Fitting the Knee to the Patient, Not the Other Way Around: A Three-Dimensional Analysis of Total Knee Arthroplasty Implant Fit

David Deckey, MD

Dual-Task Cost as a Physical Resilience Indicator for TKA in the Elderly

Jody Feld, PT, PhD

Navigating Food-Related Occupations for Adults with ADHD: An Occupational Perspective

Peyton Gemmell, OTD-S

Joint-Sparing Reconstructive Procedures versus Hindfoot Fusion in the Treatment of Progressive Collapsing Foot Deformity. A Retrospective-Comparative Analysis

Wolfram Grun, MD

The Contemporary 'In-basket': An Explosion of Unchecked Administrative Expectations

Emily Harman, MD, MS

Relative Value Units Underestimate Reimbursement for Open Reduction and Internal Fixation of Periprosthetic Humerus Fractures

Alyssa R. Henriquez, BS

Pitch Types and Their Influence on Elbow Varus Torque and Spin Rate in Professional Baseball Pitchers

Alex Hodakowski, MD

Clinical

The Impact of Preoperative Psychological Interventions on Postoperative Outcomes in Spine Surgery Patients: A Systematic Review
Maria Junaid

Primary Care Physician Follow-Up and 90-day Readmission Rates and Costs Following Hip Fracture Surgery
Lulla Kiwinda, BS

Impact of Fellowship Training and Robotic Technology on Preoperative Decision-Making in Total Hip Arthroplasty
Katherine Kutzer, BS

Talus Subchondral Density Predicts Ankle Osteoarthritic Patterns Associated with Hindfoot Malalignment
François Lintz, BA in progress

The Impact of Intraoperative and Postoperative Analgesic Regimens on Functional Mobility After Lumbar Spine Surgery
Gabriella Lozano, BS

Trends in Utilization of Intraoperative Neuromonitoring in Procedures for Incomplete Cervical Spinal Cord Injury
Emily Luo, MS

Assessment of Skeletal Respiratory Muscle Function for Rehabilitation: Tapered vs Constant Loads
Jessica Matsuoka, SPT

Functional and Radiographic Outcomes Following Dorsal or Volar Bridge Plating for Open Distal Radius Fractures
John Mwangi, BS

Prevalence of Depression in Metastatic Spine Disease Surgical Patients
Ellen O'Callaghan, BA

Minimum of Four-Year Outcomes after Anterior Cruciate Ligament Reconstruction with Quadriceps Tendon Graft Shows Favorable Outcomes: A Systematic Review
Conor O'Neill, MD

Physical Rehabilitation for Older Adults with Acute HFpEF (REHAB-HFpEF): Phase 3 Trial Design and Strategies for Supporting Intervention Fidelity
Amy Pastva, PhD

Experimentally Induced Intraarticular Effusion Does Not Result in Bilateral Sustained Limb-level Loading During Overground Walking
Laura Pietrosimone, PT, PhD

Clinical Diagnostic Study of Syndesmotic Instability Using 3-Dimensional Weight-Bearing CT Distance Mapping Algorithm
Enrico Pozzessere, MD

A Patient Education Guide to Manage the Effects of Cataracts While Waiting for Surgery
Virginia Quellmalz-Zalocco, OTD-S; Cassidy Warner, OTD-S

Clinical

A Comparison of Tension-Band Plate Growth Modulation in Mucopolysaccharidoses Versus Idiopathic Angular Deformities
Kathryn Radulovacki, BA

A Retrospective Analysis of National Trends in Lumbar Disc Arthroplasty
Nicole Rivera, BS

Interdisciplinary Spine Navigators Program: Enhancing Recovery, Reducing Distress, and Optimizing Healthcare Utilization in Spine Surgery Patients
Dana Rowe, BA

Does Timing of Previous Intra-Articular Steroid Injection Affect the Post-Operative Rate of Infection in Total Ankle Replacement?
Isabel Shaffrey, BS

Which Measurements of Glenohumeral Capsule are Reliable and Accurate?
Kyle Steinbock, BS

Widespread and Movement-Evoked Pain in Older Adults with High Impact Chronic Low Back Pain: Prevalence and Association with Physical Performance and Activity
Kat Sublett, BA

Deep Learning and Dimensionality Reduction for Sarcoma Subtyping
Jay Swayambunathan, M.Eng.

Black Race is Independently Associated with Unplanned ED Revisits at 30-and 90-Days After Orthopaedic Surgery in the Quaternary Care Center and Community Hospital Setting
Aaron Therien, MS

Distinguishing Between Combined Ankle and Hindfoot Malalignment and Isolated Foot Deformity: Introducing Subtalar Joint Offset (SJO) as an Innovative Three-Dimensional Foot Alignment Measurement
Pierre-Henri Vermorel, MD

Postoperative Pain Prescription Variability in Opioid and Nonopioid Medications
Paula Viza Gomes, BS

Intramedullary Screw Fixation for Extremely Distal Metacarpal Fractures
Jessica Welch, BS

Uncovering the Hidden Impact of Social Determinants on Sarcoma Care
Giussepe Yanez, BS

Ligament Reconstruction and Tendon Interposition Versus Suture Button Suspensionplasty for Thumb Carpometacarpal Arthritis
Ryon Yu, BS

Predictors of Peripheral Nerve Injury in Upper Extremity Gunshot Injuries
Christian Zirbes, BS

Health

Breaking Barriers: The Transformative Impact of the Future Leaders in Orthopaedic Surgery Symposium
Antoinette Charles, MPH

Cost-Effectiveness of Medial Patellofemoral Ligament Reconstruction for First-Time Patellar Dislocations - A Markov Analysis
Eoghan Hurley, MD

Financial Toxicity in Patients with Bone and Soft Tissue Sarcoma: A Single Institution Study
Devika Shenoy, BS

Other

Utilizing Occupation-Based Curriculum for Mitigating Occupational Injustices in Children
Ashleigh Burn, OTD-S; Lindsay Durdle, OTD-S

Examining the Relationship between Extreme Temperature and Youth Health Outcomes: The Role of Neighborhood Disparities in New York City
Keying Chen, BS

Utilizing Occupation-Based Curriculum for Mitigating Occupational Injustices in Children
Lindsay Durdle, OTS; Ashleigh Burn, OTS

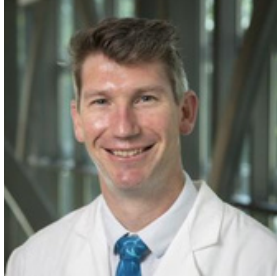
The Impact of Equity & Inclusion Leadership on Gender Diversity of Orthopaedic Residency Programs
Julia Ralph, BA

Preclinical Evaluation of Antibiotics-Loaded Nanofiber Envelope in Reducing Implant-Associated Infections
Yiqiu Zhang, MS

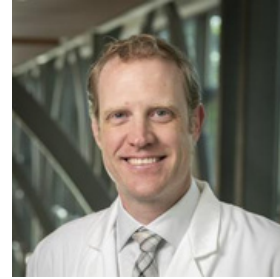
Thank you for your hard work and participation!

Chief Residents – 2025

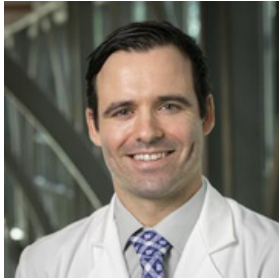
Big³
Big Ideas
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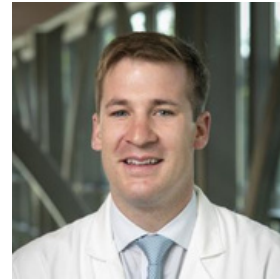
Matthew J. Brown, MD



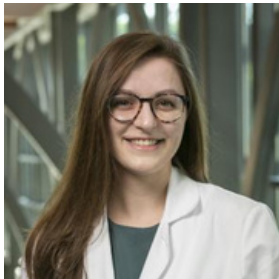
Jonathon M. Florance, MD



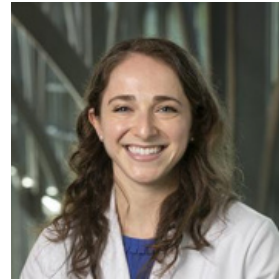
Joshua K. Helmkamp, MD



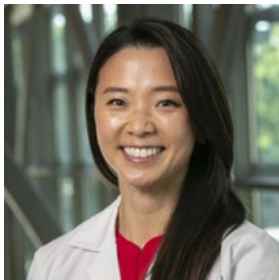
Patrick J. Kelly, MD



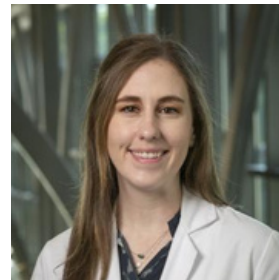
Nicole L. Levine, MD



Lucy E. Meyer, MD



Caroline N. Park, MD



Alexandra V. Paul, MD

Thank You!



Big³
Big Ideas
Big Data
Big Analysis

We are grateful for the dedication and support of our faculty, staff, students, and volunteers who make this annual event a success.

Poster Competition Judges

Gurpreet Baht, PhD
Amy Behman, MD
Michael Bolognesi, MD
Bruce Browner, MD
Todd Cade, PhD
Anthony Catanzano, MD
Joe Chakkalakal, PhD
Cesar de Cesar Netto, MD
Malcolm DeBaun, MD
Louis DeFrate, PhD
Leonardo 'Leo' Ferreira, PhD
Steven George, PhD
Adam Goode, PhD
Anthony Hamm, DC
Warren Hammert, MD
Amanda Hayes, MD
Matthew Hilton, PhD
Maggie Horn, PhD
William Jiranek, MD
Joshua Johnson, PhD
Shihuan Kuang, PhD
Robert Lark, MD

David Lee, PhD
Trevor Lentz, PhD
Brian Lewis, MD
Amy McNulty, PhD
Joe Minchew, MD
Michael Moverman, MD
Christopher Murawski, MD
James Nunley, MD
Steven Olson, MD
Christian Pean, MD
Laura Pietrosimone, PhD
Brett Roccos, MD
Sean Ryan, MD
Eliana Saltzman, MD
Andrew Schwartz, MD
Corey Simon, PhD
Harry Stafford, MD
Robert Tisherman, MD
Julia Visgauss, MD
Jocelyn Wittstein, MD
Colleen Wu, PhD
Xin Zhang, PhD

Moderators

Benjamin Alman, MD
William Eward, MD
Alison Toth, MD



Duke Orthopaedics



Our vision and mission are to develop tomorrow's leaders in orthopaedics and rehabilitation research, education, and patient care.