



ORTHOPAEDIC
— TRAUMA —
ASSOCIATION

BASIC SCIENCE FOCUS FORUM

Wednesday

OCTOBER 18, 2023

**Original Seattle Convention Center (Arch Building) – 606-607
Seattle, WA**



ACCME
ACCREDITED

*8.25 AMA PRA
Category I Credits™*

Schedule and presenters
are subject to change.



WEDNESDAY, OCTOBER 18, 2023

BASIC SCIENCE FOCUS FORUM

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OVERVIEW

The 2023 Basic Science Focus Forum Course (BSFF) is directed towards orthopaedic surgeons with an interest in the basic science of orthopaedic trauma and how it relates to or impacts their practice. Basic science researchers will also obtain valuable knowledge about translational opportunities and how their research has the potential to change orthopaedic care. This course will involve 5 main symposia specifically designed to 'bridge the gap' between basic science and clinical practice, in addition to approximately 30 original research papers from the cutting edge of basic science research.

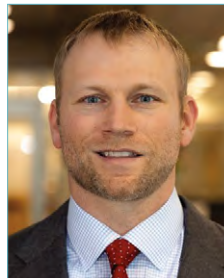
The attendees of the BSFF program will also have the opportunity to join together with the attendees at the International Trauma Care Forum for a special joint symposium. This combined session has proved to be a great collaboration and a chance to discuss ideas with our international colleagues.

LEARNING OBJECTIVES

Upon successful completion of the 2023 Basic Science Focus Forum, participants will be able to:

1. Update their knowledge in the basic science of orthopaedic trauma.
2. Understand the mechanisms of pain and how pain impacts patient outcomes in orthopaedic trauma.
3. Explore the latest research on muscle injury in orthopedic trauma.
4. Understand the biomechanics of fracture healing and how changes in manufacturing can enhance implant design.
5. Explore the latest research on fracture related infection.
6. Explore recent advancements in artificial intelligence and the impact of artificial intelligence in orthopedic trauma.

BASIC SCIENCE COMMITTEE



Justin Haller, MD *Chair*
Andrew R. Evans, MD, FACS
Michael W. Hast, PhD
Brian (Vu) Le, MD
Christopher Lee, MD
Saam Morshed, MD, PhD
John J. Wixted, MD

SYMPOSIA

Biomechanics - The Expanding Role of Additive Manufacturing in Orthopaedic Traumatology

Infection

SRI - New Paradigms in Pain Management After Skeletal Trauma

Muscular Injury in Orthopaedic Trauma

JOINT SESSION SYMPOSIUM

BSFF / ITCF / IOTA Symposium: Artificial Intelligence: International Perspectives on Critical Issues

TARGET AUDIENCE

Academic orthopaedic surgeons, community surgeons with an interest in clinically relevant basic science, basic and clinical researchers, residents and fellows will benefit most from this Basic Science Focus Forum.

WEDNESDAY, OCTOBER 18

JOINT INTERNATIONAL INDUSTRY LUNCH SESSION

Sponsored by: Zimmer Biomet

Recognizing and Treating Infection in the Orthopaedic Trauma Patient

Early Bird Registration
Until September 17.



OTA Member	OTA Member	Non-Member	Non-Member
On/Before	After	On/Before	After
9/17/23	9/17/23	9/17/23	9/17/23
\$300	\$400	\$450	\$550

Course Fee: \$300 \$400 \$450 \$550



WEDNESDAY, OCTOBER 18

7:30 AM - **INTRODUCTION**
7:35 AM *Justin Haller, MD*

7:35 AM - **SYMPOSIUM I**
8:25 AM **Biomechanics - The Expanding Role of Additive Manufacturing in Orthopaedic Traumatology**

Moderators: *Michael Hast, PhD*
Brian (Vu) Le, MD

7:35 AM **Overview**
Michael Hast, PhD

7:38 AM **Can Additively Manufactured PLGA Implants be Used for Fracture Fixation?**
Michael Hast, PhD

7:46 AM **Custom 3D Printed Implants for Segmental Bone Loss**
Malcolm DeBaun, MD

7:54 AM **3D Printing in Orthopaedic Trauma Education and Surgical Planning**
Samir Mehta, MD

8:02 AM **Speaker 4 Title TBD**
Guha Manogharan, PhD

8:10 AM **Discussion**
All Faculty

8:25 AM - **PAPER SESSION I:**
9:25 AM **Biomechanics in Fracture Fixation**

Moderators: *Michael Hast, PhD*
Brian (Vu) Le, MD

8:25 AM - **PAPER 1**
8:31 AM **Does Fixation Method Affect the Correlation of mRUST and Healing Strength?**
Dan C. Fitzpatrick, MD, MS;
John Benda, BS; Ndubuisi Obasi Obasi;
Erin Owen, PhD, MPH; Taylor Rezell, BS;
Daniel Sheerin, MD; David Weatherby, MD;
Brandon Wilkinson, MD;
Michael Bottlang, PhD

8:31 AM - **PAPER 2**
8:37 AM **The Effect of Body Weight on Interfragmentary Fracture Strain in Plate Fixation of Distal Femur Fractures: A Finite Element Analysis**
Ishan D. Shah, MD; *Adam M. Schlauch, MD;*
Lisa Phan, BA; Jiho Han, BA;
Richard Raji, M.Eng; Brian Farrell, MD

8:37 AM - **PAPER 3**
8:43 AM **Femoral Shaft Fractures: Does Routine Use of Cephalo-medullary Screws Prevent Future Fractures of the Proximal Femur?**
J. Spence Reid, MD; *James Mellen, BS;*
Zachary Koroneos, BS; Jacob Staub, BS;
Michelle Nentwig, MD;
Andrew Rodenhouse, MD;
Matthew R. Garner, MD; Gregory Lewis, PhD

8:43 AM - **PAPER 4**
8:49 AM **The Effect of Interosseous Ligament Integrity on Radial Head Stability**
Deana M. Mercer, MD; *Jodie Gomez, MS;*
Jorge Orbay, MD; Christina Salas, PhD;
Laurie Wells, PhD; Diego Rodriguez

8:49 AM Discussion

8:55 AM - **PAPER 5**
9:01 AM **Anterior Pelvic Ring Fracture with No Posterior Injury Is "Stress Positive." Does that Mean It Is Unstable?**
Joseph Featherall, MD; *Luke A. Myhre, MD;*
Dillon C. O'Neill, MD; Thomas F. Higgins, MD;
David L. Rothberg, MD; Justin M. Haller, MD;
Lucas M. Marchand, MD

9:01 AM - **PAPER 6**
9:07 AM **Surgical Stability According to Lag Screw Position in Hip Nailing for Unstable Basicervical Intertrochanteric Fractures: A Finite Element Analysis**
Dae-Kyung Kwak, MD; *Kang-Uk Lee;*
Je-Hyum Yoo; Min-Seok Kim; Sung-Jae Lee;
Seung-Hun Lee

WEDNESDAY, CONTINUED

- 9:07 AM - **PAPER 7**
9:13 AM **Anterior Tibial Artery Danger Zone in Anterolateral Plate Fixation of the Distal Tibia: A 3D CT Angiogram Modeling Study**
Brendan O'Leary, MD; William Kent, MD;
Brady Huang, MD; Sean Thomas, BS;
Garrett Berger, MD, PharmD;
Brendon C. Mitchell, MD;
Keenan Onodera, MD
- 9:13 AM - **PAPER 8**
9:19 AM **Mechanistic Propensities of Cryotherapy in a Bone Injury Site**
Matthew Zakaria; Yazan Honjol, MD;
Drew Schupbach, MD; Geraldine Merle, PhD;
Edward Harvey, MD, FIOTA
- 9:19 AM Discussion
- 9:25 AM - **Break**
9:45 AM

- 9:45 AM - **SYMPOSIUM II:**
10:35 AM **Infection -**
Moderators: **Jack Wixted, MD**
Chris Lee, MD
- 9:45 AM **Overview**
Chris Lee, MD
- 9:47 AM **Applying Antimicrobial Photodynamic Therapy to Orthopaedic Wounds**
Leah Gitajn, MD
- 9:55 AM **Bacteriophages: What Are They and How Can They Help?**
Kyle Schweser, MD
- 10:03 AM **Infection Prevention in Open Fractures: How to Go from (Very) Good to Great**
Joseph Wenke, PhD
- 10:11 AM **Local versus Systemic Antibiotics - New Trends**
Edward McPherson
- 10:19 AM **Discussion**
All Faculty

- 10:35 AM - **PAPER SESSION II:**
11:35 AM **Trauma Related Infection and Bone Healing**
Moderators: **Jack Wixted, MD**
Chris Lee, MD

- 10:35 AM - **PAPER 9**
10:41 AM **Treatment of Acute Fracture Related Infections Utilizing Bacteriophage Therapy**
Kyle Schweser, MD;
Chantelle Bozynski, DVM; Aaron Stoker, PhD;
Tamara Gull, PhD; James Cook, DVM, PhD

- 10:41 AM - **PAPER 10**
10:47 AM **Endothelial Progenitor Cell (EPC) Therapy Combined with Local Antibiotics for the Treatment of Infected Nonunions in an Animal Model**
Ikran Ali, BSc; Stéphane Gagnon, BSc, MS;
Kalter Hali, BSc, MS; Omar Hassan, BSc;
Graeme Hoit, MD;
Emil Schemitsch, MD, FIOTA;
Aaron Nauth, MD

- 10:47 AM - **PAPER 11**
10:53 AM **Comparing the Efficacy of Common Irrigation Solutions on Biofilm Formed on Titanium Orthopaedic Implant Surfaces**
Logan Bateman, BS; Leah Gitajn, MD, MS;
Matthew C. Bond, BS; Jonathan T. Elliot, PhD;
Carey D. Nadell, PhD

- 10:53 AM - **PAPER 12**
10:59 AM **Characterization of Silver Carboxylate's Biocompatibility and Efficacy as an Antimicrobial Agent**
Dioscaris R. Garcia, PhD; Colin D. Whitaker;
Benjamin Stone; Liam Connolly;
Sai Siddharth Allu; Drew James Clippert;
Valentin Antoci, MD, PhD;
Christopher T. Born, MD, FIOTA

- 10:59 AM Discussion

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WEDNESDAY, CONTINUED

- 11:05 AM - **PAPER 13**
11:11 AM Preliminary Data Demonstrates that Antimicrobial Photodynamic Therapy Is Effective in Eradicating MRSA in a Rodent Model of Contaminated High-energy Open Fracture
Valentin Demidov, PhD;
Jonathan T. Elliott, PhD; Xinyue Han, PhD;
J. Scott Sottosanti, B.Eng;
Leah Gitajn, MD, MS
- 11:11 AM - **PAPER 14**
11:17 AM Proteomic Analyses of Peripheral Blood from Patients with Fracture-Related Infection Reveals Systemic Activation of the Complement and Coagulation Cascades
Kevin M. Becker, MD;
Roman M. Natoli, MD, PhD;
Ishani Sharma, BS; James Slaven, MS;
Sarah Malek, DVM, PhD; Emma Doud, PhD
- 11:17 AM - **PAPER 15**
11:23 AM Metaplasia of Cartilage to Bone During Fracture Healing Is Regulated In Part by mTOR
Kazuhiro Morioka, MD, PhD;
Ralph Marcucio, PhD; Charles Lam, BS;
Ko Chiba, MD, PhD; Leila Bagheri, PhD;
Diane Hu, MD; Theodore Miclau III, MD, FIOTA
- 11:23 AM - **PAPER 16**
11:29 AM Collagen X Biomarker Peaks During the Endochondral Phase of Fracture Repair with a Significant Temporal Correlation to Proteins Within the Osteogenic Pathway
Zachary M. Working, MD;
Chelsea S. Bahney, PhD; Anna Laura Nelson, MS;
Ryan Coghlan, BS; Kelsey M. O'Hara, BS;
Molly E. Czachor, BS; Justin E. Hellwinkle, MD;
Karalynn J. Lancaster, BS; Brian Johnstone, PhD;
Sheila Sprague, PhD; Nathan O'Hara, PhD;
Lauren Pierpoint, PhD; VitaShock Investigators; Gerard P. Slobogean, MD
- 11:29 AM Discussion
- 11:35 AM - **Head to 6C for Lunch Symposium**
11:40 AM

11:40 AM - **JOINT INDUSTRY LUNCH SESSION** (Room 6C)
12:40 PM

Sponsored by: **Zimmer Biomet**

11:45 AM - **Recognizing and Treating Infection in the Orthopaedic Trauma Patient**
12:35 PM

Infection is a serious issue for orthopaedic surgeons and their patients. In this presentation and through cases, Dr. Westrick will review treatment options for effectively addressing infection.

Edward Westrick, MD

12:45 PM - **SYMPOSIUM III: SRI - New Paradigms in Pain Management After Skeletal Trauma**
1:35 PM

Moderators: **Saam Morshed, MD, PhD**
Chelsea S. Bahney, PhD

12:45 PM **Overview**
Saam Morshed, MD, PhD

12:48 PM **Preclinical Models to Measure Pain**
Ann Marie Malfait, MD, PhD

12:58 PM **Molecular Mechanisms of Pain**
Allan Basbaum, PhD

1:08 PM **Measuring Pain: From Biometrics to PROs – What Is Useful; What Is Not**
Thomas Higgins, MD

1:18 PM **New Pain Management Concepts (Cannabis, Education Prior to Procedures, New Data on What Inhibits FX Repair)**
Joseph Hsu, MD

1:28 PM **Discussion**
All Faculty



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WEDNESDAY, CONTINUED

1:35 PM - **PAPER SESSION III:**
2:30 PM **Systemic Impact of Trauma**

Moderators: *Saam Morshed, MD, PhD*
Chelsea S. Bahney, PhD

1:35 PM - **PAPER 17**
1:41 PM **Lipidomic Analysis Reveals Global Lipid Profile Changes In a Porcine Model with Hemorrhagic Shock and Multiple Injuries**
Yannik Kalbas, MD; Yohei Kumabe, MD; Sascha Halvachizadeh, MD; Michel P.J. Teuben, PhD; Felix Karl-Ludwig Klingebiel, MD; Paolo Cinelli, PD, PhD; Roman Pfeifer, MD; Hans-Christoph Pape, MD, FIOTA

1:41 PM - **PAPER 18**
1:47 PM **Molecular Predictors of Mortality In Frail Patients with Hip Fractures**
Adeel Ikram, BMBS, MRCS; Amy Zhang, MB, BCh; Ana Valdes, MA, PhD; Ben Ollivere, FRCS, MD

1:47 PM - **PAPER 19**
1:53 PM **Defining the 'Second Hit': Does Intramedullary Nail Fixation of Femoral Shaft Fractures Hijack the Acute Phase Response in Severely Injured Patients?**
Leigh Campbell, MD; Jonathan Savakus, MD; JonCarlos Anderson, MS; Breanne Gibson, PhD; Phillip Mitchell, MD; Stephen Gondek, MD; Stephanie Moore-Lotridge, PhD; Jonathan Schoenecker, MD, PhD

1:53 PM - **PAPER 20**
1:59 PM **Cannabinoid-Induced Gene Expression Changes in a Spinal Fusion Model**
Kaveh Momenzadeh, MD; Diana Yeritsyan, BS; Nadim Kheir, MD; Mohammadreza Abbasian, MD; Edith Martinez Lozano, MD; Caleb Yeung, MD; Harold Fogel, MD; Ara Nazarian PhD, DrSc

1:59 PM Discussion



2:06 PM - **PAPER 21**
2:12 PM **Influence of Murine Hepatitis Virus on Systemic Inflammatory Response After Femur Fracture**
Ramkumar Tiruvannamalai Annamalai, PhD; Matthew Patrick, BS; Boshen Liu, MD; Arun Aneja, MD, PhD

2:12 PM - **PAPER 22**
2:18 PM **Noninvasive Fracture Healing Monitoring with Direct Electromagnetic Coupling**
Kirk C. McGilvray, PhD; Kevin Labus, PhD; Jakob Wolynski, PhD; Jeremiah Easley, DVM; Branislav Notaros, PhD; Milan Ilic, PhD; Christian Puttlitz, PhD

2:18 PM - **PAPER 23**
2:24 PM **Early Definitive Fracture Fixation Does Not Impair Neutrophil Homeostasis in Cardiopulmonary Compensated Polytrauma: A 72hr Porcine Observation Study**
Michel Teuben, PhD; Frank Hildebrand, MD; Klemens Horst, MD; Yannik Kalbas, MD; Luke Leenen, MD, PhD; Hans-Christoph Pape, MD, FIOTA; Roman Pfeifer, Prof., MD

2:24 PM Discussion

2:30 PM - **Break**
2:50 PM

WEDNESDAY, CONTINUED

2:50 PM - **SYMPOSIUM IV:**
3:40 PM **Muscular Injury in Orthopaedic Trauma**

Moderators: *Andrew Evans, MD*
Justin Haller, MD

2:50 PM **Overview**
Andrew Evans, MD;

2:52 PM **Implementation of VML in a Large Animal Model of Segmental Bone Defect**
Roman Natoli, MD, PhD

3:02 PM **The Muscle Paracrine Effect for Fracture Healing**
Augustine Saiz Jr., MD

3:12 PM **Cellular and Molecular Influences from Skeletal Muscle on Fracture Healing**
Joseph Wenke, PhD

3:22 PM **Animal Models in Compartment Syndrome Research: Trends and Future Directions**
Dillon O'Neill, MD

3:32 PM **Discussion**
All Faculty

3:40 PM - **PAPER SESSION IV:**
4:40 PM **Muscular Injury and Bone Healing**

Moderators: *Andrew Evans, MD*
Justin Haller, MD

3:40 PM - **PAPER 24**
3:46 PM **Tissue-Engineered Muscle Therapy Enhances Functional Recovery and Survival in Composite Lower Extremity Injury**
Karina Nakayama, PhD;
Zachary Working, MD; Cynthia Alcazar, PhD; Krista Habing, MS; Nick Willett, PhD; Anthony Tahayeri, MS; Luiz Bertassoni, PhD; Karina Nakayama, PhD; Victoria Duke, BS

3:46 PM - **PAPER 25**
3:52 PM **A Functional Rat Model of Upper Extremity Tourniquet-Induced Ischemia Reperfusion Injury**
Omar A. Selim, MBBCh, MSc;
Aida Sarcon, MD; Ichiro Tsukamoto, MD; Ramona Reisdorf, BSc; Chunfeng Zhao, MD; Steven L. Moran, MD

3:52 PM - **PAPER 26**
3:58 PM **Salt-Inducible Kinase Inhibitors as a Molecular Approach to Fracture Repair**
Kaveh Momenzadeh, MD;
Diana Yeritsyan, BS; Nadim Kheir, MD; Jinhua Wang, PhD; Mohammadreza Abbasian, MD; Edith Martinez Lozano, MD; Philip Hanna, MD; Mohamed Yousef, MD; Marc Wein, MD, PhD; Ara Nazarian PhD, DrSc

3:58 PM - **PAPER 27**
4:04 PM **Comparison of Reamer-Irrigator Aspirator (RIA) Autogenous Bone Graft versus Bone Marrow Aspirate Concentrate (BMC) In the Percutaneous Treatment of Long Bone Nonunions: A Canine Model**
Brett D. Crist, MD; *Kendrick Lam, MD; Chantelle Boyzinski, DVM, MSc; Cristi Cook, DVM; Will Bezold, MS; James L. Cook, DVM, PhD*

4:04 PM Discussion

4:10 PM - **PAPER 28**
4:16 PM **Investigating the Cellular Mechanism of Age-Related Stem Cell Dysfunction**
Philipp Leucht, MD; *Kevin Leclerc; Sophie Morgani; Malissa Ramsukh; Margaux Sambon*

4:16 PM - **PAPER 29**
4:22 PM **Accelerated Aging Murine Model Exhibits Elevated Systemic Senescence and Delayed Fracture Repair**
Chelsea S. Bahney, PhD;
Marc Philippon Jr, BA; Victoria Duke, BS; Kohei Yamura, MD, PhD; Herbert Kasler, PhD; Anna Laura Nelson, MS; Matt Huard, BA, Johnny Huard, PhD; William S. Hambright, PhD

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WEDNESDAY, CONTINUED

4:22 PM - **PAPER 30**
4:28 PM **A Radiographic and Micro-CT Analysis of the Effects of Cryopreserved Endothelial Progenitor Cells on Bone Healing in a Critical Size Bone Defect Animal Model**
Matthew Raleigh, MD; *Kalter Hali, BSc, MS; Stéphane Gagnon, BSc, MS; Ikran Ali, BSc; Emil H. Schemitsch, MD, FIOTA; Aaron Nauth, MD*

4:28 PM - **PAPER 31**
4:34 PM **Targeting Inflammatory Dysregulation with Senolytic Therapy to Address Delayed Fracture Healing in Accelerated Aging Murine Model**
Chelsea S. Bahney, PhD;
Marc Philippon Jr., BA; Victoria Duke, BS; Kohei Yamura, MD, PhD; Herbert Kasler, PhD; Anna Laura Nelson, MS; Matt Huard, BA, Johnny Huard, PhD; William S. Hambright, PhD; Dane Lind

4:34 PM Discussion

4:40 pm **Adjourn for the Day**

4:50 PM - **Please Attend the International Reception**
6:00 PM - **Level 4 - Atrium Lobby**



THURSDAY, OCTOBER 19



INTERNATIONAL
ORTHOPAEDIC
TRAUMA
ASSOCIATION

10:50 AM - **JOINT SESSION SYMPOSIUM (Hall 4B)**
11:50 AM **BSFF / ITCF / IOTA Symposium: Artificial Intelligence: International Perspectives on Critical Issues**

Moderators: *Meir Marmor, MD; Justin Haller, MD; Theodore Miclau III, MD, FIOTA*

10:50 AM **Overview**
Meir Marmor, MD

State of Technology: Artificial Intelligence in 2023

10:54 AM **Not Ready for Prime-time**
Yoram Weil, MD, FIOTA

11:00 AM **Implement It Today!**
Justin Krogue, MD

Surgical Decision-Making

11:06 AM **Artificial Intelligence Is the Answer**
Job Doornberg, MD

11:12 AM **Intelligence Augmentation Should Be the Focus**
Michiel Herteleer, MD, PhD

Artificial Intelligence Validation

11:18 AM **Accurate and Applicable**
Adam Starr, MD

11:24 AM **Flawed and Needs Improvement**
Hans-Christoph Pape, MD, FACS, FIOTA

11:30 AM Discussion
All Faculty

11:50 AM **Adjourn**



The Orthopaedic Trauma Association is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The Orthopaedic Trauma Association designates this live activity for a maximum of 8.25 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.