



Basic Science Focus Forum

Wednesday-Thursday

October 20 - 21, 2021

**Fort Worth Convention Center
Fort Worth, Texas**



Basic Science Committee

Aaron Nauth, MD *Chair*

Andrew Evans, MD, FACS

Justin Haller, MD

Michael Hast, PhD

Christopher Lee, MD

Saam Morshed, MD, PhD

Emil Schemitsch, MD

Andrew Trenholm, MD

John Wixted, MD



11.5 AMA PRA

Category I Credits™

2021 OTA Annual Meeting

October 20 - 23, 2021

#OTA2021

Schedule and presenters are subject to change.

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Basic Science Focus Forum

October 20 - 21, 2021
Fort Worth, Texas

Overview

The 2021 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 6 main symposia specifically designed to 'bridge the gap' between basic science and clinical practice, in addition to 29 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.

Wednesday, October 20
12:05 PM - 1:00 PM

International Industry Lunch Session

Sponsored by: **Zimmer Biomet**

Current Topics in Clavicle Fracture Management

Speaker: Anil Dutta, MD

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.

Symposia

- *Combined Session with International Trauma Forum: Management of (Aseptic) Non-unions and Severe Bone Defects: Let's Get This Thing Healed*
- *Post-Traumatic OA: From Basic Science to Clinical Implications*
- *Orthopaedic Infections: What Have We Learned?*
- *SRI Collaborative Session: Simple Design and Analysis Strategies for Solving Common Problems in Orthopaedic Clinic Research*
- *Other Symposia Topics Include: Biomechanics, Orthobiologics, and Fracture Healing*

Learning Objectives

Upon successful completion of this course, participants will be able to:

- ✓ Update knowledge in the basic science of orthopaedic trauma
- ✓ Demonstrate an improved understanding of the biomechanics of fracture fixation
- ✓ Understand the basic science and clinical implications of orthopaedic infections
- ✓ Explore the latest research on polytrauma from a basic science and clinical perspective
- ✓ Understand the basic science and clinical aspects of post-traumatic osteoarthritis
- ✓ Explore the latest basic and clinical research on enhancing fracture healing
- ✓ Understand the concepts around design and analysis in clinical research

Early Bird Registration
Until September 30.



OTA Member On/Before 9/30/21	OTA Member After 9/30/21	Non-Member On/Before 9/30/21	Non-Member After 9/30/21
\$250	\$350	\$350	\$450

Course Fee: \$250 \$350 \$350 \$450

Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Wednesday, October 20, 2021

7:30 AM - **Introduction**
7:35 AM Aaron Nauth, MD

7:35 AM - **Symposium I**
9:05 AM **Great Debates in Trauma Biomechanics**

Moderators: *Michael Hast, PhD*
Emil H. Schemitsch, MD

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

7:40 AM **Locked Plate vs. Forward Dynamization vs. Reverse Dynamization - Which Way Should I Go?**
(5 minutes per speaker)
Samir Mehta, MD
Utku Kandemir, MD
Vaida Glatt, PhD

7:55 AM Discussion

8:10 AM **Sawbones vs. Cadaver Models - What Should I Believe Most?**
Cory Collinge, MD
Michael Hast, PhD

8:20 AM Discussion

8:35 AM **Mechanics vs. Biology - Which is "More Important" to Consider?**
Robert O'Toole, MD
Ara Nazarian, PhD

8:50 AM Discussion



9:05 AM - **Paper Session I**
10:00 AM **Biomechanics**

Moderators: *Michael Hast, PhD*
Emil H. Schemitsch, MD

9:05 AM - **PAPER 1**
9:13 AM **Smart Fracture Plate Monitors Callus Stiffness**

Eric H. Ledet, PhD; Madelyn Stout; Sydney M. Caparaso; Keegan Cole MD; Benjamin Liddle, BS; Nathaniel Cady, PhD; Reena Dahle, PhD; Michael T. Archdeacon, MD, FAAOS

9:13 AM - **PAPER 2**
9:21 AM **A Biomechanical Comparison of Two Fixation Methods for Unstable Lateral Compression (AO/OTA 61B2) Pelvic Ring Injuries**

Eric Hempten, MD; Benjamin Matthew Wheatley, MD; Patrick Schimoler; Alexander Kharlamov, MD, PhD; Patricia Melvin, MD; Mark Carl Miller, PhD; Gregory T. Altman, MD; Daniel T. Altman, MD; Edward Ryan Westrick, MD

9:21 AM Discussion

9:28 AM - **PAPER 3**
9:36 AM **The Effect of Screw Fixation on Sacroiliac Joint Stiffness using Vibration Energy Color Doppler Imaging**

Caleb Gottlich, MD; Alex Stephen Drusch, MS; Thomas Githens, DO; Cyrus Theodore Caroom, MD; Phillip Spelman Sizer, PhD, PT

9:36 AM - **PAPER 4**
9:44 AM **Orthogonal Plating of Distal Femur Fractures: A Biomechanical Comparison with Plate-Nail and Parallel Plating Constructs**

Zoe Beatrice Cheung, MD; Philip Nasser, MS; James C. Iatridis, PhD; David Forsh, MD

Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Wednesday, continued

9:44 AM - **PAPER 5**
9:52 AM **A Biomechanical Comparison Between TightRope and Suture-Post Fixation: A Novel Technique**
Pierce Johnson, MD; Paulo Castaneda, MD; Robert Walker, MD; Tony K. Nguyen, MD; J. Tracy Watson, MD

9:52 AM Discussion

10:00 AM **Morning Break**

10:15 AM - **Symposium II**
11:07 AM **SRI Collaborative Session: Simple Design and Analysis Strategies for Solving Common Problems in Orthopaedic Clinic Research**

Moderators: **Saam Morshed, MD**
Gerard Slobogean, MD

10:15 AM **Overview**
Saam Morshed, MD

10:17 AM **Not a RCT? How Do We Get Causal Inference from Observational Data**
Renan Castillo, MD

10:27 AM **Confounding Bias and How to Best Adjust for It [Stratification, Matching, Regression, and PSA]**
Saam Morshed, MD

10:37 AM **The Power of Repeated Measures and Longitudinal Data [Longitudinal Regression, etc.]**
Gerard Slobogean, MD

10:47 AM **Handling Missing Data and Loss to Follow-up [Imputation, Time to Event Analysis, etc.]**
Herman Johal, MD, PhD

10:57 AM Discussion

11:07 AM - **Paper Session II**
12:00 PM **Quantifying Fracture Healing**

Moderators: **Saam Morshed, MD**
Emil H. Schemitsch, MD

11:07 AM - **PAPER 6**
11:15 AM **A Short Course of Dehydroepiandrosterone is Associated with Accelerated Fracture Healing in a Mouse Fracture Model**
David Kirby, MD; Daniel B. Buchalter, MD; Cyrus Luczkow; John Frederick Dankert, MD; Devan Mehta, MD; Philipp Leucht, MD

11:15 AM - **PAPER 7**
11:23 AM **Adult Collagen X Fracture Biomarker Levels Demonstrate Early Peak After Fracture to Match Preclinical Model**
Zachary Mark Working, MD;
Kaitlyn E. Whitney, BS;
Justin Hellwinkel, MD, MSc;
Lauren Pierpoint; Ryan Coghlan;
Darin M. Friess, MD; Theodore Miclau, MD;
William Horton, MD; Brian Johnstone, PhD;
Chelsea S. Bahney, PhD

11:23 AM Discussion

11:29 AM - **PAPER 8**
11:37 AM **Novel Profiling Method to Detect Hypoxia Biomarker After Cold Therapy at Bone Injury Site**
Matthew Zakaria, BS, MSc;
Yazan Honjol, BA, MD;
Drew Schupbach, MD, BS; Géraldine Merle;
Edward J. Harvey, MD, MSc

11:37 AM - **PAPER 9**
11:45 AM **Three-dimensional Ultrasound Reconstruction of Sonographic Callus: A Novel Imaging Modality for Early Evaluation of Fracture Healing**
Jamie A. Nicholson, MBChB, MRCSed;
William M. Oliver, MBBS, MRCSed;
Tom MacGillivray, PhD;
Christopher M. Robinson, MD;
Hamish Robert Wallace Simpson, ChB, DMed, MA, MB

Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Wednesday, continued

11:45 AM - **PAPER 10**
11:53 AM **Advanced Imaging Evaluation of Distal Radius Fractures Using FE Analysis of HR-pQCT**
Phillip John Curtis Spanswick, MSc; Mohammad Salem, PhD; Danielle Whittier, BS; Robert Korley, MD; Steven Boyd; Prism Schneider, MD, PhD

11:53 AM Discussion

12:00 PM **Proceed to Ballroom C**

12:05 PM - **BSFF/ITCF Combined Industry Lunch**
1:57 PM



Current Topics in Clavicle Fracture Management

Speaker: **Anil Dutta, MD**

Box Lunch Provided by OTA

1:00 PM **Return to Meeting Room 201AB**

1:05 PM - **Symposium III**
1:57 PM **Orthopaedic Infections: What Have We Learned?**

Moderator: **Christopher Lee, MD**

1:05 PM **Overview**
Christopher Lee, MD

1:07 PM **Host Modulation in Infection Prevention**
Nicholas Bernthal, MD

1:17 PM **Race to the Surface – Orthopaedic Implants and Infection**
Joseph Wenke, PhD

1:27 PM **PO vs. IV Antibiotics in Orthopaedic Infections**
Paul Holtom, MD

1:37 PM **Antibiotic Powder Use in Orthopaedic Infection and Prevention – Current Concepts**
Robert V. O’Toole, MD

1:47 PM Discussion

1:57 PM - **Paper Session III**
2:52 PM **Infection, Scaffolds and Osteoporosis**

Moderator: **Christopher Lee, MD**

1:57 PM - **PAPER 11**
2:05 PM **A Micro-CT and Biomechanical Analysis of the Effects of Intra-Wound Vancomycin Powder on Infection and Bone Healing in a Rat Model**
Ikran Ali; Charles Godbout, PhD; Hening Sun, BS; Graeme Hoit, MD; Emil H. Schemitsch, MD; Aaron Nauth, MD

2:05 PM - **PAPER 12**
2:13 PM **Microgel-Enhanced Delivery of Adenosine to Accelerate Fracture Healing**
Shyni Vargheese, PhD; Jiaul Hoque, PhD; Mark Gage, MD

2:13 PM Discussion

2:20 PM - **PAPER 13**
2:28 PM **Human Mesenchymal Stromal Subcellular Compositions Depends on Bone Mass Density: A Single Cell Level Study by Mass Cytometry**
Benjamin Eggerschwiler; Elisa Anna Casanova; Daisy Canepa, MSc; Sascha Halvachizadeh, MD; Georg Osterhoff, MD; Yannik Kalbas; Hans-Christoph Pape, MD; Paolo Cinelli, PhD

2:28 PM - **PAPER 14**
2:36 PM **Bone Targeting Nanocarrier-Assisted Delivery of Adenosine to Treat Osteoporotic Bone Loss**
Shyni Vargheese, PhD; Jiaul Hoque, PhD; Mark Gage, MD

2:36 PM - **PAPER 15**
2:44 PM **Thrombelastography Platelet Mapping Identifies Platelet-mediated Hypercoagulability Following a Hip Fracture**
Prism Schneider, MD, PhD; Daniel You, MD; Andrew Dodd, MD; Paul James Duffy, MD; Ryan Martin, MD; Robert Korley, MD

2:44 PM Discussion

2:52 PM **Afternoon Break**

Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Wednesday, continued

- 3:05 PM - **Symposium IV**
3:57 PM **Post-Traumatic OA: From Basic Science to Clinical Implications**
- Moderators: *Justin Haller, MD*
Andrew Trenholm, MD
- 3:05 PM **Overview**
Justin Haller, MD
- 3:07 PM **Role of Bone Remodeling in PTOA Development**
Marjolein van der Meulen, PhD
- 3:17 PM **Assessing Mechanical Variables that Impact PTOA Development and Outcome**
Donald D. Anderson, PhD
- 3:27 PM **Influence of Inflammatory Cytokines on the Pathogenesis of PTOA**
Steven Olson, MD
- 3:37 PM **Biologic Enhancements for the Prevention of PTOA**
J. Lawrence Marsh, MD
- 3:47 PM Discussion

3:57 PM - **Paper Session IV**
4:52 PM **Infection, Scaffolds and Osteoporosis**

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

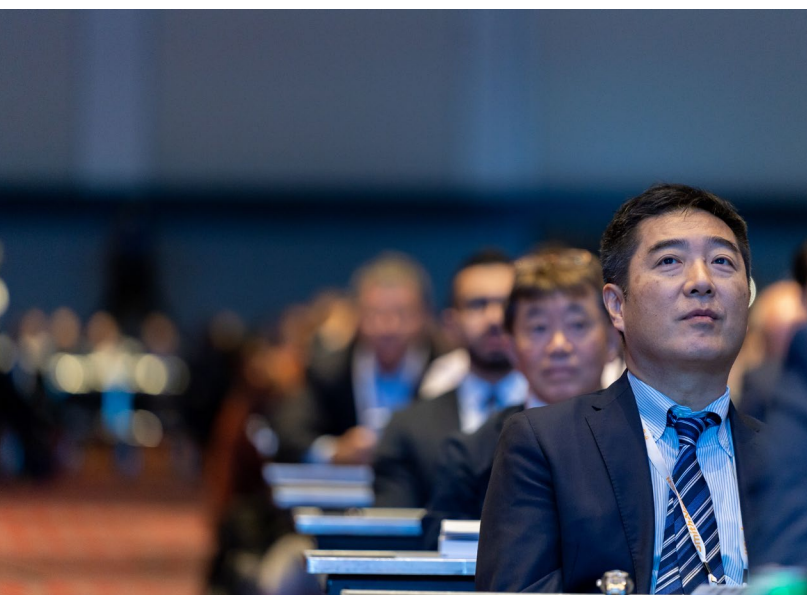
- 3:57 PM - **PAPER 16**
4:05 PM **Greater Acute Articular Inflammatory Response in Tibial Plafond Fractures as Compared to Rotational Ankle Fractures**
Lucas Scott Marchand, MD;
David Lynn Rothberg, MD;
Thomas F. Higgins, MD; Justin Haller, MD

- 4:05 PM - **PAPER 17**
4:13 PM **Articular Fragment Restoration is Critical to Mitigate Post-traumatic Osteoarthritis in a Porcine Pilon Fracture Model**
Graham John Dekeyser;
Richard Tyler Epperson; Dustin Williams, PhD;
Aaron L. Olsen, DVM, PhD; Justin Haller, MD

4:13 PM Discussion

- 4:20 PM - **PAPER 18**
4:28 PM **Articular Fracture Increases Inflammatory Chondrocyte Gene Expression more than Compression with a High Synovitis Co-culture Model**
Megan Libke;
Daniel Joseph Cunningham, MD;
Bridgette D. Furman, BS;
Virginia Byers Kraus, PhD;
Farshid Guilak, PhD; Amy L. McNulty, BS, PhD;
Steven A. Olson, MD

- 4:28 PM - **PAPER 19**
4:36 PM **Combination of lidocaine and IL-1Ra Is Effective at Reducing Degradation of Porcine Cartilage Explants**
Michael W. Buchanan, BS;
Bridgette D. Furman, BS;
Amy L. McNulty, BS, PhD;
Steven A. Olson, MD



Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Wednesday, continued

- 4:36 PM - **PAPER 20**
4:44 PM **Systemic Glucose-Insulin-Potassium Reduces Skeletal Muscle Injury, Kidney Injury, and Pain in a Murine Ischemia-Reperfusion Model**
Daniel B. Buchalter, MD; David Kirby, MD; Devan Mehta, MD; John Frederick Dankert, MD; Kenneth A. Egol, MD; Sanjit R. Konda, MD; Philipp Leucht, MD
- 4:44 PM Discussion
- 4:52 PM Adjourn for the Day

Please attend the International Reception on Level 2 - Ballroom Lobby



Thursday, October 21, 2021

Basic Science Focus Forum and International Trauma Care Forum will have their combined symposium in Ballroom C

- 7:30 AM - **Introduction**
7:35 AM **Aaron Nauth, MD**

7:35 AM - **Joint Session - Symposium V**
8:35 AM **Management of (Aseptic) Non-unions and Severe Bone Defects: Let's Get This Thing Healed!**

Moderators: **Aaron Nauth, MD**
Hans-Christoph Pape, MD

- 7:35 AM **The Basic Science of Nonunion Etiology**
Brett Crist, MD
- 7:45 AM **Induced Membrane Technique for Nonunion Management**
Peter Giannoudis, MD
- 7:55 AM **Biological Treatments for Nonunions: Bone Graft Types and Distraction Osteogenesis**
Martin Poeze, MD
- 8:05 AM **Outlook of Documentation Options: The New AO Registry Initiative**
Hans-Christoph Pape, MD
- 8:15 AM **Putting It All Together: A Comprehensive Approach to Nonunion Management**
Aaron Nauth, MD
- 8:25 AM Discussion

- 8:35 AM **Break/Proceed to Meeting Room 201 AB**

Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Thursday, continued

8:45 AM - **Paper Session V**
9:40 AM **Polytrauma and Compartment Syndrome**

Moderator: **Aaron Nauth, MD**

8:45 AM - **PAPER 21**
8:53 AM **Post-Traumatic Inflammatory Load: IL-6 and IL-8 Levels, Associated Potential Surrogate Markers and Regression Analysis for Impact of Various Injury Properties**
Dennis K. Rono, MBCHB, MMED

8:53 AM - **PAPER 22**
9:01 AM **Lipidomic Analysis in a Porcine Polytrauma Model Show Significant Posttraumatic Changes to the Circulating Lipid Profile**
Yohei Kumabe, MD; Yannik Kalbas; Sascha Halvachizadeh, MD; Thorsten Hornemann, PhD; Roman Pfeifer, MD; Paolo Cinelli, PhD; Hans-Christoph Pape, MD

9:01 AM Discussion

9:09 AM - **PAPER 23**
9:17 AM **Protective Effects of New Femoral Reaming Techniques (Reamer Irrigator Aspirator, RIA I and II) on Pulmonary Function and Posttraumatic Contusion (CT Morphology) - Results from a Standardized Large Animal Model**
Sascha Halvachizadeh, MD; Michel Paul Johan Teuben, MD, MSc; Yannik Kalbas; Nikola Cesarovic, DVM, PhD; Paolo Cinelli, PhD; Roman Pfeifer, MD; Hans-Christoph Pape, MD

9:16 AM - **PAPER 24**
9:24 AM **In vivo Intramuscular pH in Tibia Fractures is Acidic But Normalizes After Stabilization & Resuscitation**
Loren O. Black, MD, MBA; Megan Catherine Rushkin, MPH; Emelia Soddors, MS; Jeffrey Samuel Cheesman, MD; James E. W. Meeker, MD; Jung U. Yoo, MD; Darin M. Friess, MD; Zachary Mark Working, MD

9:24 AM - **PAPER 25**
9:32 AM **Pre-Clinical Acute Compartment Syndrome with a Porcine Continuous Measurement Model**
Yazan Honjol, BA, MD; Rachel Monk; Drew Schupbach, MD, BS; Géraldine Merle; Edward J. Harvey, MD, MSc

9:32 AM Discussion

9:40 AM - **Symposium VI**
10:32 AM **Fracture Healing - Orthobiologics: From Basic Science to Clinical Application**

Moderators: **Andrew Evans, MD**
John Wixted, MD

9:40 AM **Overview**
Andrew Evans, MD

9:42 AM **Basic Science Pathways for Pharmacologic Approaches to Enhancing Fracture Repair**
Ralph Marcucio, PhD

9:52 AM **Translational Challenges in Fracture Repair - What the FDA Needs to See**
Doug Dirschl, MD

10:02 AM **Study Design Tactics that Optimize the Potential for Clinical Translation of Basic Science Research**
Joseph Johnson, MD

10:12 AM **Candidate Basic Science Pathways as Potential Targets for Clinical, Surgical, and Orthobiologics Modification**
Jaimo Ahn, MD, PhD

10:22 AM Discussion

Basic Science Focus Forum

October 20 - 21, 2021 • Fort Worth, Texas

Thursday, continued

10:32 AM - **Paper Session VI**
11:15 AM **Fracture Healing:
Cells and Bone Grafting**

Moderators: *Andrew Evans, MD*
John Wixted, MD

10:32 AM - **PAPER 26**
10:40 AM **Biomimetic Hematoma: Novel Carrier
Delivers Extremely Low Dose rhBMP-2
for Highly Effective Healing of Large Bone
Defects in Goats**
Vaida Glatt, PhD; Anna Woloszyk;
Animesh Agarwal, MD

10:40 AM - **PAPER 27**
10:48 AM **Short Platelet Rich Plasma Exposure
Induces a Priming Effect on the
Biophysiological Potency of Bone Marrow
Mesenchymal Stem Cells in Human**
James Vun, MBCHB, MRCSed;
Paul Harwood, FRCS (Ortho), MSc;
Jehan Jomaa El-Jawhari, MBCHB, MSc, PhD;
Elena Jones, PhD;
Peter Giannoudis, MD, BS, MBBS

10:48 AM - **PAPER 28**
10:56 AM **Bone Graft Composition with RIA from
a Native vs. Previously Reamed Long Bone
for bone graft harvest?**
Stephanie N. Moore-Lotridge, PhD;
Cesar Cereijo, DO; Sam Robert Johnson, BS;
Jonathan G. Schoenecker, MD;
Cory Alan Collinge, MD;
William T. Obremskey, MD, MPH

10:56 AM - **PAPER 29**
11:04 AM **Comparison of Reamer-Irrigator-Aspirate
(RIA) to Bone Marrow Aspirate
Concentrate (BMC) for Osteoprogenitor
Cell Retention and Osteoinductive Protein
Release on Cancellous Bone**
Brett D. Crist, MD;
Aaron Michael Stoker, MS, PhD;
Jane Liu, MD; James P. Stannard, MD;
James L. Cook, DVM, PhD

11:04 AM Discussion

11:12 AM **Adjourn to Industry Symposia**



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 11.5 AMA PRA Category 1 Credits™.

Physicians should claim only the credit commensurate with the extent of their participation in the activity.

