



BASIC SCIENCE FOCUS FORUM

Wednesday-Thursday
September 30 – October 1, 2020



Basic Science Committee
Aaron Nauth, MD *Chair*
Andrew R. Evans, MD, FACS
Justin Haller, MD
Michael W. Hast, PhD
Christopher Lee, MD
Saam Morshed, MD
Emil H. Schemitsch, MD
John J. Wixted, MD



11 AMA PRA
Category I Credits™

Music City Center
Nashville, Tennessee

Details & Registration:
ota.org

2020 OTA
ANNUAL MEETING
September 30 –
October 3, 2020

#sneakpeekNashville



OVERVIEW

The 2020 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 six 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, September 30
11:35 am - 12:30 pm

INTERNATIONAL INDUSTRY LUNCH SESSION

Sponsored by: **Zimmer Biomet**

A.L.P.S.® Clavicle Plating System

Speaker (tentative): Paul Kiritsis, 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: Polytrauma: Update on Basic Science and Clinical Evidence*
- *Post-Traumatic Osteoarthritis: 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 August 31.



	OTA Member On/Before 8/31/20	OTA Member After 8/31/20	Non-Member On/Before 8/31/20	Non-Member After 8/31/20
Course Fee:	\$250	\$350	\$350	\$450

BASIC SCIENCE FOCUS FORUM

September 30 – October 1, 2020 🎵 Nashville, Tennessee

WEDNESDAY, September 30, 2020

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

7:35 AM - **SYMPOSIUM I**
8:35 AM **Great Debates in Trauma Biomechanics**

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

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

7:38 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

7:53 AM Discussion

8:01 AM **Sawbones vs. Cadaver Models - What Should I Believe Most?**
Christopher Birch, MD
Michael Hast, PhD

8:11 AM Discussion

8:18 AM **Mechanics vs. Biology - Which is "More Important" to Consider?**
TBD
Ara Nazarian, PhD

8:28 AM Discussion



8:35 AM - **PAPER SESSION I**
9:25 AM **Biomechanics**
Moderators: *Michael Hast, PhD*
Emil H. Schemitsch, MD

8:35 AM - **PAPER 1**
8:43 AM **Reverse Dynamization Accelerated Bone Healing in a Goat Osteotomy Model**
Vaida Glatt, PhD; Mikhail Samchukov, MD; Alexander Cherkashin, MD; Christopher August lobst, MD

8:43 AM - **PAPER 2**
8:51 AM **"Stress Taper" Strategy in Plate Fixation Increases Failure Strength in a Cadaveric Femur Model**
Jeremy Raducha, MD; Christopher Nacca, MD; Joseph Crisco, PhD; Andrew R. Evans, MD

8:51 AM - **PAPER 3**
8:59 AM **Evaluation of Intramedullary Olecranon Screw Fixation for Simple Olecranon Fractures: A Biomechanical Study**
Kelly McKnight, MD; Tysen Timmer, MD; Mikayla Forness; Alexander Chong, MSAE, MSME; Gorden David Potter, MD

8:59 AM - **PAPER 4**
9:07 AM **The Effect of Proximal Tibiofibular Joint Dislocation on Knee Mechanics: Reduction and Fixation Matters**
Erik Arthur Magnusson, MD; Scott Telfer, PhD; Kate Parker; Mia S. Hagen, MD; Michael Githens, MD; Reza Firoozabadi, MD

9:07 AM - **PAPER 5**
9:15 AM **Patella Fracture Fixation: A Biomechanical Comparison of Cannulated Screws and Anterior Tension Band with Low-Profile, Multiplanar Mesh Plating**
Brittany E. Homcha, MD; Trevin Cowman, BA; Madison Lynn Goss, BS; Gregory S. Lewis, PhD; J. Spence Reid, MD; Matthew Robert Garner, MD

9:15 AM Discussion

9:25 AM **Morning Break**

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WEDNESDAY, continued

9:45 AM - 10:45 AM **SYMPOSIUM II**
SRI Collaborative Session:
Simple Design and Analysis Strategies
for Solving Common Problems in
Orthopaedic Clinic Research

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

9:45 AM **Overview**
Saam Morshed, MD

9:50 AM **Not a RCT? How Do We Get Causal**
Inference from Observational Data
Renan Castillo, MD

10:00 AM **Confounding Bias and How to Best**
Adjust for It [Stratification, Matching,
Regression, and PSA]
Saam Morshed, MD

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

10:20 AM **Handling Missing Data and Loss to**
Follow-up [Imputation, Time to Event
Analysis, etc.]
Herman Johal, MD, PhD

10:30 AM Discussion

10:45 AM - 11:27 AM **PAPER SESSION II**
Quantifying Fracture Healing

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

10:45 AM - 10:53 AM **PAPER 6**
Are Bone Turnover Markers Useful
Surrogate Measures of Fracture Healing
After Intramedullary Fixation of Tibia and
Femur Fractures?

Gerard Slobogean, MD, MPH, FRCSC;
Nathan N. O'Hara, MHA; Zachary Hannan, BS;
Sofia Bzovsky, MSc; Jonathan Derrick Adachi;
Christopher Stewart, BA;
Chelsea S. Bahney, PhD; Sheila Sprague, PhD;
Vita-Shock Investigators



10:53 AM - 11:01 AM **PAPER 7**
mRUST Scores Can Describe Boney Union,
But Can They Predict Patient Function
and Pain?

Eric J. Abbenhaus, MD;
Gavin Santini Hautala;
Josh Van Wyngaarden, DPT, PT;
Cale Jacobs, PhD; Brian Noehren, PT, PhD;
Paul Edward Matuszewski, MD

11:01 AM - 11:09 AM **PAPER 8**
Local Infiltrative Analgesia of Murine
Femur Fractures in Vivo Does Not Inhibit
Fracture Healing

Andrew Farley Tyler, MD, PhD;
Jaimo Ahn, MD, PhD;
Derek James Donegan, MD

11:09 AM - 11:17 AM **PAPER 9**
Hemorrhagic Shock Affects Specific
Immune Cell Populations in Early Fracture
Callus

George Kolettis, MD; Kayla Delaney, BS;
Jie Xie, MD, PhD; Jared A. Smith;
Fletcher A. White, MS, PhD;
Roman Natoli, MD; Todd Owen McKinley, MD

11:17 AM Discussion

11:27 AM **Break for Lunch**
Proceed to Room 106 ABC

11:35 AM - 12:30 PM **JOINT INDUSTRY LUNCH**



Solutions for the Treatment of
Humeral Fractures

Speaker (tentative): **TBD**
Box Lunch Provided by OTA

12:30 PM **Return to Room 207AB**

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WEDNESDAY, continued

12:35 PM - **SYMPOSIUM III**
1:35 PM **Orthopaedic Infections:
What Have We Learned?**

Moderator: *Christopher Lee, MD*

- 12:35 PM **Overview**
Christopher Lee, MD
- 12:40 PM **Host Modulation in Infection Prevention**
Nicholas Bernthal, MD
- 12:50 PM **Race to the Surface –
Orthopaedic Implants and Infection**
Joseph Wenke, PhD
- 1:00 PM **PO vs. IV Antibiotics in Orthopaedic
Infections**
Paul Holtom, MD
- 1:10 PM **Antibiotic Powder Use in Orthopaedic
Infection and Prevention – Current Concepts**
Robert V. O'Toole, MD
- 1:20 PM Discussion

1:35 PM - **PAPER SESSION III**
2:25 PM **Infection and Fracture Healing**
Moderator: *Christopher Lee, MD*

- 1:35 PM - **PAPER 10**
1:43 PM **Local Antibiotic Delivery via Calcium
Sulfate for Orthopaedic Infections**
*Ashley Levack, MD; Daniel Driscoll, MD;
Kathleen Turajane, BS;
Ajay Premkumar, MD, MPH; Xu Yang, MD;
Andy Miller, MD; Mathias P.G. Bostrom, MD;
David Wellman MD;
Alberto V. Carli, MD, MSc, FRCSC*

- 1:43 PM- **PAPER 11**
1:51 PM **Computational Analysis and Visualization
of Biofilm Development on Implant
Materials**
*Adrian Turcu, BA; Ellis Berns, BS;
Caitlin Barrett; Carole Spake, MS;
Jacqueline Leong, BA;
Christopher T. Born, MD;
Dioscaris R. Garcia, PhD*

- 1:51 PM - **PAPER 12**
1:59 PM **Zapping Deep Tissue Infection with a
Fast Setting Biodegradable Hydrogel**
*Yazan Honjol, BA, MD; Daniela Vieira, MSc;
Samuel Angel, MSc;
Edward J. Harvey, MD, MSc, FRCSC;
Géraldine Merle*

- 1:59 PM - **PAPER 13**
2:07 PM **The Induced Membrane Technique:
Effects of Antibiotic-Impregnated
Spacers on Healing of a Critical-Size
Femoral Defect in a Rat Model**
*Hening Sun, BS; Charles Godbout, PhD;
Gareth Ryan, BS; Ikran Ali;
Emil H. Schemitsch, MD; Aaron Nauth, MD*

- 2:07 PM - **PAPER 14**
2:15 PM **Skeletal Muscle Autografting Improves
Bone Healing In Pigs with Segmental
Bone Defects and Volumetric Muscle Loss**
*Roman Natoli, MD; Benjamin Corona, PhD;
Alexander Brinker, BS;
Caio De Andrade Staut, MD;
Stephen K. Mendenhall;
Melissa Kacena, PhD;
Todd Owen McKinley, MD*

2:15 PM Discussion

2:25 PM - **PAPER SESSION IV**
3:25 PM **Polytrauma**
Moderator: *Aaron Nauth, MD*

- 2:25 PM - **PAPER 15**
2:33 PM **Inflammatory Cytokines Provide Unique
Predictive Value Beyond Injury Severity:
A Prospective Cohort Study of
Orthopaedic Trauma Patients**
*Arun Aneja, MD; David C. Landy, MD;
Alejandro Marquez-Lara, MD, PhD;
Boshen Liu, MD; Peter Mittwede, MD, PhD;
Shea Comadoll, MD; George V. Russell, MD*

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WEDNESDAY, continued

2:33 PM - **PAPER 16**
2:41 PM **Systemic Neutrophil Homeostasis Is Not Affected by Reaming Techniques for Intramedullary Nailing in a Standardized Porcine Polytrauma Model**
Michel Teuben; Sascha Halvachizadeh, MD;
Yannik Kalbas; Zhi Qiao;
Nikola Cesarovic, DVM, PhD;
Paolo Cinelli, PhD; Roman Pfeifer, MD;
Hans-Christoph Pape, MD;
TREAT Research Group

2:41 PM Discussion

2:51 PM - **PAPER 17**
2:59 PM **Individual Hypercoagulable and Inflammatory Response Following Surgical Fixation of Femur Fractures**
Daniel You, MD; Robert Korley, MD;
Paul James Duffy, MD; Ryan Martin, MD;
Richard E. Buckley, MD;
Andrea Soo MSc, PhD;
Prism Schneider, MD, PhD, FRCSC

2:59 PM - **PAPER 18**
3:07 PM **Possible Therapeutic Application of CORM-3-Derived Carbon Monoxide in Acute Limb Compartment Syndrome**
Patrick Wang, MD;
Abdel-Rahman Lawendy, FRCS;
Emil H. Schemitsch, MD;
Aurelia Bihari, MSc, PhD

3:07 PM - **PAPER 19**
3:15 PM **Ischemia-Reperfusion (I/R)-Induced Effects During Resuscitative Balloon Occlusion of the Aorta (REBOA): How Does the Zone of Occlusion Affect Extremities and Truncal Perfusion?**
Sascha Halvachizadeh, MD; Yannik Kalbas;
Ladislav Mica, MD, PhD; Miriam Lipiski, DVM;
Zoran Rancic, MBA, MD, MSc, PhD;
Valentin Neuhaus, MD;
Hans-Christoph Pape MD; Roman Pfeifer, MD

3:15 PM Discussion

3:25 PM **Break**
Proceed to Room 106 ABC

3:40 PM - **SYMPOSIUM IV– JOINT SESSION** 4:45 PM **Polytrauma: Update on Basic Science and Clinical Evidence**

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

3:40 PM **Polytrauma: What is True and What is New?**
Hans-Christoph Pape, MD

3:50 PM **The Significance of Inflammation in Polytraumatized Patients**
Todd McKinley, MD

4:00 PM **Early Neutrophil Changes in Polytrauma Patients and its Prognostic Relevance**
Luke PH Leenen, MD, PhD, FACS

4:10 PM **Management of Major Fractures in Polytrauma, What Does the Clinical Literature Tell Us?**
Frank Hildebrand, MD

4:20 PM **Putting it all Together, When You Should Intervene Based on What We Know Now!**
Heather Vallier, MD

4:30 PM Discussion

4:45 PM Adjourn for the Day

4:50 PM - **INTERNATIONAL RECEPTION**
6:00 PM (Davison BR Foyer)
With special thanks and support from

3M + KCI™



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THURSDAY, October 1, 2020

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

7:35 AM - **SYMPOSIUM V** 8:25 AM **Post-Traumatic Osteoarthritis: From Basic Science to Clinical Implication**

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

7:35 AM **Overview**
Justin Haller, MD

7:40 AM **Basic Science of Cartilage Injury
and Repair**
Farshid Guilak, MD

7:48 AM **Assessing Mechanical Variables that
Impact PTOA Development and Outcome**
Donald Anderson, PhD

7:56 AM **Influence of Inflammatory Cytokines on
the Pathogenesis of PTOA**
Steven Olson, MD

8:04 AM **Biologic Enhancements for the
Prevention of PTOA**
J. Lawrence Marsh, MD

8:12 AM Discussion

8:25 AM - **PAPER SESSION V** 9:15 AM **Post-traumatic Osteoarthritis** Moderators: *Justin Haller, MD* *Andrew Trenholm, MD*

8:25 AM - **PAPER 20**
8:33 AM **Articular Fracture in the Knee of
T-Cell-Deficient Mice Results in More
Severe Posttraumatic Arthritis**
Michael W. Buchanan, BS;
Bridgette D. Furman, BS; Jacob Zeitlin;
Janet L. Huebner; John Yi, PhD;
Virginia Byers Kraus, PhD;
Steven A. Olson, MD

8:33 AM - **PAPER 21**
8:41 AM **The Intra-Articular Hematoma Immediately
after Ankle Fracture Causes Cartilage
Damage that is Partially Attenuated by
Anti-Inflammatory Agents**
Nicholas Allen; Bijan Abar, BS;
Samuel Bruce Adams, MD

8:41 AM - **PAPER 22**
8:49 AM **Protection and Prevention of Cartilage
Damage in Rat Knee Osteoarthritis by
Arnebia Euchroma Extract**
Soheil Ashkani Esfahani, MD;
Bart Lubberts; Rohan Bhimani, MBBS

8:49 AM - **PAPER 23**
8:57 AM **Prophylactic Vitamin C for Immobilized
Shoulder Joints in Rats - An in-vivo Model**
Oscar Feusi; Hans-Christoph Pape, MD;
Paolo Cinelli, PhD; Simon Tiziani

8:57 AM - **PAPER 24**
9:05 AM **Phosphodiesterase-5 Inhibition Improves
Bone Regeneration at Early Stages of
Traumatic Avascular Necrosis of the
Femoral Head in Rats**
Andre Luiz Campos Pessoa, Dr;
Victor Hugo Vieira De Oliveira Araujo, MSc;
Ana Lucia Rosa Nascimento, MSc;
Nelson Elias; Jorge José De Carvalho, PhD

9:05 AM Discussion

9:15 AM **Morning Break**



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THURSDAY, continued

9:25 AM - 10:15 AM **SYMPOSIUM VI**
**Enhancing Fracture Healing:
Basic Science, Clinical Evidence and
Technical Tricks**

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

9:25 AM **Overview**

9:30 AM **TBD**

9:38 AM **TBD**

9:46 AM **TBD**

9:54 AM **TBD**

10:02 AM Discussion

10:15 AM - 11:05 AM **PAPER SESSION VI**
Fracture Healing: Cells and Bone Grafting

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

10:15 AM - 10:23 AM **PAPER 25**
**Discordant Effects of Non-Steroidal
Anti-Inflammatory Drugs on Human and
Mouse Skeletal Stem Cells from
Acute Fractures**

Lawrence Henry Goodnough, MD;
Thomas Han Ambrosi, MSc, PhD;
Holly Steininger, BS; Julius A. Bishop, MD;
Michael J. Gardner, MD;
Charles K.F. Chan, PhD

10:23 AM - 10:31 AM **PAPER 26**
**The Effluent of Autologous Bone Graft
Preparations Is a Good Source for
Skeletal Stem Cells, Which Are Markedly
Different from Mesenchymal Stromal Cells**
Kimberly Ann Grannis, MD;
Mark A. Lee, MD; Fernando A. Fierro, PhD;
Bryan Le; Wei Yao, MD

10:31 AM - 10:39 AM **PAPER 27**
**Effects of TXA on Human Osteoblasts as
Proxy for Fracture Healing**
William D. Rieger, BA;
Adam Yoonjin Park, MD;
James F. Kellam, MD, FRCSC;
Catherine G. Ambrose, PhD

10:39 AM - 10:47 AM **PAPER 28**
**Atrophic Nonunions are Associated with
Functional Defects in Human Skeletal
Stem Cells**
Lawrence Henry Goodnough, MD;
Thomas Han Ambrosi, MSc, PhD;
Julius A. Bishop MD; Michael J. Gardner, MD;
Charles K.F. Chan, PhD

10:47 AM - 10:55 AM **PAPER 29**
**What Happens on the Back Table?
Viability and Osteogenic Potential of RIA
Bone Graft as a Function of Time and
Temperature**
Adam Hadley Kantor, MD;
William James Uffmann, MD;
Lucas Scott Marchand, MD;
Justin Haller, MD; Thomas F. Higgins, MD;
David Lynn Rothberg, MD

10:55 AM Discussion

11:05 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 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.