BASIC SCIENCE FOCUS FORUM

2015 Basic Science Committee
Edward J Harvey, MD, Chair
Mohit Bhandari, MD; Joseph Borrelli Jr, MD;
Todd O McKinley, MD; Aaron Nauth, MD;
Emil H Schemitsch, MD; Brett D Crist, 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.

Attendees of this activity can earn up to
11.5 AMA PRA Category 1 Credits™

Objectives
Upon successful completion of the Basic Science Focus Forum,
you will be able to:
• Understand the complex physiological issues associated
  with polytrauma patients
• Comprehend the changing treatment and diagnostic
  parameters for critical size bone defects
• Recognize the best indications for absolute or relative
  fixation in fracture management
• Review the biomechanical principals in directed fixation for
  controversial fractures and subluxations
• Appreciate what other musculoskeletal conditions we need
  to treat in trauma
• Identify how research may change your practice

Wednesday, October 7, 2015
6:30 am Registration
7:30 am Introduction
Edward J Harvey, MD, Program Chair

7:35 am - 8:45 am Symposium 1
Management of Polytraumatized Patients with Severe Wounds
Moderators: Todd O McKinley, MD
Timothy Billiar, MD
7:35 am Measuring Patient-Specific Mechanical and Ischemic Tissue Injury in Multiply Injured Patients
Greg E Gaski, MD
7:50 am Restoring Functional Muscle in Severe Wounds with Volumetric Muscle Loss
Benjamin Corona, PhD

8:05 am Characterizing Molecular and Inflammatory Pathways in Severe Soft Tissue Wounds
Eric Elster, MD
8:20 am Computational Biologic Approaches to Understanding Clinical Outcomes in Multiply Injured Patients
Yoram Vodovozt, PhD
8:35 am Discussion

8:45 am - 9:24 am Paper Session 1
Biomechanically-Directed Fixation
Moderators: Todd McKinley
Timothy Billiar, MD
8:45 am Overview
Timothy Billiar, MD
8:50 am Paper 1
Cytokines as Predictors of Multiple Organ Dysfunction Syndrome of Polytrauma Patients – Osteoprotegerin and Lipocalin-2 better than Interleukin-6?
Marcel Winkelmann, MD; Henning Peters; Christian Macke, MD; Philipp Mommsen, MD; Christian Zeckey, MD; Christian Schröter, MD; Christian Krettek, MD; Claudia Neunaber, MD
8:56 am Paper 2
A Severe Hemorrhagic Shock Leads to a Delayed Fracture Healing and Biomechanical Instability in a Murine Model
Katrin Bundkirchen, MS; Luisa Schäck, MD; Sandra Noack, MD; Christian Krettek, MD; Claudia Neunaber, MD
9:02 am Paper 3
Vancomycin and Imipenem Release from Nails Covered with Antibiotic-loaded Acrylic Cement Pharmacokinetic Study
Jorge Barla, MD; Luciano Rossi, MD; Carlos Sancineto, MD
9:08 am Paper 4
Elution Characteristics of PMMA Bone Cement IM Spacers Impregnated with Vancomycin and Tobramycin
Andrew Patton, MD; Brandon Perez, MD; William Buford, PhD
9:14 am Discussion
9:24 am Break
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<tr>
<th>Time</th>
<th>Session/Topic</th>
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<tr>
<td>9:45 am -</td>
<td><strong>Symposium 2</strong></td>
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| 11:35 am | Critical Size Bone Defects: Is There a Consensus in 2015 for Diagnosis and Treatment?  
Moderators: Aaron Nauth, MD  
J Tracy Watson, MD |
| 9:45 am | Size Matters: Defining “Critical” in Bone Defect Size  
Emil Schermitzsch, MD |
| 10:00 am | Induced Membrane Techniques (Masquelet) for Bone Defect Management  
Brent L Norris, MD |
| 10:15 am | The Role of Biologics in Bone Defect Management  
J Tracy Watson, MD |
| 10:30 am | Infected Bone Defects: State of the Art  
Treatment  
Aaron Nauth, MD |
| 10:45 am | Discussion                                                                |
| 10:50 am - | **Paper Session 2**                                                      |
| 11:35 am | Critical Size Bone Defects  
Moderators: Aaron Nauth, MD  
J Tracy Watson, MD |
| 10:50 am | Overview  
Aaron Nauth, MD |
| 10:55 am | **Paper 5**  
Effect of External Beam Irradiation on the Pathway of Bone Fracture Healing  
Yongren Wu, PhD; Evan Hanna, MD;  
Daniel McDonald, MS; Kenneth Venek, PhD;  
Hai Yao, PhD; Vincent Pellegrini, MD |
| 11:01 am | **Paper 6**  
Novel PTH Based Bone Graft Substitute for Treatment of Fractures – Results from a Large Ovine Tibial Plateau Defects Study  
Jason Schense, PhD;  
Brigitte von Rechenberg, DVM;  
Martin Stauuber, PhD;  
Stephen Ferguson, Prof PhD |
| 11:07 am | **Paper 7**  
Pharmaceutical and Genetic Depletion of Sclerotin and the Effect on Fracture Healing  
Mohammad Alzahrani, MD, MSc;  
Reggie Hamdy, MB, MSc (Ortho.), FRCS(C) |
| 11:13 am | **Paper 8**  
Comparative Analysis of Thrombopoietin (TPO), a Novel Agent to Heal Segmental Bone Defects, with Bone Morphogenetic Protein-2 (BMP-2): A Hypothesis  
Generating Transcriptomic Study  
Nabarun Chakraborty, MS, MBA;  
Rasha Hammami, PhD;  
Duncan Donohue, PhD; Todd McKinley, MD;  
Paul Childress, PhD; Benjamin Corona, PhD;  
Tien-Min Chu, DDS, PhD; Melissa Kacena, PhD |
| 11:19 am | **Paper 9**  
BMP-2 Increases Survival of Mesenchymal Stem Cells and Fracture Healing when Deployed in Photopolymerizable Hydrogels  
Motasem Refaat, MD; Nina Vollmer, PhD;  
Steve Ho, BS; Eben Altsberg, PhD;  
Kent Leach, PhD; Mark Lee, MD |
| 12:00 pm - | **Symposium 3**                                                            |
| 1:40 pm | Absolute versus Relative Fixation  
Moderators: Joseph Borrelli, MD  
Brent L Norris, MD |
| 12:30 pm | Plates: Alternative Fixation Methods and Their Influence on Fracture Healing  
Gerald Lang, MD |
| 12:45 pm | IM Nails are the Mainstay of Diaphyseal and Metaphyseal? Fracture Fixation: And Why?  
Thomas A (Toney) Russell, MD |
| 1:00 pm | Pros and Cons of Plates and Screws in Osteoporotic Bone  
David Rothberg, MD |
| 1:15 pm | Periprosthetic Fracture Fixation: To Graft or Not to Graft?  
William M Ricci, MD |
| 1:30 pm | Discussion                                                                |
| 1:40 pm - | **Paper Session 3**                                                      |
| 2:19 pm | Absolute versus Relative Fracture Fixation  
Moderators: Joseph Borrelli Jr, MD  
Brent L Norris MD |
| 1:40 pm | Overview  
Joseph Borrelli Jr, MD |
| 1:45 pm | **Paper 10**  
Controlled Axial Dynamization with a Novel Active Locking Plate can Deliver Faster and Stronger Healing  
Michael Bottlang, PhD; Stanley Tsal, MS;  
Anika Drechsler, BS; Brigitte von Rechenberg, DVM;  
Manuel Asch, BS; Daniel Fitzpatrick, MS, MD;  
Peter Augat, PhD; Steven Madey, MD |
1:51 pm  **Paper 11**  
A Biomechanical Comparison of Standard versus Far Cortical Locking Screws in a Periprosthetic Distal Femur Fracture  
*Kimberly Jacobsen, MD; J Bledsoe, PhD; Heidi Israel, PhD, RN; Jeffrey Whiting, MD; Lisa Cannada, MD*

1:57 pm  **Paper 12**  
In Vivo Correlation of RUST Scoring with Biomechanical Strength of Nailed Tibia Fractures: Can We Finally Define Union Radiographically?  
*Paul Tornetta, MD; Jody Litrenta, MD; William Ricci, MD; Roy Sanders, MD; Robert O’Toole, MD; Henry Faber, MS; Jason Nascone, MD*

2:03 pm  **Paper 13**  
The Biomechanical Advantage of Locked versus Non-locked Symphysisal Plating of Unstable Pelvic Ring Injuries  
*Ryan Godinsky, MD; Gregory Vrabec, MD; Loredana Guseila, BS; Danielle Filipkowski, MS; John Elias, PhD*

2:09 pm  Discussion

2:19 pm  Break

2:40 pm - 3:45 pm  **Symposium 4**  
**Biomechanical - Hot Topics 2015**  
**Moderators:**  *Emil Schemitsch, MD  
Michael Bottlang, MD*

2:40 pm  **Proximal Humerus Fractures:** Using Biomechanics to Reduce Failure of Locked Implants  
*Dean G Lorich, MD*

2:48 pm  **Femoral Neck Fracture Fixation:** What is the Rationale for Implant Choice?  
*Gerard P Slobogean, MD*

2:56 pm  **Nailing Unstable Intertrochanteric Fractures:** Biomechanical Evidence for Improved Proximal Fixation  
*Steven A Olson, MD*

3:04 pm  **Periprosthetic Distal Femur Fractures:** Nail or Plate?  
*Emil Schemitsch, MD*

3:12 pm  **Syndesmotic Injuries:** How Flexible Should the Fixation Be?  
*David W Sanders, MD*

3:20 pm  **Talar Neck Fractures:** Is Standard Screw Fixation Adequate?  
*Bruce Sangeorzan, MD*

3:28 pm - 3:45 pm  Discussion

3:45 pm - 4:50 pm  **Paper Session 4**  
**Biomechanics**  
**Moderators:**  *Emil Schemitsch, MD  
Michael Bottlang, MD*

3:45 pm  **Overview**  
*Emil Schemitsch, MD*

3:50 pm  **Paper 14**  
The Effect of Varying Tension of a Suture Button Construct in Fixation of the Tibiofibular Syndesmosis - Evaluation Using Stress Computed Tomography  
*John Morello, MBBS (Hons); Hakim Louati, MSc; Andrew Bodrog, MD; Andrew Stewart, MD; Steven Papp, MD FRCP; Allan Liew, MD, FRCSC; Wade Gofton, MD, FRCPC*

3:56 pm  **Paper 15**  
Anatomic Ligament Repair Restores Ankle and Syndesmotic Rotational Stability as Much as Syndesmotic Screw Fixation  
*Patrick Schottel, MD; Josh Baxter, PhD; Susannah Gilbert, MS; Matthew Garner, MD; Dean Lorich, MD*

4:02 pm  **Paper 16**  
Initial Stiffness of Bicortical Locked Screw versus Unicortical Locked Screw and Graft-Cable Fixation of Comminuted Vancouver C Periprosthetic Fractures: A Biomechanical Study  
*Michael Beebe, MD; David Hulet, BS; Casey Whale, BS; Sean Tagge, BS; Jeremy Gilliland, MD; Erik Kubik, MD*

4:08 pm  Discussion

4:18 pm  **Paper 17**  
Comparison of Three Methods for Maintaining Inter-fragmentary Compression after Fracture Fixation  
*Brigham Au, MD; John Groundland, MD; Brandon Santoni, PhD; Kyle Stoops, MD; H Claude Sagi, MD*
Thursday, October 8, 2015

7:25 am  Introduction
Edward J Harvey, MD, Program Chair

7:30 am -  Symposium 5
8:20 am  What’s Important Besides Getting the Bone to Heal?
Moderators: Brett D Crist, MD
Mark A Lee, MD

7:30 am  What to Do When the Articular Cartilage Doesn’t Heal or Can’t Be Reconstructed?
James P Stannard, MD

7:40 am  Periarticular Knee Fractures: Ligamentous Stability Affects Success
William Harvin, MD

7:50 am  Fractures Don’t Heal without Soft Tissue Coverage: Understanding the Soft Tissue Reconstructive Ladder
Michael J Gardner, MD

8:00 am  Muscular Recovery: How Much is Lost with Injury?
Thomas Higgins, MD

8:10 am  Discussion

8:20 am -  Paper Session 5
9:22 am  Besides Bone Healing
Moderators: Brett D Crist, MD
Mark A Lee, MD

8:20 am  Overview

8:25 am  Paper 20
Autologous Minced Muscle Treatment of Volumetric Muscle Loss Improves Neuromuscular Strength
Jennifer McDaniel, PhD; Catherine Ward, PhD; Joseph Wenke, PhD; Benjamin Corona, PhD

8:31 am  Paper 21
Comparison Between Supra-patellar and Para-patellar Approach for Proximal Tibia Fractures: Cadaveric Study
Rodolfo Zamora, MD; Craig Wright, MD; Adam Short, MD; David Seligson, MD

8:37 am  Paper 22
Blind Area of Reverse-L Posteromedial Approach Compare with Posterolateral Approach for Posterolateral Tibial Plateau Fractures: A Cadaveric Study
Wich Orapiriyakul, MD; Theerachai Apivaththakul, MD
8:43 am  Paper 23  
The Safety and Feasibility of Minimally Invasive Plate Osteosynthesis (MIPO) on the Medial Side of the Femur: A Cadaveric Injection Study  
Theerachai Apivatthakakul, MD

8:49 am  Discussion

8:54 am  Paper 24  
Under Pressure: The Utility of Splitting Fiberglass Casts  
Kevin Kleis, DO; John Schlechter, DO; Joshua Doan, MEng; Christine Farnsworth, MS; Eric Edmonds, MD

9:00 am  Paper 25  
Targeted Stimulation of Retinoic Acid Receptor Signaling Mitigates the Formation of Heterotopic Ossification Formation in an Established Blast-Related Traumatic Injury Model  
Gabriel Pavey, MD; Ammar Qureshi, PhD; Allison Tomasino, BS; Danett Bishop, PhD; Masahiro Iwamoto, PhD; Maurizio Pacifici, PhD; Benjamin Potter, MD; Thomas Davis, PhD; Jonathan Forsberg, MD

9:06 am  Paper 26  
Transforming Growth Factor-ß2 Gene Expression Early may be Predictive of the Severity of Future Development of Heterotopic Ossification  
Ronald Goodlett, MD; Patrick Jones, MD; Youngmi Ji, PhD; Daniel Griffin, MD; Leon Nesti, MD, PhD; Husain Bharmal, MD

9:12 am  Discussion

9:22 am  Break

9:40 am -  Symposium 6  
Does Research Change Practice?  
Moderators: Mohit Bhandari, MD; Edward J Harvey, MD

10:00 am  6 Clinical Research Papers That Have Influenced My Practice  
Michael T Archdeacon, MD

10:10 am  Does Level I Evidence Mean “I Should Change my Practice?”  
Peter Giannoudis, MD

10:20 am  Are Journals the Future Source of Practice-Changing Evidence?  
Roy Sanders, MD

10:30 am  Discussion

10:51 am  Paper 28  
Carbon Monoxide Releasing Molecule-3 (CORM-3) Protects the Skeletal Muscle In Porcine Model of Compartment Syndrome  
Aurelia Bihari, MSc; Gediminas Cepinskas, DVM, PhD; David Sanders, MD; Abdel-Rahman Lawendy; MD, PhD; Philipp Haas, MD; Katrin Bundkirchen, MS

11:10 am  ADJOURN TO INDUSTRY SYMPOSIA  
Registration Required  
(Boxed lunch available)