

# 2010 OTA Pre-Meeting Course Basic Science Focus Forum

Theodore Miclau, III, MD, Chair

Attendees of this activity can earn up to 12.25 AMA PRA Category I Credits™.

Hilton Baltimore Hotel,  
Holiday Ballroom 6 (Level 2)

## Wednesday – Thursday, October 13 – 14, 2010

### Target Audience

Attendees of the 26th Annual Meeting of the Orthopaedic Trauma Association, orthopaedic trauma surgeons, fellows and residents, basic scientists, bioengineers and biologists.

### Forum Objectives

- Develop a greater understanding of biomechanics models and how to choose the most appropriate model
- Become well versed in bone defect repair and healing
- Learn how best to choose a pre-clinical model in orthopaedic trauma research
- Review advances in imaging and its implications
- Learn the latest issues and trends in funding orthopaedic trauma research

### Program

Wednesday, October 13, 2010

6:30 AM	Registration
7:25 AM	Introduction: <i>Theodore Miclau, III, MD, Program Chair</i>
7:30 – 8:50 AM	<b>SYMPOSIUM I: BIOMECHANICS: CHOOSING THE RIGHT MODEL</b> Moderators: <i>Steven A. Olson, MD</i> <i>Thomas (Toney) A. Russell, MD</i>
7:30 AM	Introduction <i>Steven A. Olson, MD</i>
7:35 AM	Choosing the Right Specimen <i>Steven A. Olson, MD</i>
7:45 AM	Plate Fixation – A Clinician's Perspective <i>Philip J. Kregor, MD</i>
8:00 AM	Plate Fixation – An Engineer's Perspective <i>Michael Bushelow, MS</i>

8:10 AM	<b>SYMPOSIUM I, continued</b> IM Nail Fixation – A Clinician's Perspective <i>Thomas (Toney) A. Russell, MD</i>
8:20 AM	IM Nail Fixation – An Engineer's Perspective <i>Loren L. Latta, MD, PhD</i>
8:30 AM	Discussion <i>Symposium Panel</i>
8:50 – 10:12 AM	<b>PAPER SESSION I: BIOMECHANICS</b> Moderators: <i>Steven A. Olson, MD</i> <i>Thomas (Toney) A. Russell, MD</i>
8:50 AM	Overview: <i>Steven A. Olson, MD</i>
9:00 AM Paper #1	Can We Trust Ex Vivo Mechanical Testing of Fresh Frozen Cadaveric Specimens? The Effect of Post Freezing Delays <i>Paul Tornetta, III, MD<sup>1</sup>; Jacob L. Cartner, PhD<sup>2</sup>; Zane Hartsell, PhD<sup>2</sup>; William M. Ricci, MD<sup>3</sup>; <sup>1</sup>Boston University Medical Center, Boston, Massachusetts, USA; <sup>2</sup>Smith and Nephew, Inc, Memphis, Tennessee, USA; <sup>3</sup>Washington University St. Louis, St Louis, Missouri, USA</i>
9:06 AM Paper #2	A Biomechanical Comparison of Standard Screw and Hybrid Fixation of Unstable Humeral Shaft Fractures <i>Robert F. Ostrum, MD<sup>1</sup>; Jason Nydick, DO<sup>2</sup>; Matthew Boardman, DO<sup>2</sup>; <sup>1</sup>Cooper University Hospital, Camden, New Jersey, USA; <sup>2</sup>Philadelphia College of Osteopathic Medicine, Philadelphia, Pennsylvania, USA</i>

## Basic Science Forum Program, cont'd

- 9:12 AM  
Paper #3 **Biomechanics of Distal Radioulnar Repair: Ligament Reconstruction versus Capsulorrhaphy**  
*Christopher Dy, MD<sup>1</sup>;*  
*Elizabeth Anne Ouellette, MD<sup>2</sup>;*  
*Anna-Lena Makowski<sup>2</sup>; Dena Mohnani<sup>3</sup>;*  
*Ali Malik <sup>4</sup>; Edward Milne, BS<sup>5</sup>;*  
*Loren Latta, PhD<sup>5,6</sup>;*  
*<sup>1</sup>Hospital for Special Surgery,*  
*New York, New York, USA;*  
*<sup>2</sup>Miami International Hand Surgery Service,*  
*North Miami Beach, Florida, USA;*  
*<sup>3</sup>University of Florida, School of Medicine,*  
*Gainesville, Florida, USA;*  
*<sup>4</sup>Nova Southeastern School of Medicine,*  
*Fort Lauderdale-Davie, Florida, USA;*  
*<sup>5</sup>Max Biedermann Institute for Biomechanics,*  
*Miami Beach, Florida, USA;*  
*<sup>6</sup>University of Miami, Department of*  
*Orthopaedics, Miami Beach, Florida, USA*
- 9:18 AM **Discussion**
- 9:24 AM  
Paper #4 **Biomechanical Evaluation of Trans-sacral, Trans-alar, and Iliosacral Screw Fixation for Comminuted Transforaminal Sacral Fractures**  
*Brett D. Crist, MD; Ferris Pfeffer, PhD;*  
*Michael Khazzam, MD; Yvonne Murtha, MD;*  
*Gregory Della Rocca, MD; William Carson, PhD;*  
*University of Missouri,*  
*Columbia, Missouri, USA*
- 9:30 AM  
Paper #5 **Quantifying the Load Sharing Capabilities of Distal Femur Plating through Strain Analyses in Healthy and Osteoporotic Bone in Different Fracture Types**  
*Jacob L. Cartner<sup>1</sup>; Zane Hartsell, BS<sup>2</sup>;*  
*Bob Jones, III, BS<sup>3</sup>; William Ricci, MD<sup>2</sup>;*  
*<sup>1</sup>Smith & Nephew,*  
*Memphis, Tennessee, USA;*  
*<sup>2</sup>Washington University Medical School,*  
*St. Louis, Missouri, USA*
- 9:36 AM  
Paper #6 **Does Screw Orientation Influence Construct Stiffness in Vertical Shear Fractures of the Medial Malleolus?**  
*Safdar N. Khan, MD;*  
*Derek Amanatullah, MD; Shane Curtiss;*  
*Philip R. Wolinsky, MD;*  
*University of California, Davis,*  
*Sacramento, California, USA*
- 9:42 AM **Discussion**
- 9:48 AM  
Paper #7 **The Mechanical Effect of Targeted Blocking Screws in Distal Femur Fractures**  
*Sagar J. Desai, MD; David W. Sanders, MD;*  
*Louis Ferreira, MD; Josh Giles;*  
*James Johnson, PhD;*  
*University of Western Ontario,*  
*London, Ontario, Canada*
- 9:54 AM  
Paper #8 **Does Insertion Torque Affect the Mechanics of Locking Hole Inserts and Fatigue Performance of Bridge Plate Constructs?**  
*Jacob L. Cartner<sup>1</sup>; Adam Messina, BS<sup>1</sup>;*  
*Charlie Baker<sup>1</sup>;*  
*Thomas (Toney) A. Russell, MD<sup>2</sup>;*  
*Paul Tornetta III, MD<sup>3</sup>;*  
*William M. Ricci, MD<sup>4</sup>;*  
*<sup>1</sup>Smith & Nephew,*  
*Memphis, Tennessee, USA;*  
*<sup>2</sup>Regional Medical Center,*  
*Memphis, Tennessee, USA;*  
*<sup>3</sup>Boston University Medical School,*  
*Boston, Massachusetts, USA;*  
*<sup>4</sup>Washington University Medical School,*  
*St Louis, Missouri, USA*
- 10:00 AM  
Paper #9 **Biomechanical Investigation of Plate Working Length on Fatigue Characteristics of Locking Plate Constructs in Cadaveric Distal Metaphyseal Femoral Fracture Models**  
*William M. Ricci, MD<sup>1</sup>;*  
*Paul Tornetta, III, MD<sup>2</sup>;*  
*Yanming Zheng, PhD<sup>3</sup>; Ramona Soileau<sup>3</sup>;*  
*Jacob Cartner, PhD<sup>3</sup>;*  
*<sup>1</sup>Washington University,*  
*St. Louis, Missouri, USA;*  
*<sup>2</sup>Boston University Medical Center,*  
*Boston, Massachusetts, USA;*  
*<sup>3</sup>Smith and Nephew, Inc.,*  
*Memphis, Tennessee, USA*
- 10:06 AM **Discussion**
- 10:12 AM **Break**

## Basic Science Forum Program, cont'd

10:30 – 11:40 AM	<b>SYMPOSIUM II: BONE DEFECT REPAIR</b> Moderators: <i>Emil H. Schemitsch, MD</i> <i>Thomas A. Einhorn, MD</i>	12:02 PM Paper #12	<b>Endothelial Progenitor Cells for Healing and Angiogenesis in a Segmental Bone Defect Model: A Comparison with Mesenchymal Stem Cells</b> <i>Aaron Nauth, MD; Emil H. Schemitsch, MD; Ru Li, MD;</i> <i>St. Michael's Hospital,</i> <i>Toronto, Ontario, Canada</i>
10:30 AM	<b>Selecting the Right Autograft</b> <i>Aaron Nauth, MD</i>		
10:40 AM	<b>Induced Membranes (Masquelet Technique): What Is the Evidence?</b> <i>Hans-Christoph Pape, MD</i>	12:08 PM	<b>Discussion</b>
10:50 AM	<b>Subchondral Defects: What Is the Best Bone Void Filler?</b> <i>William G. DeLong, Jr., MD</i>	12:14 PM Paper #13	<b>Decreasing Complications in Open Fractures with a Novel Bone Graft</b> <i>Kate V. Brown, MD<sup>1</sup>; Bing Li, PhD<sup>2</sup>;</i> <i>Teja Guda, PhD<sup>1</sup>; Scott Guelcher, PhD<sup>2</sup>;</i> <i>Josh Wenke, PhD<sup>1</sup>;</i> <i><sup>1</sup>United States Army Institute of Surgical Research, San Antonio, Texas, USA;</i> <i><sup>2</sup>Vanderbilt University Medical Center, Nashville, Tennessee, USA</i>
11:00 AM	<b>The Use of Osteobiologics in Bone Defects</b> <i>J. Tracy Watson, MD</i>		
11:10 AM	<b>Large Diaphyseal Defects: What Is the Best Treatment?</b> <i>Michael D. McKee, MD</i>		
11:20 AM	<b>Discussion</b>	12:20 PM Paper #14	<b>Xenograft Bone Inclusion Improves Incorporation of Hydroxyapatite Cement into Cancellous Defects</b> <i>Michael J. Voor, PhD; Eric M. Yoder, BS;</i> <i>Robert L. Burden, Jr.;</i> <i>University of Louisville,</i> <i>Louisville, Kentucky, USA</i>
11:40 AM – 12:38 PM	<b>PAPER SESSION II: BONE DEFECT REPAIR</b> Moderators: <i>Emil H. Schemitsch, MD</i> <i>Thomas A. Einhorn, MD</i>		
11:40 AM	<b>Overview:</b> <i>Thomas A. Einhorn, MD</i>		
11:50 AM Paper #10	<b>Endothelial Progenitor Cells for Healing of Segmental Bone Defects</b> <i>Ru Li, PhD<sup>1</sup>; Kivanc Atesok, MD<sup>1</sup>;</i> <i>David Wright, BS<sup>2</sup>; Aaron Nauth, MD<sup>1</sup>;</i> <i>Cari Whyne, PhD<sup>2</sup>;</i> <i><sup>1</sup>St Michael's Hospital, University of Toronto, Toronto, Ontario, Canada;</i> <i><sup>2</sup>University of Toronto, Toronto, Ontario, Canada</i>	12:26 PM Paper #15	<b>Evaluation of Histological and Mechanical Properties of Plexur M. Bone/polymer Biocomposite in a Rabbit Defect Model</b> <i>Christophe Nich, MD<sup>1</sup>; Bertrand David, PhD<sup>2</sup>;</i> <i>Karim Oudina, BS<sup>1</sup>; Valentin Myrtil, BS<sup>1</sup>;</i> <i>Herve Petite, PhD<sup>1</sup>; Hamadouche Moussa, MD<sup>3</sup>;</i> <i><sup>1</sup>Orthopaedic Research Laboratory, Paris, France;</i> <i><sup>2</sup>Ecole Central, Paris, France;</i> <i><sup>3</sup>Department of Orthopaedics, Hopital Cochin, Paris, France</i>
11:56 AM Paper #11	<b>Increasing Vascularity to Improve Healing of a Segmental Defect of the Rat Femur</b> <i>Rena L. Stewart, MD<sup>1</sup>;</i> <i>Jessica B. Goldstein, RN<sup>1</sup>; Eddie L. Hyatt, BS<sup>1</sup>;</i> <i>Tien-Min G. Chu, PhD<sup>2</sup>;</i> <i>Shawn R. Gilbert, MD<sup>1</sup>;</i> <i><sup>1</sup>University of Alabama at Birmingham, Birmingham, Alabama, USA;</i> <i><sup>2</sup>Indiana University, Indianapolis, Indiana, USA</i>	12:32 PM 12:38–1:45 PM	<b>Discussion</b> <b>Lunch</b>

## Basic Science Forum Program, cont'd

- 1:45 – 3:05 PM**      **SYMPOSIUM III:  
CHOOSING A PRE-CLINICAL  
MODEL IN ORTHOPAEDIC  
TRAUMA**  
Moderators: *Edward J. Harvey, MD*  
*R. Geoff Richards, PhD*
- 1:45 PM      **Osteoporotic Fractures**  
*Peter V. Giannoudis, MD*
- 2:00 PM      **Bone Defects**  
*Jennifer Lansdowne, AVCS*
- 2:15 PM      **Articular Injury**  
*Paul A. Martineau, MD*
- 2:30 PM      **Osteomyelitis**  
*R. Geoff Richards, PhD*
- 2:45 PM      **Discussion**
- 3:05– 4:03 PM**      **PAPER SESSION III:  
PRE-CLINICAL ANIMAL MODELS**  
Moderators: *Edward J. Harvey, MD*  
*Peter V. Giannoudis, MD*
- 3:05 PM      **Overview:** *Edward J. Harvey, MD*
- 3:15 PM      **Mesenchymal Stem Cell Transplantation  
to Promote Fixation of Orthopaedic  
Hardware**  
Paper #16  
*Chan Gao, MD;*  
*Experimental Medicine, McGill University,*  
*Montreal, Quebec, Canada*
- 3:21 PM      **Mechanical Stability Affects Angiogenesis  
during Fracture Healing**  
Paper #17  
*Chuanrong Lu, MD; Xiaodong Wang, PhD;*  
*Zhiqing Xing, MD; Ralph Marcucio, PhD;*  
*University of California, San Francisco,*  
*San Francisco, California, USA*
- 3:27 PM      **Murine Model of Oligotrophic Tibial  
Nonunion**  
Paper #18  
*Calvin T. Hu, MD;*  
*Catherine A. Humphrey, MD;*  
*Regis J. O'Keefe, MD;*  
*Department of Orthopaedics, University of*  
*Rochester School of Medicine,*  
*Rochester, Minnesota, USA*
- 3:33 PM      **Discussion**
- 3:39 PM      **Heterotopic Ossification following  
Extremity Blast Amputation: An Animal  
Model in the Sprague-Dawley Rat**  
Paper #19  
*Oliver O. Tannous, MD<sup>1</sup>; Cullen Griffith, MD<sup>1</sup>;*  
*Robert V. O'Toole, MD<sup>2</sup>;*  
*Vincent D. Pellegrini, MD<sup>1</sup>;*  
*<sup>1</sup>University of Maryland School of Medicine,*  
*Baltimore, Maryland, USA;*  
*<sup>2</sup>University of Maryland School of Medicine,*  
*R. Adams Cowley Shock Trauma Center,*  
*Baltimore, Maryland, USA*
- 3:45 PM      **Androstendiol Exerts Protective Effects in  
a Murine Two-hit Model**  
Paper #20  
*Christian Zeckey, MD; Frank Hildebrand, MD;*  
*Ulf Brunnemer, MD; Philipp Mommsen, MD;*  
*Michael Frink, MD; Christian Krettek, MD;*  
*Tanja Barkhausen, MD;*  
*Trauma Department, Hannover Medical*  
*School, Hannover, Germany*
- 3:51 PM      **Effects of Binge Alcohol Consumption  
and Anti-oxidant Therapy on Healing of  
Femur Fractures in a Rat Model**  
Paper #21  
*Dustin Volkmer, MD; Michael Stover, MD;*  
*John Callaci, MD; Ryan Himes, BS;*  
*Loyola University Medical Center,*  
*Maywood, Illinois, USA*
- 3:57 PM      **Discussion**
- 4:03 PM      **Adjourn**



See pages 33 - 34 for information about Skills Labs.

# Basic Science Forum Program, cont'd

## Program

Thursday, October 14, 2010

6:30 AM	Registration		
7:25 AM	Introduction: <i>Theodore Miclau, III, MD, Program Chair</i>		
7:30 – 8:50 AM	<b>SYMPOSIUM IV: ADVANCES IN IMAGING: ARTICULAR CARTILAGE</b> Moderators: <i>Joseph Borrelli, Jr., MD Todd O. McKinley, MD</i>		
7:30 AM	Can Non-Destructive MRI Provide a Measurement of Cartilage Function? The Role of Delayed Gadolinium-Enhanced MRI of Cartilage (dGEMRIC) <i>Deborah Burnstein, PhD</i>		
7:45 AM	T2 and Ultra-Short T2 Weighted Imaging: Research and Clinical Applications <i>Constance R. Chu, MD</i>		
8:00 AM	Imaging of the Acutely Injured Joint: What Do the Findings Mean? <i>Hollis G. Potter, MD</i>		
8:15 AM	Limiting Metallic Implant Artifacts <i>John A. Carrino, MD, MPH</i>		
8:30 AM	Discussion		
8:50 – 9:19 AM	<b>PAPER SESSION IV: IMAGING</b> Moderators: <i>Joseph Borrelli, Jr., MD Todd O. McKinley, MD</i>		
8:50 AM	Overview: <i>Todd O. McKinley, MD</i>		
8:55 AM Paper #22	Quantitative Micro-CT Compared to Biomechanics in a Mouse Fracture Model <i>Kevin R. O'Neill, MD; William T. Obrebsky, MD; Jonathan Schoenecker, MD; Christopher Stutz, MD; Jeffrey S. Nyman, MD; Nicholas A. Mignemi, MD; Vanderbilt University Medical Center, Nashville, Tennessee, USA</i>		
		9:01 AM Paper #23	Use of Two 3-D Fluoroscopic Systems for the Assessment of Articular Reduction: A Cadaveric Study <i>Yoram A. Weil, MD<sup>1</sup>; Meir Liebergall, MD<sup>1</sup>; Rami Mosheiff, MD<sup>1</sup>; Syndie M. Singer, MD<sup>2</sup>; Amal Khoury, MD<sup>1</sup>; <sup>1</sup>Hadassah Hebrew University Medical Center, Jerusalem, Israel; <sup>2</sup>University of Toronto, Toronto, Ontario, Canada</i>
		9:07 AM Paper #24	Comparative Biomechanical and MicroCT Analysis of Osseointegration: Biodegradable Magnesium Alloy versus Titanium Control <i>Richard Andreas Lindtner, MD; Christoph Castellani, MD; Department of Pediatric Surgery, Medical University of Graz, Graz, Austria</i>
		9:13 AM	Discussion
		9:19 AM	Break
		9:30 – 10:50 AM	<b>SYMPOSIUM V: FUNDING ORTHOPAEDIC TRAUMA RESEARCH</b> Moderators: <i>Theodore Miclau, III, MD Michael J. Bosse, MD</i>
		9:30 AM	Update from the National Institute of Arthritis and Musculoskeletal and Skin Diseases/National Institutes of Health <i>James S. Panagis, MD, MPH</i>
		9:45 AM	Opportunities through the Department of Defense: Basic Research <i>Joseph C. Wenke, PhD</i>
		10:00 AM	Opportunities through the Department of Defense: Clinical Research <i>LTC Romney C. Andersen, MD</i>
		10:15 AM	Funding through the Food and Drug Administration <i>Barbara D. Buch, MD</i>
		10:30 AM	Discussion

## *Basic Science Forum Program, cont'd*

- 10:50 AM – 12:10 PM**      **SYMPOSIUM VI:  
BRINGING PRODUCTS  
TO MARKET**  
Moderators: *Mohit Bhandari, PhD*  
*Barbara D. Buch, MD*
- 10:50 AM      **Re-thinking the 510K Mechanism for  
Devices: What Does the Future Hold?**  
*Barbara D. Buch, MD*
- 11:05 AM      **Getting Fracture Healing Biologics  
Approved: What Are the New Standards  
for Industry?**  
*Ricardo Dent, PhD*
- 11:20 AM      **Surgeon-Industry Collaborations in  
Implant Design: Are the Roadblocks  
Worth the Hassle?**  
*Thomas (Toney) A. Russell, MD*
- 11:35 AM      **Designing the Right Fracture Healing:  
If We Only Knew?**  
*Thomas A. Einhorn, MD*
- 11:50 AM      **Discussion**
- 12:10 PM      **Adjourn**
- 1:00 PM**      **ANNUAL MEETING BEGINS**  
Welcome – *Timothy J. Bray, MD,*  
*OTA President*



*Enjoy the Baltimore waterfront.*