13\textsuperscript{th} Annual Meeting of the International Society for Computer Assisted Orthopaedic Surgery

Orlando, FL, USA
June 12-15, 2013
ACCREDITATION INFORMATION

Learning Objectives

- Educate and demonstrate on a personal level the need for improved surgical accuracy in Orthopedic Surgery and the new technologies currently available to meet that need.
- Offer attendees an opportunity to perform enhanced procedures using the newest and most technologically advanced surgical tools now in the industry.
- Measure, record, and report improvements when performing surgical tasks on a personal and collective level using new and innovative tools.
- Survey the participating surgeons to critically evaluate the latest technologically sophisticated tools and methods to determine the value and potential for clinical acceptance.
- Learn from panel discussions, presentations, and debates from key innovators, authors, proponents, and detractors of these technologies.

Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of Marshall University Joan C. Edwards School of Medicine and the International Congress for Joint Reconstruction (ICJR). Marshall University Joan C. Edwards School of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

Designation Statement/Credit Statement

Marshall University Joan C. Edwards School of Medicine designates this educational activity for a maximum of 22 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity. Session registration and evaluation are required.

Disclosure of Conflicts of Interest

Marshall University Joan C. Edwards School of Medicine (MUJCESOM) requires instructors, planners, managers and other individuals who are in a position to control the content of this activity to disclose any real or apparent conflict of interest they may have as related to the content of this activity. All identified real or apparent conflicts of interest are thoroughly reviewed and resolved by MUJCESOM’s planning process for fair balance, scientific objectivity of studies mentioned in the materials or used as the basis of content, and appropriateness of patient care recommendations. Disclosure information will be presented verbally or in print to participants before presentation of the agenda lectures.
Conference Chairman

Robert L. Thornberry, M.D.
Tallahassee Orthopedic Clinic, Tallahassee, Florida, USA

Program Committee

Brian L. Davies, Ph.D. (Chairman)
London, Great Britain
Florian Gebhard, M.D.
Ulm, Germany
Branislav Jaramaz, Ph.D.
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David M. Kahler, M.D.
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Bern, Switzerland
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Aachen, Germany

Norberto Confalonieri, M.D.
Milan, Italy
Antony Hodgson, Ph.D.
Vancouver, Canada
Leo Joskowitz, Ph.D.
Jerusalem, Israel
Philippe Merloz, M.D.
Grenoble, France
Frédéric Picard, M.D.
Clydebank, Great Britain
Nobuhiko Sugano, M.D.
Osaka, Japan

Award Committees

On Saturday, awards will be given for the best clinical and technical podium and poster presentations of the meeting. The four awardees will be selected by the following committees:

**BEST PODIUM PRESENTATION COMMITTEE**

Frédéric Picard, M.D. (Chairman)
Clydebank, Great Britain
Branislav Jaramaz, Ph.D.
Pittsburgh, USA
Jean-Yves Jenny, M.D.
Strasbourg, France
Klaus Radermacher, Ph.D.
Aachen, Germany
Jongkeun Seon, M.D., Ph.D.
Chonnam National University, Korea
Moshe Shoham, Ph.D.
Haifa, Israel
Nobuhiko Sugano, M.D.
Osaka, Japan

**BEST POSTER PRESENTATION COMMITTEE**

Norberto Confalonieri, M.D. (Chairman)
Milan, Italy
Andrea Ferretti, M.D.
Rome, Italy
Antony Hodgson, Ph.D.
Vancouver, Canada
Philippe Merloz, M.D.
Grenoble, France
Lutz-P. Nolte, Ph.D.
Bern, Switzerland
Stefano Santamarina, M.D.
Milan, Italy

Meeting Planning Committee

Ali Oliashirazi, M.D.
Instructional Advisor
David N. Bailey, MBA
CME

Sylke Anderson
ICJR
Erin Collins
ICJR
Mark Sacaris
ICJR
Wednesday, June 12, 2013

Pre-course: Technological Advances in Orthopaedic Surgery

7:00 BREAKFAST/REGISTRATION
7:30 Welcome
    Robert L. Thornberry, MD
7:35 Why we Need New Technologies in Orthopedics and Introduction to meeting
    William Petty, MD
7:50 What Navigation Has to do to Become Mainstream
    James B. Stiehl, MD

New Enabling Technologies in Total Knee Replacement

Moderator: Scott Banks, PhD

8:05 GPS Navigation
    James B. Stiehl, MD
8:17 Custom Implants Rationale
    Raj K. Sinha, MD, PhD
8:29 Custom Implants and Navigation
    Gary A. Levengood, MD
8:41 IMU Based Navigation
    David J. Mayman, MD; David A. Camarata, MD
8:53 Debate: Navigation vs Cutting Blocks
    David S. Stulberg, MD; Ryan M. Nunley, MD
9:05 Robot Wars
    D. Kevin Lester, MD
9:25 Conventional vs Robotic Unicondylar Knee Arthroplasty Surgery
    Bryn Jones, MD
9:45 DISCUSSION

Ligament Balancing

Moderator: David J. Mayman, MD

10:00 Navigation and Sensors
    David A. Camarata, MD
10:08 Smart Chip Technology
    Martin Roche, MD
10:15 Soft Tissue Balancing
    Sam Hakki, MD
10:24 Avoiding Mid-flexion Instability
    Gary Botimer, MD
10:32 Personalized Guidance System
    James B. Stiehl, MD
10:40 DISCUSSION
Coffee Break

10:55  COFFEE WILL BE SERVED IN THE INDUSTRIAL EXHIBITION AREA

New Technologies in Hip Replacement

Moderator:  David Stulberg, MD

11:25  Lateral Registration Rationale

William T. Long, MD

11:35  Navigation for FAI

TBD

11:45  Hip Sextant

Stephen B. Murphy, MD

11:55  Sensor-Based Navigation

David J. Mayman, MD

12:05  Patient-Specific Technologies

Robert L. Thornberry, MD

12:15  How I use the Navigation Tools for Anterior THA

Stefan Kreuzer, MD

12:25  Surgeon Tools of the Future

Martin Roche, MD; Robert L. Thornberry, MD

12:45  DISCUSSION

Surgeon Perception Exercises/Luncheon

Moderator:  Robert L. Thornberry, MD

13:00  BOXED LUNCHES TO BE SERVED IN GENERAL SESSION ROOM

Technology Breakouts – Open to all Pre-course and CAOS-International Registrants

14:00  Breakout 1:

Improved Navigation with Sensor Outputs

(Supported by Exactech, Inc.)

Breakout 2:

Handheld Robotics

(Supported by Blue Belt Technologies, Inc.)

Breakout 3:

Navigation Simplified

(Supported by Brainlab)

Breakout 4:

Rethinking Total Knee Replacement: Is There Room for Improvement and Innovation?

(Supported by ConforMIS, Inc.)

18:00  DEBRIEF

Welcome/Cocktail Reception Combined with CAOS-International

18:30  RECEPTION TO BE HELD IN THE INDUSTRIAL EXHIBITION AREA – OPEN TO ALL REGISTRANTS OF THE PRE-COURSE AND OF THE 13TH ANNUAL MEETING OF CAOS-INTERNATIONAL
## Thursday, June 13, 2013

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>6:30</td>
<td><strong>BREAKFAST &amp; REGISTRATION</strong></td>
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<tr>
<td>7:15</td>
<td>Welcome and introduction</td>
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<td><em>Robert L. Thornberry, Brian L. Davies</em></td>
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### Session I – Total Knee Replacement, Part 1: Patient Specific Implants

**Chairmen:** K. Deep and B.L. Davies

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<th>Time</th>
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<tr>
<td>7:45</td>
<td>Accuracy of an MRI based patient matched cutting jigs technology in TKA: evaluation with navigation</td>
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<td>7:55</td>
<td>CT-based patient-specific instrumentation is effective in patients with pre-existing hardware about the knee</td>
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<td><em>Goldberg TG, Curry WT, Bush JW, Li J</em></td>
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<td>8:05</td>
<td>Digital and CT-based planning in total knee prosthesis using patient specific instrumentation: a prospective study</td>
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<td><em>Manzotti A, Aldè S, Confalonieri N</em></td>
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<td>8:15</td>
<td>CT-based patient-specific instrumentation is accurate for TKA: a single-surgeon prospective trial</td>
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<td><em>Goldberg TD, Curry WT, Bush JW, Li J</em></td>
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<td>8:25</td>
<td>Preliminary results with kinematic alignment in TKA</td>
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<tr>
<td>8:35</td>
<td>Severe coronal plane deformity in total knee arthroplasty utilizing patient specific instrumentation</td>
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<td><em>Alvi HM, Talati R, Patel AR, Yaffe MA, Stulberg SD</em></td>
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### Session II – Total Hip Replacement, Part 1: Planning

**Chairmen:** S.D. Stulberg and R. Ellis

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<th>Time</th>
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<tr>
<td>8:50</td>
<td>A validation study of automated 3D planning system for total hip arthroplasty</td>
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<tr>
<td></td>
<td><em>Takao M, Yokota F, Kagiyama Y, Nakamoto M, Tomiyama N, Tada Y, Sato Y, Sugano N</em></td>
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<tr>
<td>9:00</td>
<td>Computer simulation of the stem anteverision using landmarks on the cut surface of the femoral neck in total hip arthroplasty</td>
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<td><em>Tsukeoka T, Tsuneizumi Y, Lee TH, Suzuki M</em></td>
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<td>9:10</td>
<td>Variation in anatomical landmarks used for conventional cup alignment as measured by CT</td>
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<td><em>Murphy WS, Kowal JH, Murphy SB</em></td>
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<tr>
<td>9:20</td>
<td>The safe zone for acetabular component orientation</td>
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<td><em>Murphy WS, Werner SD, Kowal JH, Murphy SB</em></td>
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### Presidential Guest Lecture 1

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<tr>
<td>9:30</td>
<td>How sensors will change orthopaedic surgery</td>
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<td><em>Martin W. Roche, M.D. (Holy Cross Hospital, OrthoSensor, Ft. Lauderdale, Florida, USA)</em></td>
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### Coffee Break and Technological Breakout Session 5: Ligament Balancing (Supported by OrthoSensor)

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<td>10:00</td>
<td><strong>COFFEE WILL BE SERVED IN THE INDUSTRIAL EXHIBITION AREA</strong></td>
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### Lunch Break

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<td>11:30</td>
<td><strong>LUNCH WILL BE SERVED IN THE INDUSTRIAL EXHIBITION.</strong></td>
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Session III – Trauma & Training

Chairmen: P.A. Grützner and G. Zheng

12:30 Spine surgery training tool – pedicle force measurements

12:40 Computer assisted orthopedic training system for fracture fixation
Rambani R, Viant W, Ward J, Mohsen A

12:50 Vertebroplasty medical simulation learning environment

13:00 Virtual implant planning system – first clinical results
Franke J, Vetter SY, Muehlhaeuser I, Wendl K, Gruetzner PA, Von Recum J

13:10 Image based guided treatment of metatarsal V-fractures

13:20 Percutaneous iliosacral screw placement: evaluation of a novel biplanar robot navigation aiming system

Session IV – Tools and Techniques, Part I

Chairmen: C. Park and A. Barret

13:30 Gait analysis of leg length discrepancy focusing on the balancing function of the trunk
Tamura S, Hamada H, Takao M, Sakai T, Nishii T, Miki H, Sugano N

13:40 Tool bracing for performance improvement in simulated femoral head-neck osteochondroplasty
Kooymann JJR, Hodgson AJ

13:50 A new tool to quantify the articular coherence of joint during motion: application to the comparison of ACL reconstructions in knee surgery
Breton D, Leboucher J, Burdin V, Rémy-Néri O

14:00 Next generation bone morphology analysis: a principal tangent component framework
Hefny MS, Rudan JF, Ellis RE

14:10 Validation of new 3D glenoid version measure on truncated scapulae for TSA planning
Chaoui J, Walch G, Boileau P

14:20 Full automatic image-to-patient registration of MRI and ultrasound images in computer-assisted humerus surgery
Fakhfakh HE, Llort-Pujol G, Hamitouche C, Stindel E

Coffee Break and Poster Session – Part 1

14:30 POSTERS S1-S9 WERE RATED “SPECIAL POSTERS” INDICATING AN EXCEPTIONAL QUALITY OF THIS WORK. POSTERS WILL BE PRESENTED IN FIVE SESSIONS, DURING WHICH THE AUTHORS OF THE RESPECTIVE SESSION’S POSTERS WILL BE PRESENT AT THE POSTER BOOTHS. HOWEVER, ALL POSTERS AND SPECIAL POSTERS OF ALL SESSIONS WILL BE ON DISPLAY DURING THE ENTIRE TIME OF THE MEETING.

S1) Computer-assisted planning and patient-specific instruments for bone tumor surgery within the pelvis – an experimental study
Paul L, Docquier PL, Banse X, Cartiaux O

S2) The evolving role of computer navigation in musculoskeletal oncology
Young PS, Bell SW, Mahendra A

S3) Three dimensional analyses of femoral torsion and femoral anterior bowing
Kanaji A, Enomoto H, Nakamura T, Yanagimoto S, Funayama A, Toyama Y, Suda Y

S4) Registration and tracking accuracy of the HipSextant™ navigation system in patients suffering from developing dysplasia of hip joint with Crowe III and IV deformities
Tokunaga K, Ikeda T
S5) A novel embalming technique preserves cadaveric wrist biomechanics over extended periods of time
Casier CB, Dickinson AWL, Sellens RW, Ellis RE, Pichora DR

S6) Comparison of flexion stability and clinical outcomes between robotic and navigation systems in total knee arthroplasty
Park C, Song EK, Seon JK, Park HW, Lee KJ

S7) Kinematic differences before and after total knee arthroplasty
Akbari Shandiz M, Saevarsson SK, Yoo S, Anglin C

S8) Modelling the effect of bone resection and soft tissue releases in correcting flexion contractures in total knee arthroplasty
Changulani M, Deakin AH, Picard F

S9) Accuracy of screw placement in navigated percutaneous iliosacral screws
Richter PH, Rahmanzadeh T, Gebhard F, Krischak G, Arand M, Weckbach S, Kraus M

1) Quantitative assessment of knee kinematics utilizing a new low profile pivot shift test
Anthony CA, McDermott S, Mccunniff P, Albright JP

2) Pelvis tumor resection: 3D preoperative planning and navigation validation using a virtual specimen
Ritacco LE, Milano FE, Ayerza MA, Muscolo DL, Farfalli GL, Aponte -Tinao LA

3) Postoperative 3D analysis of CT-based navigation assisted curved periacetabular osteotomy (CPO) using OrthoMAP 3D®
Tokunaga K, Dohmae Y, Miyasaka D, Watanabe K

4) Patient-tailored fixation plate for accurate 3D positioning in corrective osteotomy of the distal radius
Dobbe JGG, Vroemen JC, Strackee SD, Streekstra GJ

5) Assessment of bilateral symmetry of the radius and ulna: implications for optimal 3D planning of corrective procedures
Dobbe JGG, Vroemen JC, Jongs R, Strackee SD, Streekstra GJ

6) Short stem metaphyseal engaging implants: can insertion in varus be avoided?
Marquez -Lara A, Curtis D, Patel RM, Stulberg SD

7) Variation in coronal and sagittal stem alignment and its impact on prosthetic range of motion in total hip arthroplasty
Tanaka T, Takao M, Sakai T, Nishii T, Sugano N

8) 3D CT-angiography/angio MRI in assesment of vascular anatomy of intra pelvic vessels around acetabulum in preoperative planning of revision THR: a case report
Narendra HS, Roshankumar BN

9) Acetabular cup navigation using patient-specific guide and inertia sensors
Kunz M, Rudan JF, Mann S, Twiss R, Ellis RE

10) Radiologically silent loosening of the acetabular component in total hip arthroplasty

11) Variation in cup orientation using conventional cup alignment techniques as measured by CT
Murphy WS, Kowal JH, Murphy SB

12) Effect of incorrect docking on clinical accuracy of the HipSextantTM navigation system
Murphy WS, Wellman S, Kowal JH, Murphy SB

13) Retropatellar pressure distribution during 3D-patellar-tracking under muscular loading – dynamic measurements with an industrial robot to evaluate the influence of ligament instabilities
Hofbauer VR, Bittrich T, Glasbrenner J, Schulze M, Surke C, Koesters C, Rosenbaum D, Raschke MJ

14) Evaluation of biomechanical models for the planning of total hip arthroplasty

15) Coordinated control for CT-free robot-assisted total knee arthroplasty
Yen PL, Hung SS, Hsu SW
16) Navigated total knee arthroplasty: a five-year follow-up study of 97 consecutive patients
Sampath SA, Voon HS, Sangster M, Davies H

17) Rotational positioning of the femoral component in total knee arthroplasty with patellofemoral navigation: bicentric study about 145 cases
Piriou P, Peronne E

18) Wear pattern of femorotibial compartments in osteoarthritic knees with varus, neutral and valgus alignment
Khan MS, Jilani LZ, Deep K

19) Computer-assisted total knee replacement (CAS TKR) vs. conventional total knee replacement (TKR): postoperative ankle radiographic finding and ankle clinical assessment
Chompoosang T, Khongphaophong M, Chulasiri P, Sriphirom P

20) Special instrument or computer navigation for knee replacement surgery – whenever or when?
Kaminskiy AV, Gorbunov EV

21) Three-dimensional analyses of tibia vara with reference to a mid-sagittal plane in total knee arthroplasty
Enomoto H, Nakamura T, Shimosawa H, Niki Y, Kiriyama Y, Nagura T, Toyama Y, Suda Y

22) Quantitative measurement of mechanical alignment and coronal knee laxity throughout the early functional range of knee motion
Russell DF, Deakin AH, Fogg QA, Picard F

23) Initial clinical experiences using a new image based guidance system for K-wire insertion in scaphoid bone fractures
Schöll H, Mentzel M, Gülke J, Gebhard F, Kraus M

24) Finite element analysis of osteoporotic humerus fractures fixed with locking plate construct
Weil Y, Peleg E

25) Visualization of lumbosacral nerves during anterior sacroiliac plate fixation using navigation system: a case report
Takao M, Sakai T, Nishii T, Sugano N

26) Image-guided osteochondral autologous autografting of the ankle
Kunz M, Stewart AJ, Bardana DD

27) Development of computer assisted surgery technique for fixation of scaphoid fractures
Khamaisy S, Peleg E, Segal G, Chamed A, Luria S

28) Comparison of alignment unicompartmental knee replacement using conventional non-navigation technique with computer-assisted navigation technique
Pink M, Valousek T, Miklas M

29) Robotic-assisted unicompartmental knee arthroplasties with a minimum of 2-year follow-up
Plate JF, Augart MA, Seyler TM, Sun D, Von Thaer S, Poehling GG, Lang JE, Jinnah RH

30) ISO-CAOS: toward a new iso-based quality concept for modeling and evaluating accuracy in computer assisted orthopaedic surgery
Cartiaux O, Paul L, Docquier PL, Banse X

Session V – Total Knee Replacement, Part 2: Alignment

Chairmen: E.K. Song and P.L. Yen

15:30 In vitro comparison of two methods of detection of the functional hip center vs. anatomical hip center in computer assisted surgery
Dib Z, Dardenne G, Poirier N, Huet PY, Lefevre C, Stindel E

15:40 Three challenges of TKA – one force-torque-based solution: the genALIGN system
Zimmermann F, Asseln M, Rath B, Radermacher K

15:50 Accuracy of a novel computer-assisted guidance system for total knee arthroplasty
Angibaud LD, Silver XS, Gulbransen S, Stulberg B
16:00  Trabecular orientation in the human tibia and the relationship with lower-limb alignment for patients with osteoarthritis of the knee  
  Sampath SA, Lewis S, Fosco M, Tigani D

16:10  Anatomy-based patellar tracking in navigated total knee arthroplasty  

16:20  The amount of tibial slope does not affect the level of maximum flexion: a review of 123 navigated total knee arthroplasties  
  Sciberras NC, Deakin AH, Picard F

16:30  END OF THE DAY
**Friday, June 14, 2013**

7:45  **REGISTRATION**

### Session VI – Unicompartmental Knees, Part 1: Navigation & Patient Specific Implants

**Chairmen:**  A. Pearle and B. Jaramaz

- **8:00**  Navigation or patient specific instrumentation in unicompartimental knee arthroplasty: a prospective study  
  Confalonieri N, Aldè S, Manzotti A

- **8:10**  Improving the accuracy of unicompartimental knee arthroplasties  

- **8:20**  Comparative study of unicondylar knee arthroplasty performed using navigation system and conventional technique after 5 year follow-up  
  Seon JK, Song EK, Lee KJ, Park HW, Park C

- **8:30**  Minimum 5-year follow up of 253 consecutive computer assisted unicondylar knee replacement  
  Khakha RS, Norris M, Kheiran A, Chauhan SK

- **8:40**  NavioPFS for unicondylar knee replacement: Early cadaver validation  
  Jaramaz B, Nikou C, Simone A

- **8:50**  Evaluating joint laxity in UKR using NavioPFS  
  Jaramaz B, Picard F, Gregori A

- **9:00**  Functional differences between unicondylar and total knee arthroplasty using flexible electrogoniometry  
  Smith JR, Blyth M, Jones B, Maclean A, Rowe PJ

### Session VII – Arthroscopy & ACL

**Chairmen:**  E. Stindel and L.-P. Nolte

- **9:10**  Non-invasive, non-radiological quantification of anteroposterior knee joint ligamentous laxity  
  Russell DF, Deakin AH, Fogg QA, Picard F

- **9:20**  Double-bundle ACL reconstruction: novice surgeons utilizing computer-assisted navigation versus experienced surgeons  

- **9:30**  Navigated anatomic femoral tunnel placement using a transtibial technique for hamstring anterior cruciate ligament reconstruction  
  Sampath SAC, Voon HS, Sangster M, Davies H

- **9:40**  Navigated intra-articular us probe for 3D arthroscopic knee cartilage evaluation: in-vitro thickness measurement and cadaveric feasibility  

- **9:50**  3D ultrasound for accurate guidance of arthroscopic femoroacetabular impingement osteoplasty: a phantom model validation study  
  Buchan LL, Hacihaliloglu I, Ellis RE, Gilbart MK, Wilson DR

### Presidential Guest Lecture 2

- **10:00**  Why embracing navigation is the right thing to do  
  William Petty, M.D. (Exactech, Gainesville, Florida, USA)

### Coffee Break and Technological Breakout Session 6: IMU-Based Navigation (Supported by Zimmer, Inc.)

- **10:30**  COFFEE WILL BE SERVED IN THE INDUSTRIAL EXHIBITION AREA
**Session VIII – Total Knee Replacement, Part 3: Soft Tissue Balancing**

**Chairmen: A. Ferretti and C. Anglin**

11:30 A comparison of intra-operative laxity and clinical outcomes in single-radius versus multi-radius femoral design for total knee arthroplasty  
*Lee KJ, Song EK, Seon JK, Park HW, Park C*

11:40 Development of surgical algorithms for ligament balancing using an orthosensor instrumented tibial trial in total knee surgery  
*Meere PA, Walker PS, Bell CA*

11:50 Does posterior osteophyte of femoral condyle affect on gap balancing and limb alignment during computer assisted total knee arthroplasty? A preliminary study  

12:00 An elevated joint line after TKA leads to increased mid-flexion laxity  
*Klingenstein G, Cross MB, Plaskos C, Li AX, Nam D, Lyman S, Pearle AD, Mayman D*

12:10 Comparison of the lateral parapatellar and the medial parapatellar approaches in computer navigated arthroplasty for severe valgus deformity of the knee  
*Sankar B, Venkatraman R, Changulani M, Sapare S, Deakin AH, Deep K, Picard F*

12:20 Virtual reconstruction planning during revision total knee replacement  
*Jenny JY*

**Lunch Break and General Assembly of CAOS-International**

12:30 Lunch will be served in the industrial exhibition. All members of the International Society for Computer Assisted Orthopaedic Surgery are kindly invited to join the CAOS-International General Assembly in the Lecture Hall.

**Session IX – Tools and Techniques, Part 2**

**Chairmen: J.B. Cobb and M. De La Fuente**

14:00 Smart screwdriver for accurate intuitive surgery using the Exactech GPS system  
*De La Fuente M, Jeromin S, Boyer A, Billet S, Lavallée S, Stiehl J, Radermacher K*

14:10 Electrical impedance controlled milling – a novel approach towards removal of bone cement in RTHR  
*Niesche A, Mirz M, Korff A, Müller M, Brendle C, Leonhardt S, Radermacher K*

14:20 Accuracy of electromagnetic tracking in an image-guided surgery suite  
*Lugez E, Pichora DR, Akl SG, Ellis RE*

14:30 Towards occlusion-resistant surgical instrument tracking  
*Liu W, Ren H*

14:40 Surgical navigation and planning with minimum radiation in orthopaedic interventions  
*Ren H, Kang X*

14:50 Evaluation of a new computer-assisted guidance system  
*Boiardo RA, Brax M, Giordano GC, Hohl NS, Polakovic SV*

**Coffee Break and Poster Session – Part 2**

15:00 Posters S10-S14 were rated “Special Posters” indicating an exceptional quality of this work. Posters will be presented in five sessions, during which the authors of the respective session’s posters will be present at the poster booths. However, all posters and special posters of all sessions will be on display during the entire time of the meeting.

S10) Percutaneous femoral de-rotation osteotomy using a combination of computer navigation, intramedullary saw and a cephalomedullary nail – description of a technique  
*Taylor RJ, Williams JC, Pereira GC*
S11) Scapula statistical shape model construction based on watershed segmentation and 3D elastic registration
Mayya M, Poltaretskyi S, Hamitouche CH, Chaoui J

S12) Computer-assisted surgery as indication of choice: total knee arthroplasty in case of retained hardware or extra-articular deformity
Tigani D, Fosco M, Ben Ayad R, Amendola L

S13) Radiographic analysis of an accelerometer-based system for the tibial resection in total knee arthroplasty

S14) Scaphoid fracture angle – three dimensional analysis of fracture morphology

31) Segond’s fracture: a biomechanical study using navigation
Ferretti A, D’Arrigo C, Monaco E, Maestri B, Conteduca F

32) Is it possible to measure accurately the anterior knee laxity prior to the ACL reconstruction? A comparison between pre-operative GNRB measurements and intra-operative navigation measurements
Jenny JY

33) The transverse acetabular ligament and acetabular margin as a guide to cup orientation in total hip arthroplasty
Deep K

34) Assessing the value of robotics in joint replacement surgery
Bargar WL

35) Ergonomic review of the factors resulting in localised fatigue with surgical robotics
Banger M, Rowe PJ

36) Shape analysis of bones reverse engineered from CT images
Venne G, Swe-Pui Lee B, Smith EJ, Ellis RE

37) Low incidence of complications in computer assisted total knee arthroplasty – a retrospective review of 1596 cases
Khakha RS, Norris M, Kheiran A, Chauhan SK

38) Outcomes of trainees’ experience of computer assisted total knee replacement with minimum follow-up of 5 years
Khakha RS, Kheiran A, Sivaprakasam M, Chauhan SK

39) Preoperative prediction of gap balance based on the radiographic flexion and extension laxities in robotic total knee arthroplasty
Park HW, Song EK, Seon JK, Lee KJ, Park C

40) The influence of reference point definition to cut proximal tibia on the thickness of tibial osteotomy and on the joint gap in total knee arthroplasty
Shimosawa H, Enomoto H, Niki Y, Toyama Y, Suda Y

41) Evaluation of the alignment discrepancies during total knee arthroplasty using an image-free computer-assisted guidance system
Angibaud LD, Silver XS, Stulberg B

42) Disambiguation of 3D reconstruction of lower limbs from biplanar X-rays using shape criteria
Quijano S, Aubert B, Thoreux P, Rouch P, Skalli W

43) Implant image navigation with minimally invasive insertion for fractures and osteotomies of the distal femur – a preliminary report
Weil YA, Goldman V, Liebergall M

44) Femoral fracture reduction with parallel manipulator robot on traction table
Lin H, Wang JQ

45) Camera spy: an intra-operative teaching tool
Picard G, Blair M, Picard F

46) Time analysis of Mako RIO UKA procedures in comparison to the Oxford UKA
Banger M, Rowe PJ, Blyth M
**Session X – Total Hip Replacement, Part 2: Outcome**

Chairmen: T. Masaki and C. Belvedere

16:20 A multicenter evaluation of acetabular cup positioning in robotic-assisted total hip arthroplasty  
*Dounchis J, Elson L, Bragdon C, Padgett D, Marchand R, Illgen R, Malchau H*

16:30 Accuracy and precision of computer navigation in total hip arthroplasty  
*Khan MS, Goudie S, Deep K*

16:40 Comparison of surgical accuracy in image free THA navigation of different versions  
*Nishio S, Fukunishi S, Fukui T, Fujihara Y, Okahisa S, Yoshiya S*

16:50 Accuracy of acetabular cup placement in navigated THA with modified registration technique in semilateral decubitus position  
*Sakathien Y, Sudprasert W, Seurjui J*

17:00 Assessment of the accuracy of the femoral prosthesis antetorsion in THA with image-free navigation and gravity guide  
*Fukunishi S, Nishio S, Fukui T, Fujihara Y, Morimoto S, Yoshiya S*

**Session XI – Oncology & Osteotomy**

Chairmen: M. Liebergall and F. Leitner

17:10 Results of navigated open wedge high tibial osteotomy compared with conventional cable technique  
*Seon JK, Song EK, Lee KJ, Park HW, Park C*

17:20 The acetabular coverage and hip range of motion after reorientation osteotomy of the acetabulum  
*Hamada H, Takao M, Nishii T, Sakai T, Sugano N*

17:30 Computer-assisted X-ray image-based navigation of periacetabular osteotomy with fiducial based 3D acetabular fragment tracking  
*Murphy RJ, Otake Y, Lepisto J, Armand M*

17:40 Computer assisted surgery: applications in orthopedic oncology  
*Gerbers JG, Jutte PC*

17:50 Computer navigation aided precision excision for sacrum chordoma  
*Zhang Q, Niu X, Wang T, Xu L, Ma K*

**CAOS Gala Dinner**

19:00 The 2013 CAOS Gala Dinner will take place at Palm Grand Ballroom, Hilton Orlando  
- Honoring CAOS-International Past Presidents  
- Presentation of the Maurice E. Müller Award for Excellence in Computer Assisted Surgery currently sponsored by Medacta International SA  
- Introduction of the new CAOS-International President  
- Invitation to the 14th Annual Meeting of CAOS-International in Milan

22:30 END OF THE DAY
Saturday, June 15, 2013

7:45  **BREAKFAST**

**Session XII – Total Knee Replacement, Part 4: Outcomes & Robotics**

**Chairmen:**  F. Picard and S. Bignozzi

8:00  Five-year follow-up of minimally invasive computer assisted total knee arthroplasty (MICATKA) versus conventional computer assisted total knee arthroplasty (CATKA) – a comparative study  
*Khakha RS, Norris M, Kheiran A, Chauhan SK*

8:10  Complications in conventional versus computer-assisted navigation in sequential bilateral total knee arthroplasty  
*Merz MK, Boenenkamp FC, Sadr KN, Goldstein WM, Gordon AC*

8:20  Our experience using CAS for total knee replacement  
*Bayers-Thering MT, Phillips MJ, Krackow KA*

8:30  Press-fit total knee arthroplasty with a robotic-cutting guide – proof of concept and initial clinical experience  
*Ponder CE, Plaskos C, Cheal EJ*

8:40  Influence of pre-operative deformity on surgical accuracy and time in robotic-assisted TKA  
*Koenig JA, Plaskos C*

8:50  Robotic-assisted total knee arthroplasty with minimum follow-up 7 years compared with conventional total knee arthroplasty  
*Park HW, Song EK, Seon JK, Lee KJ, Park C*

**Session XIII – Total Hip Replacement, Part 3: Intraop**

**Chairmen:**  K. Tokunaga and M. Conditt

9:00  Computer-assisted intraoperative measurement of leg-length in total hip arthroplasty  
*Ecker TM, Steppacher SD, Murphy SB*

9:10  Comparison of computer navigated vs non navigated techniques in leg length restoration in total hip arthroplasty  
*Sankar B, Atiya S, Changulani M, Khan MS, Deakin A, Deep K*

9:20  Leg length control during total hip replacement: the effect of a navigation measurement  
*Jenny JY, Viau A*

9:30  Cup positioning in total hip arthroplasty using the Mako robotic hip system: a pilot study with a matched-pair control group  
*El Bitar Y, Stake CE, Botser IB, Jackson TJ, Lindner D, Domb BG*

9:40  Clinical evaluation of an inertial measurement unit in monitoring pelvic position during total hip arthroplasty  
*Barr CJ, Nebergall AK, Scarborough DM, Braithwaite G, Kwon YM, Rubash HE, Muratoglu OK, Malchau H*

9:50  Influence of soft tissue impingement on range of motion during posterior approach THA: in vivo measurement study using CT-based navigation system  
*Nakamura N, Iwana D, Kitada M, Maeda Y, Sakai T*

**Coffee Break and Poster Session – Part 3**

10:00  **POSTERS S15-S18 WERE RATED “SPECIAL POSTERS” INDICATING AN EXCEPTIONAL QUALITY OF THIS WORK. POSTERS WILL BE PRESENTED IN FIVE SESSIONS, DURING WHICH THE AUTHORS OF THE RESPECTIVE SESSION’S POSTERS WILL BE PRESENT AT THE POSTER BOOTHS. HOWEVER, ALL POSTERS AND SPECIAL POSTERS OF ALL SESSIONS WILL BE ON DISPLAY DURING THE ENTIRE TIME OF THE MEETING.**

S15)  The effect of navigator on length of stay and rehabilitation for total hip arthroplasty patients  
*Suksathien R, Suksathien Y*
S16) Combined MR imaging for the assessment of knee joint kinematics under full bodyweight-bearing
   *Al Hares G, Eschweiler J, Radermacher K*

S17) Reproducibility of in vivo femoro-pelvic joint angle measurements upon repositioning assessed using open MRI imaging under weightbearing conditions with applications to femoroacetabular impingement
   *Kang XM, Wilson DR, Hodgson AJ*

S18) Clinico-radiological analysis of outcomes of total knee arthroplasty with a unique technique of gap balancing using navigation assistance
   *Abhishek SP, Song EK, Seon JK, Park HW, Lee KJ, Park C*

47) Automated laser registration and quantitative assessment of articular cartilage for computer assisted orthopaedic surgery
   *Joshi SV, Rowe PJ, Pierce G, Ahmed KE, Macleod C*

48) Primary malignant bone tumor resection and joint-sparing surgery under computer navigation
   *Niu X, Zhang Q, Wang T, Yu F, Zhao H, Xu L*

49) Identification of the safe zones for landmark registration with an imageless navigation system during total knee arthroplasty
   *Pereira GC, Amanatullah DF, Meere PA, Di Cesare PE*

50) Orthopilot system navigation in total hip surgery: accuracy of a light software in a study with 75 patients
   *Panisset JC, Chappuis J*

51) Assessing registration quality in the operating room: a statistical approach
   *Hawke T, Jakopec M, Rodriguez Y Baena F*

52) Determination of bone coordinates and kinematic assessment of knee motion using skeletal markers in a cadaver study
   *Hung SS, Yen PL, Lee MY, Tseng GF*

53) The Q-angle and its effect on active kinematics – a simulation study
   *Asseln M, Zimmermann F, Eschweiler J, Radermacher K*

54) Using graphics processing units to achieve real-time bone surface extraction from volumetric medical ultrasound image data using local phase features
   *Amir-Khalili A, Abugharbieh R, Hodgson AJ*

55) Is there any advantage on short-term results of patient-specific instrument guided total knee arthroplasty?
   *Lee KJ, Song EK, Seon JK, Park HW, Park C*

56) Patient specific instrumentation with preexisting ipsilateral hardware
   *Alvi HM, Luo M, Talati R, Sweeney P, Patel AR, Yaffe MA, Stulberg SD*

57) The evaluation of manual 2D/3D registration technology and its potential to deduce prosthetic wear in patients with metal-on-metal hip resurfacing prostheses
   *Chu JYY, St. John P, Kunz M, Rudan JF, Eastal RA*

58) Comparative study of stability, radiological and clinical outcomes after total knee arthroplasty between navigation system and conventional technique at 10 years follow-up
   *Seon JK, Song EK, Park HW, Lee KJ, Park C*

59) Preoperative planning for complex reconstructive surgery in orthopaedic trauma
   *Leung KS, Chui CSE, Tang N, Tso CY*

60) Kinematic walking assessment to compare robotic assisted and conventional unicompartmental knee arthroplasty
   *Motesharei A, Rowe P, Smith J, Blyth M, Jones B, MacLean A*

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**Session XIV – Unicompartmental Knees, Part 2: Robotics**

**Chairmen:** N. Confalonieri and S. Lavallée

11:00 Patient specific "à la carte" knee reconstruction with unicompartmental knee replacement – a feasibility study
   *Jenny JY*
11:10 The accuracy of a robotically-controlled freehand sculpting tool for unicompndylar knee arthroplasty
*Smith JR, Picard F, Rowe PJ, Deakin A, Riches PE*

11:20 Robot-assisted, custom-made, unicondylar knee arthroplasty for traumatic osteoarticular loss
*Andrews BL, Summugum S, Clarke S, Floyd D, Aqil A, Cobb JP*

11:30 Robot-assisted, patient-specific, medial unicompartmental knee arthroplasty
*Andrews BL, Aqil A, Cobb JP*

11:40 Lower limb alignment control: is it more challenging in lateral compared to medial unicondylar knee arthroplasty?
*Khamaisy S, Brian B, Denis D, Reinhardt K, Pearle A*

11:50 Robotic-assistance enables inexperienced surgeons to perform unicompartmental knee replacements accurately on their first attempt
*Karia MK, Andrews BA, Masjedi MM, Jaffry ZJ, Cobb JP*

12:00 Improving outcomes of lateral unicompartmental knee arthroplasty with robotic-assisted surgery
*Augart MA, Plate JF, Seyler TM, Von Thaer S, Allen J, Sun D, Poehling GG, Jinnah RH*

12:10 Comparison of outcomes of robotic and manually implanted unicompartmental knee arthroplasty
*Hansen DC, Palmer RM, Botkin K, Wasielewski RC, Kusuma SK*

### Scientific Awards Ceremony

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### Closing

12:45 Closing remarks
*Robert L. Thornberry*

13:00 MEETING ADJOURNS

### Venue Information

**Venue**
Hilton Orlando Lake Buena Vista
1751 Hotel Plaza Boulevard,
Lake Buena Vista, Florida 32830
USA
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CAOS 2014

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CAOS 2014 Milan
International Society for Computer Assisted Orthopaedic Surgery

June 18-21