Vancouver, Canada, June 17-20, 2015

Computer Assisted Orthopaedic Surgery

15th Annual Meeting of CAOS-International Final Program

CAOS International

Award Sponsorship:

CAOS International thanks the following organizations for their support in recognizing excellence in the field of computer assisted orthopaedic surgery:

MEDACTA AWARD FOR M. E. MÜLLER EXCELLENCE
IN COMPUTER ASSISTED ORTHOPAEDIC SURGERY

BEST PRESENTATION AND BEST POSTER AWARDS

Front cover: the *Ga'akstalas* pole from the Kwakwaka'wakw First Nation of northern Vancouver Island, currently located at Brockton Point in Stanley Park. Designed by Russel Smith and carved by Wayne Alfred and Beau Dick. The 2015 CAOS conference is being held on the traditional and unceded lands of the Coast Salish people.

Conference Chair

Antony Hodgson, PhD
Director, Graduate Program in Biomedical Engineering
Centre for Hip Health and Mobility
University of British Columbia, Vancouver, Canada

Program Committee

Ferdinando Rodriguez y Baena, PhD, UK (Chair)
Joshua Giles, PhD, UK (Adjunct to the Chair)
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Leo Joskowicz, PhD, Israel
Nobu Sugano, MD, Japan
Tetsuyou Watanabe, PhD, Japan
David Kahler, MD, USA
Branko Jaramaz, PhD, USA
Kwok Leung, MD, China

Award Committees

On Friday evening, we will present the Medacta Award for for M. E. Müller Excellence in Computer Assisted Orthopaedic Surgery. Prof. Randy Ellis chaired this award committee.

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

Chair: Angela Deakin
Klaus Radermacher
Nobuhiko Sugano
Jong Keun Seon
Jean-Yves Jenny
Moshe Shoham
Kamal Deep

BEST POSTER PRESENTATION COMMITTEE

Chair: Branko Jaramaz
Philippe Merloz
Ferdinando Rodriguez y Baena
Chris Plaskos
Carolyn Anglin
Kwok-Sui Leung

Program at a Glance – CAOS

All oral presentation sessions in Saturna Island Room (one level up from Exhibition Hall) unless otherwise noted. Poster sessions on Exhibition Hall level.

Thursday, June 18

08:00 – 09:00	Session 1: Robot Assisted Arthroplasty
09:00 – 10:00	Panel 1: Measurement of Accuracy in CAOS
10:00 – 10:30	Poster Session and Special Posters
10:30 – 11:00	Break
11:00 – 12:00	CAOS Procedure Video Demonstrations
12:00 – 13:00	Lunch
13:00 – 14:30	Joint Symposium (Pacific Ballroom): Orthopaedics and Technology Plenary: A Brief History of CAOS – Prof. Klaus Radermacher Panel: Current Technical Needs in Orthopaedics
14:30 – 15:00	Break
15:00 – 15:30	Poster Session and Special Posters
15:30 – 16:30	Panel 2: Radiostereometric Analysis (RSA)
16:30 – 17:30	Session 8: Total Hip Arthroplasty 1
17:45	President's Dinner (invitation only); shuttle pickup at Hotel Vancouver
17:45	Young Investigators' Dinner; meet guide in Hotel Vancouver lobby

Friday, June 19

08:00 – 09:00	Session 9: Total Knee Arthroplasty 1	
09:00 – 10:00	Panel 3: Alignment of the Knee	
10:00 – 10:30	Poster Session and Special Posters	
10:30 – 11:00	Break	
11:00 – 12:00	Session 12: Novel Navigation & Planning	
12:00 – 12:30	AGM	
12:30 – 13:30	Lunch	
13:30 – 14:30	Panel 4: New Knee Ligaments: Implications for CAOS	
14:30 – 15:00	Break	
15:00 – 15:30	Poster Session and Special Posters	
15:30 – 16:00	Session 16: Registration & Shape Models	
16:00 – 17:00	Session 17A: Extended Talks – Cortes Island Rm.	Session 17B: Total Knee Arthroplasty 2
17:00 – 18:00	Session 18A: Extended Talks – Cortes Island Rm.	Session 18B: Total Hip Arthroplasty 2
18:15	Gala Dinner at Vancouver Aquarium; shuttle pickup at Hotel Vancouver	
19:30	Awards Ceremony in Lower Teck Gallery, Vancouver Aquarium	

Saturday, June 20

08:00 – 09:00	Session 19: Spine
09:00 – 10:00	Session 20: Fracture, Fluoroscopy & Assessment
10:00 – 10:30	Poster Session and Special Posters
10:30 – 11:00	Break
11:00 – 12:30	Joint Symposium (Pacific Ballroom) Total Knee Replacement: Beyond Navigation
12:30 – 13:00	Awards (Vancouver Island room)

Canadian Orthopaedic Association Mobile Apps Available for Download

The COA Mobile Apps contain the Programs-at-a-Glance for the following meetings:

- COA: Canadian Orthopaedic Association
- CAOS: Computer Assisted Orthopaedic Surgery
- CORS: Canadian Orthopaedic Research Society
- CORA: Canadian Orthopaedic Resident Association

Available on both the App Store and in Google Play.

Wireless Access

Join: Fairmont Meeting **Group name**: COA2015 **Access Code**: COA2015

Online Proceedings

Conference proceedings will be available online via the conference website starting June 18, 2015.

Program at a Glance – COA

ICL = Instructional Course Lecture
Hyatt = Hyatt Hotel – 1 block away from Hotel Vancouver

Thursday, June 18

07:00-08:30	ICL 1: Sunlife Transition Planning	Boardroom
	ICL 2: Education: Antibiotic Prophylaxis for Dental Interventions following TJR	Tweedsmuir
	ICL 3: Foot and Ankle/Paediatrics	Hyatt - Grouse
	CORS Paper Session 1: Bone, Ligament, and Tendon	Waddington
07:15-08:45	Symposium 1: Patient Safety and Quality	Pacific Ballroom (Plenary)
08:30-10:30	CORS Paper Session 2: Arthroplasty	Waddington
09:00-10:30	Coffee Break	Exhibit Hall (BC Ballroom)
10:30-11:00	Grad Ceremony, COA Business Meeting, CORL & Sasmon awards	Pacific Ballroom (Plenary)
12:00-13:00	Lunch	Exhibit Hall (BC Ballroom)
13:00-14:30	Symposium 2: Ortho and Technology	Pacific Ballroom (Plenary)
	CORS Paper Session 3: Joints and Arthritis	Waddington
	CORS Paper Session 4: Spine	Boardroom
	COA Education Workshop: Development and implementation of Prof. Acts	Tweedsmuir
	Paper Session: Hip 1	Hyatt - English Bay
	Trauma Symposium: How to Get your Hip Fracture Patient Ready for the O.R.	Vancouver Island
14:30-15:00	Coffee Break	Exhibit Hall (BC Ballroom)
15:00-16:30	CORS Symposium and Macnab Lecture	Waddington
	Symposium 3: Practice	Pacific Ballroom
	mgmt., Education, and Reg. in Ortho.	(Plenary)
16:30-17:00	R.I. Harris Lecture	Pacific Ballroom (Plenary)
17:00-18:00	Fireside Chats Tough Cases: Trauma	Waddington
	Fireside Chats Tough Cases: Arthroplasty	Vancouver Island
	Fireside Chats Tough Cases: Foot and Ankle	Tweedsmuir
	Fireside Chats Tough Cases: Sports	Cortes
	Fireside Chats Tough Cases: Paeds.	Boardroom

Friday, June 19

07:15-08:45	ICL 4: Arthroplasty Recovery after PJR	Pacific Ballroom- Plenary
	ICL 5: Paeds./Tumour	Tweedsmuir
	ICL 6: Sports 1: Injuries to the Acrom. And Steyno. Joint	Vancouver Island
	COFAS Research Mtg.	Hyatt - Grouse
	Paper Session: Education	Boardroom
09:00-10:30	Paeds. Symposium: T&T for Trauma Toddlers, Adolescence	Tweedsmuir
	Paper Session: Hip 2	Pacific Ballroom- Plenary
	Paper Session: Knee 1	Waddington
	Paper Session: Sports	Vancouver Island
	Paper Session: Foot and Ankle	Hyatt - English Bay
	Paper Session: Tumour	Boardroom
10:30-11:00	Coffee break	Exhibit Hall (BC Ballroom)
11:00-11:30	Presidential Guest speaker	Pacific Ballroom (Plenary)
11:30-12:30	President-elect address and transfer of office	Pacific Ballroom (Plenary)
12:30-13:30	Lunch	Exhibit Hall (BC Ballroom)
13:30-17:00	COFAS Lab	CESEI- VGH
13:30-15:00	Tips and Tricks: Sports	Vancouver Island
	Tips and Tricks: Arthroplasty	Pacific Ballroom (Plenary)
	Paper Session: Hand/Upper Extremity	Waddington
15:00-15:45	Coffee break	Exhibit Hall (BC Ballroom)
15:45-17:15	Symposium: Sports	Vancouver Island
	Symposium: Upper Extremity	Waddington
	Symposium: Hand	Boardroom
	Paper Session: Knee 2	Pacific Ballroom (Plenary)
	Paper Session: Critical Issues	Hyatt - English Bay
	Paper Session: Peads.	Tweedmuir

Saturday, June 20

07:15-08:45	ICL 7: Arthorplasty: Mgmt. of Joint infections	Pacific Ballroom (Plenary)
	ICL 8: Sports 2: Deciding Optima Intervention for pain. Hip	Waddington
	ICL 9: F&A/ Trauma	Vancouver Island
	ICL10: UE Challenges in Shoulder Arthroplasty	The Roof
	ICL11: Spine	Hyatt Grouse
08:45-10:45	Symposium 4: Global Ortho.	Pacific Ballroom (Plenary)
10:30-11:00	Coffee Break	Pacific Ballroom Foyer
11:00-12:30	Symposium 5: TKR beyond Navigation	Pacific Ballroom (Plenary)
	Trauma Symposium 2	Vancouver Island
	Paper Session: Paeds./Spine	Hyatt Grouse
	Paper Session: Upper Extremity	The Roof
12:30-13:15	Lunch	Pacific Ballroom Foyer
13:15-14:45	Paper Session: Hip 3	Pacific Ballroom (Plenary)
	Paper Session: Sports	Waddington
	Paper Session: Trauma 2	Vancouver Island
	Paper Session: Upper Extremity 2	The Roof
	Paper Session: Spine	Hyatt Grouse

Thursday, June 18th, 2015

All oral and panel presentations will be held in the Saturna Island room unless otherwise noted.

07:30-08:00 Breakfast

08:00-09:00 Session 1: Robot Assisted Arthroplasty

CHAIRS: *Norberto Confalonieri and Klaus Radermacher*

08:00 *Benjamin Domb, John Redmond, Alexandra Petrakos, Chengcheng Gui, Jennifer Christopher,* ***Dr. Parth Lodhia*** *and Carlos Suarez-Ahedo*
***Accuracy of Component Positioning in 2330 Total Hip Arthroplasties: A Comparative Analysis by Surgical Technique and Mode of Guidance.** [PDF]

08:10 *Thomas Coon, Alvaro Hernandez and* ***Dr. Michael Conditt***
***Short Term Survivorship and Outcomes of Robotically Assisted Bicompartmental Arthroplasty** [PDF]

08:20 *Carlos Suarez-Ahedo, Chengcheng Gui, Timothy Martin, Christine Stake, Sivashankar Chandrasekaran,* ***Jennifer Christopher*** *and Benjamin Domb*
***Preservation of Acetabular Bone Stock in Total Hip Arthroplasty Using Conventional vs. Robotic Techniques: A Matched-Pair Controlled Study** [PDF]

08:30 *Wei Tian, Yajun Liu, Mingxing Fan and* ***Dr. Xiaoguang Han***
Accuracy and safety assessment of spinal implants assisted by the Robotic Spinal Surgery System: animal study [PDF]

08:40 ***Dr. Branislav Jaramaz****, Constantinos Nikou, Michael Casper, Stephen Grosse and Riddhit Mitra*
***Accuracy Validation Of Semi-Active Robotic Application For Patellofemoral Arthroplasty** [PDF]

08:50 *Eun-Kyoo Song,* ***Dr. Jong-Keun Seon****, Seung-Hun Lee and Young-Jun Seol*
Robot-assisted Total Knee Arthroplasty with Minimum Follow-up Nine years Compared with Conventional Total Knee Arthroplasty [PDF]

09:00-10:00 Session 2: Panel Discussion - Measurement of Accuracy in CAOS

CHAIRS: *Olivier Cartiaux and Leo Joskowicz*
Panelists: K. Radermacher (Germany), B. Jaramaz (USA), Y. Diesinger (France), B. Thornberry (USA) and M. Conditt (USA).

The panel is part of a standardization project entitled "Accuracy Measurements in Computer-Assisted Orthopaedic Surgery". The International Society for Computer Assisted Orthopaedic Surgery (CAOS-International) is planning to submit a proposal by the end of 2015 to the ISO Central Secretariat in Geneva, Switzerland, for the development of a new consensus-based ISO standard on accuracy measurements in CAOS based on the views and needs of researchers, clinicians, and industry. For this purpose, we are planning to apply for European funds (COST or H2020) to finance the project for the development of the ISO standard.

10:00-10:30 Session 3A: E-Poster Set 1

LOCATION: Main Foyer

Takeshi Ogawa, Masaki Takao, Futoshi Yokota, Takashi Sakai, Takashi Nishii, Yoshito Otake, Yoshinobu Sato and Nobuhiko Sugano
Are 2D Measurements Of Muscle Atrophy And Degeneration Valid In Patients With Hip Disease? [PDF]

Daniel Giles, Michael P. Kempston, Richard W. Sellens, Randy E. Ellis and David R. Pichora
Locked Versus Non-Locked Plating For The Fixation Of Distal Radius Fractures: A Biomecical Comparison [PDF]

An asterisk (*) in front of an oral presentation title indicates that the authors have disclosed a potential or real conflict of interest in some aspect of the paper being presented. Conflicts of interest related to both posters and oral presentations are disclosed in the proceedings. Authors in boldface indicate the person scheduled to present the paper.

Ping-Lang Yen, Shuo-Suei Hung and Yi-Jing Chu
Study Of Muscular Effects On Measurement Accuracy Of Skin Markers [PDF]

Yifei Dai, Laurent Angibaud and Barton Harris
Evaluation of Tracker Visibility during Computer-Assisted Total Knee Arthroplasty [PDF]

Yu Takeda, Shigeo Fukunishi, Yuki Fujihara and Shiniti Yoshiya
Accuracy Of Component Orietation And Leg Length Adjustments Using A Revised Version Image-Free Navi gation In Total Hip Arthroplasty [PDF]

Peter Richter, Florian Gebhard and Michael Kraus
First experience with laser guided percutaneous pedicle screw placement in the lumbar spine [PDF]

Saker Khamaisy, Hendrik Zuiderbaan, Meir Liebergall and Andrew Pearle
Coronal Tibiofemoral Subluxation in Knee Osteoarthritis [PDF]

Seung-Jae Lim, In-Kwon Yeo, Su-Cheol Kim and Youn-Soo Park
Effects of Micro-Arc Oxidation Coating on Outcomes of a Cementless Grit-Blasted Tapered-Wedge Stem in Total Hip Arthroplasty [PDF]

10:00-10:30 Session 3B: Special Posters

LOCATION: Pacific Ballroom Foyer

Yuki Nakanishi, Yoshiyuki Kagiyama, Futoshi Yokota, Masaki Takao, Takeshi Ogawa, Nobuhiko Sugano, Yukio Tada, Yoshito Otake and Yoshinobu Sato
Handling different designs of femoral stems for automated THA planning: Determination of stem anteversion angle using statistical prediction [PDF]

Chun-Sing Chui, King-Lok Liu, Lik-Hang Hung and Kwok-Sui Leung
Criticial Postoperative Analysis Of Patient-Specific Instrument Assisted Corrective Osteotomy Using 2D/3D Registration [PDF]

Michael Kraus, Florian Gebhard and Peter Richter
Effective dose of intraoperative 3D imaging in spine surgery [PDF]

Seung-Jae Lim, In-Kwon Yeo, Su-Choel Kim and Youn-Soo Park
Robot-assisted Primary Cementless Total Hip Arthroplasty with a Short Bone Conserving Stem: A Prospective Randomized Short-term Outcome Study [PDF]

10:30-11:00 Coffee Break

11:00-12:00 Session 4: CAOS Clinical Video Demonstrations

CHAIR: *Antony Hodgson*

CATKR – Chaiyaporn Siramanakul (Rangsit University, Thailand)
Computer Aided ACL Reconstruction – Shameem Sampath (Imperial College of London)
Camera-Augmented C-Arm Surgery – Anna von der Heide (Technical University of Munich)
O-Arm-Navigated Spine Surgery – Ganesh Swamy (University of Calgary)
OmniNAV Robotic Total Knee Arthroplasty – Jan Koenig (Winthrop University Hospital, NY)

12:00-13:00 Lunch Break

13:00-14:30 Session 5: Joint Symposium - Orthopaedics and Technology

CHAIRS: *Antony Hodgson and John Rudan*

LOCATION: Pacific Ballroom
Plenary Address: *A Brief History of Computer-Assisted Orthopaedic Surgery*
Prof. Klaus Radermacher, RWTH Aachen, Germany

Panel: *Current Technical Needs in Orthopaedics*

- Anthony Cooper, BC Children's Hospital, Pediatric Orthopaedics
- John Street, Vancouver General Hospital, Spine
- Emil Schemitsch, St. Michael's Hospital, Toronto, Hip Arthroplasty
- Alastair Younger, St. Paul's Hospital, Vancouver, Foot and Ankle

14:30-15:00 Coffee Break

15:00-15:30 Session 6A: E-Poster Set 2

LOCATION: Main Foyer

Pei-Yuan Lee, Ming-Hsien Hu and Min-Liang Wang
A Wearable Glasses System Development for Spinal Image Fusion and Surgery by Using Mixed Reality Technology [PDF]

Mohammad Arafat Hussain, Pierre Guy, Antony Hodgson and Rafeef Abugharbieh
Automatic Bone Segmentation In Ultrasound Using Combined Strain Imaging And Envelope Signal Power [PDF]

Sven Vetter, Benedict Swartman, Johanna Pelzer, Paul Alfred Grützner and Jochen Franke
Clinical results after minimal invasive navigated screw osteosynthesis of the acetabulum [PDF]

Hooman Esfandiari, Derek Lichti and Carolyn Anglin
A Robust, Accurate And Low Cost C-Arm Base-Tracking System [PDF]

Qiang Yuan, Shan Zheng and Wei Tian
Computer assisted minimally invasive spine surgery for resection of ossification of the ligamentum flavum in the thoracic spine [PDF]

Michele Touchette, Robyn Newell, Carolyn Anglin, Meena Amlani, Pierre Guy and Antony Hodgson
Evaluation of the VirtX training system for simulation of C-arm operation in the operating room setting [PDF]

Rahul Khare and Branislav Jaramaz
Accuracy and inter-user variability of UKR component varus/valgus measurements using simulated long standing AP radiographs [PDF]

Eun-Kyoo Song, Jong-Keun Seon, Seung-Hun Lee and Young-Jun Seol
Results of Total Knee Arthroplasty Using Ligament-specific Navigation-assisted Gap Balance Technique [PDF]

Eun-Kyoo Song, Jong-Keun Seon, Seung-Hun Lee and Young-Jun Seol
Comparison of Mid-term Results of TKA performed using Navigation System and Conventional Technique [PDF]

15:00-15:30 Session 6B: Special Posters

LOCATION: Pacific Ballroom Foyer

Motoko Nakasone, Satoshi Nakasone, Chojo Futenma, Masaki Kinjo, Kenji Horiki, Takeshi Murase and Fuminori Kanaya
Three-Dimensional Deformity Analysis Of The Forearm Bones In Congenital Proximal Radioulnar Synostosis [PDF]

David Wilson, Pia Bucher, Martin Grewe, Carolyn Anglin, Stefen Zachow and Michael Dunbar
Validation Of Three Dimensional Models Of The Distal Femur Created From Surgical Navigation Point Cloud Data [PDF]

Keisuke Uemura, Masaki Takao, Takashi Sakai, Takashi Nishii and Nobuhiko Sugano
Muscle volume recovery of the gluteus maximus, gluteus medius and thigh muscles after hiparthroplasty [PDF]

Mohamed Hefny, John Rudan and Randy E. Ellis
Lie Group Shape Models: A Core Technology For A Computer-Assisted Surgery Open Framework [PDF]

15:30-16:30 Session 7: Panel Discussion - Radiostereometric Analysis

CHAIRS: *Glen Richardson and Trevor Gascoyne*
Panelists: Academic: Elise Laende / Matthew Teeter; Industry: Erik Giphart / Chad Munroe / John Simon; Surgical: Glen Richardson / Doug Naudie / Eric Bohm / Martin Lavigne.

Simple, precise diagnostic imaging in orthopaedics Radiostereometric analysis (RSA) was pioneered 40 years ago in Sweden and is a relatively simple technological advancement over traditional radiography which allows researchers to accurately track fixation, wear, and movement of joint replacements in vivo, making it a valuable tool for assessing efficacy of orthopaedic devices. Four Canadian orthopaedic centres have collaborated to form the Canadian RSA Network; a non-profit company providing standardized, multi-centred RSA research of orthopaedic products in order to enhance the health and function of Canadian orthopaedic patients. Collectively, this Network has decades of RSA experience and strives to promote and advance RSA technology in Canada.

16:30-17:30 Session 8: Total Hip Arthroplasty 1

CHAIRS: *Carolyn Anglin and Jong Keun Seon*

16:30 ***Dr. Hidetoshi Hamada**, Masaki Takao, Keisuke Uemura, Takashi Sakai, Takashi Nishii and Nobuhiko Sugano*
What Morphological Factors Influence On Hip Flexion Range Of Motion After Rotational Acetabular Osteotomy? - CT Simulation Study [PDF]

16:40 ***Dr. Norberto Confalonieri** and Alfonso Manzotti*
Problems, Obstacles And Complications In More Than 400 Navigated Modular Short Stems In Hip Arthroplasty [PDF]

16:50 ***Yuki Fujihara**, Shigeo Fukunishi, Yu Takeda and Shinichi Yoshiya*
Clinical Study For Measurement Of Stem Antetorsion During Total Hip Arthroplasty. CT Free Navigation Vs G-Guide [PDF]

17:00 ***Dr. Kunihiko Tokunaga***
The EOS X-Ray Imaging Acquisition System is useful to measure the implant angles after THA in standing positions [PDF]

17:10 ***Dr. Shigeo Fukunishi**, Yuki Fujihara, Yu Takeda and Shinichi Yoshiya*
Accuracy Of Combined Anteversion In The Combined Anteversion Technique With Image-Free Navigated Total Hip Arthroplasty [PDF]

17:20 ***Dr. Yuki Maeda**, Nobuo Nakamura, Makoto Hamawaki, Takashi Nishii and Nobuhiko Sugano*
Improvement of activities of daily living after Total Hip Arthroplasty using computed tomography based navigation system [PDF]

President's Dinner Cruise (by invitation)
17:45 Shuttle pickup at Hotel Vancouver
22:15 Return to Hotel

Young Investigators' Dinner
Young Investigators' Dinner (Cactus Club Coal Harbour)
17:45 Meet guide in Hotel Vancouver lobby

Friday, June 19th, 2015

07:30-08:00 Breakfast

08:00-09:00 Session 9: Total Knee Arthroplasty 1

CHAIRS: *Mahmoud Hafez and Chris Plaskos*

08:00 ***Dr. Patrick Meere**, Svenja Schneider, Ilya Borukhov and Peter Walker*
***How Accurately Can Knees Be Balanced During Total Knee Replacement Surgery? Evaluations of Common Surgical Balancing Corrections.** [PDF]

08:10 ***Dr. Patrick Meere**, Svenja Schneider, Ilya Borukhov and Peter Walker*
***On the Potential Role of the Collateral Ligaments Strain Ratio from Varus-Valgus Testing as a Predictor of Knee Arthroplasty Outcome** [PDF]

08:20 *Mostafa Elnemr, **Dr. Mahmoud Hafez**, Khaled Aboelnasr and Mohamed Radwan*
Operative time in TKA: Comparison between patient specific instruments and conventional [PDF]

08:30 *Jean-Yves Jenny, Michael Cross, Cyril Hamad, Fabrice Bertrand, **Dr. Laurent Angibaud** and Yifei Dai*
***The Effect Of Posterior Tibial Slope On The Kinematics Of Pcl-Retaining Tka – A Pilot Study** [PDF]

08:40 *Pasquale Petrera, James Petrera, **Xeve Silver** and Laurent Angibaud*
***Exactechgps Guidance System Does Not Increase Operative Time When Compared To Conventionally Instrumented Total Knee Arthroplasty** [PDF]

08:50 ***Dr. Pornpavit Sriphirom**, Pawit Yuangngoen, Sorawut Sirisak, Chaiyaporn Siramanakul, Thakrit Chompoosang and Anuchit Vejjaijiva*
Comparison Of Clinical Outcomes Between Parallel Joint Line To The Floor And Oblique Joint Line After Computer Assisted Total Knee Arthroplasty: Preliminary Study [PDF]

09:00-10:00 Session 10: Panel Discussion - Alignment of the Knee: An Insight

CHAIR: *Kamal Deep*
Panelists: Y. Diesinger (France), J. A. Koenig (USA), Eric Stindel (France), E. K. Song (S Korea), Mr. K. Deep (UK).

Alignment of the knee has been an ongoing issue for surgeons. With the advent of computerised measurement techniques, the insight into alignment has evolved. The target alignment in TKA is controversial, whether it is mechanical or kinematic. The panel will give an insight of what is normal, how it varies, how and what to plan and different tools available to achieve the desired alignment. The attendees will have a good insight into the issues of alignment and how to achieve desired results. The session will be a mixture of talks and panel discussions.

10:00-10:30 Session 11A: E-Poster Set 3

LOCATION: Main Foyer

Christoph Hänisch, Juliana Hsu and Klaus Radermacher
Level Set Based Segmentation Of The Distal Femur From 3D Ultrasound Volume Images [PDF]

Eric Stindel, Fabrice Bertrand, Julien Leboucher and Stephane Lavallée
Femoral Neck Adjustment using Computer Assisted THA [PDF]

Masashi Karasawa, Jeremy Kooyman and Antony Hodgson
Preliminary Accuracy Assessment of a New Bone-Mounted Robot for Unicompartmental Knee Arthroplasty [PDF]

Jasper Gerbers, Pawel Tomaszewski and Paul Jutte
Accurate imagebased CAS planning and surgical training through 3D printing [PDF]

Josh Schroeder, Meir Liebergall, Yair Barzilay and Leon Kaplan
Computer Assisted Robotic Surgery in Octogenarians a case controlled study [PDF]

Vincent Roman Hofbauer, Thomas Bittrich, Johannes Glasbrenner, Dieter Rosenbaum and Michael Raschke
Reconstruction of the medial patellofemoral ligament (MPFL) can lead to an increased retropatellar force - dynamic measurements with an industrial robot under muscular loading [PDF]

Wei Tian, Yunfeng Xu, Bo Liu, Yajun Liu, Zhao Lang and Shuo Feng
Computer-assisted, minimally invasive transforaminal lumbar interbody fusion: one surgeon's learning curve [PDF]

Yajun Liu, Jingwei Zhao, Mingxing Fan, Yanwei Lv, Wenyong Liu and Wei Tian
Influential Factors On Clinical Accuracy Of Ct-Based Active Infrared Navigation System [PDF]

10:00-10:30 Session 11B: Special Posters

LOCATION: Pacific Ballroom Foyer

Jean-Yves Jenny and Yann Diesinger
Measurement Of The Posterior Femoral Offset: Navigation Is More Precise Than Standard X-Rays [PDF]

Jean Chaoui, Marc-Olivier Gauci, Gilles Walch and Pascal Boileau
Automatic 3D Planning and Use of Patient Specific Guides for TSA [PDF]

Malte Asseln, Maximilian C. M. Fischer, Ghaith Al Hares, Valentin Quack and Klaus Radermacher
Relationship Between The Distal Femoral Morphology And Cruciate Ligament Attachments [PDF]

Jörg Eschweiler, Maximilian C. M. Fischer, Jan P. Stromps, Norbert Pallua and Klaus Radermacher
Biomechanical Modelling Of The Wrist For Patient Adapted Model Guided Therapy [PDF]

10:30-11:00 Coffee Break

11:00-12:00 Session 12: Novel Navigation & Planning

CHAIRS: *Ilker Hacihaliloglu and John Rudan*

11:00 ***Joshua William Giles*** *and Ferdinando Rodriguez y Baena*
Development And Validation Of A Novel Patient Specific Guide System For Minimially Invasive Total Shoulder Arthroplasty [PDF]

11:10 *Brian J. Rasquinha, Andrew W. L. Dickinson and* ***Dr. Randy E. Ellis***
An Integrated Calibrator and Verification Tool for Electromagnetic Navigation of Intraoperative Computed Tomography [PDF]

11:20 ***Dr. Julien Leboucher****, Zoheir Dib, Shaban Almouahed and Eric Stindel*
***Novel US device for the estimation of pelvic tilt** [PDF]

11:30 ***Mohammad Amini****, Tiffany Ngo, Robert McCormack and Shahram Amiri*
An Imaged-Based Technique For Tracking C-Arm Fluoroscopes With An Example Use In High Tibial Osteotomy [PDF]

11:40 *Mina Iravani, Dr. Farzam Farahmand,* ***Soheil Medhipour*** *and Maryam Hovittalab*
Pre-Planning Of High Tibial Osteotomy: The Effect Of Ligamentous Tissues [PDF]

11:50 ***Dr. Eric Stindel**, Christian Lefevre, Robert Brophy, Romain Gerard, Leela Biant, James Stiehl and Matthew Matava*
An Innovative Technique Using Computer Navigation To Optimize The Results Of High Tibial Osteotomy [PDF]

12:00-12:30 Session 13: Annual General Meeting

CHAIR: *Kamal Deep*

12:30-13:30 Lunch Break

13:30-14:30 Session 14: Panel Discussion - New Knee Ligaments: New Implications for CAOS

CHAIR: *Burt Klos*
Panelists: Y. Diesinger (France), Andrea Ferretti (Italy), Jong-Keun Seon (Korea), Burt Klos (Netherlands)

In November 2013 the Orthopaedic Sports Medicine Community was awakened by a media hype around a new ligament in the knee joint, found in Belgium by Steven Claes, which was previously unknown to surgeons performing arthroscopic ACL reconstruction. North American surgeons buffered the media, showing this new named ALL ligament was an anatomic structure that was found on anatomic sections. Old studies from a French surgeon (1879), Segond, showed that the avulsion fracture, named Segond fracture, was attached to a strong capsulair structure. This structure seems to be the same as the new named ALL ligament. New ligaments could mean new indications and new surgical techniques, which was already seen with the hype of the double bundle ACL reconstruction. Many researches used CAOS to scientifically show the advantages and limitations of DB techniques. In 2009, A Pearle (New York, USA) produced 10 papers using CAOS technology in relation to the new interest in biomechanics and reconstruction techniques. Andre Ferretti (Rome, Italy) previously described a dissection technique in which cutting individual structures was followed by CAOS measurements. He showed a structure on the anterolateral site of the knee, which after cutting produced a pivot shift instability. Most recently (2014) he pro posed a new reconstruction technique, which he recorded with the help of CAOS. Recent interest in this structure, its function, diagnostics and surgical implications were largely influenced by the use of CAOS.

14:30-15:00 Coffee Break

15:00-15:30 Session 15A: E-Poster Set 4

LOCATION: Main Foyer

Vivian Chung, Robyn Newell, Angela Kedgley, Bassam Masri, Shahram Amiri and Antony Hodgson
Leveraging Existing C-Arms for RSA Analysis [PDF]

Ioannis Georgilas, Giulio Dagnino, Payam Tarassoli, Roger Atkins and Sanja Dogramadzi
Robot-Assisted System For Joint Fracture Surgery [PDF]

William Kerr, Philip Rowe and Stephen Gareth Pierce
Measurement of the Geometry of the Distal Femur Using Robotic 3D Ultrasound [PDF]

Laurent Angibaud, Yifei Dai, Jean-Yves Jenny, Michael Cross, Cyril Hamad and Amaury Jung
Verification Of A Novel Test Method To Evaluate The Effect Of Posterior Tibial Slope On The Kinematics Of PCL-Retaining TKA [PDF]

Yifei Dai, Laurent Angibaud, Barton Harris, Scott Gulbransen and Doug Begin
Accuracy Comparison Between Two Contemporary CAOS Systems [PDF]

Yifei Dai, Laurent Angibaud and Barton Harris
Intraoperative Evaluation Of Achieved Bony Resections During TKA – Is It CAOS System-Dependent [PDF]

Yifei Dai, Laurent Angibaud and Barton Harris
Method To Evaluate The Effect Of Leg Position On The Intraoperative Measurement Of Planned Resection During Computer-Assisted Total Knee Arthroplasty [PDF]

Julie Smith, Alberto Gregori, Frederic Picard, Jess Lonner and Branislav Jaramaz
Does Image Free Robotic Assisted Unicondylar Knee Arthroplasty Achieve The Surgeons' Specific Plan [PDF]

Niamul Quader, Antony Hodgson and Rafeef Abugharbieh
Assessing the Feasibility of Downsampling and Wavelet Resizing for Real-time Extraction of Bone Surfaces from 3D Ultrasound [PDF]

15:00-15:30 Session 15B: Special Posters

LOCATION: Pacific Ballroom Foyer

Todd Borus, Don Roberts, Pamela Fairchild, Jennifer Christopher, Michael Conditt, Jonathan Matthews, Kyle Pirtle and Mike Baer
UKA Patients Return to Function Earlier than TKA Patients [PDF]

Christoph Hänisch, Juliana Hsu, Erik Noorman and Klaus Radermacher
Model Based Reconstruction Of The Bony Knee Anatomy From 3D Ultrasound Images [PDF]

Fraser Henderson, Roberto Alho, Angela Deakin, Philip Riches and Frederic Picard
Assessment Of Coronal Mechanical Alignment With Applied Varus And Valgus Force Through The Range Of Flexion Using Non-Invasive Navigation [PDF]

15:30-16:00 Session 16: Registration and Statistical Shape Models

CHAIRS: *Randy E. Ellis and Kwok Leung*

15:30 ***Dr. Guoyan Zheng**, Alper Akcoltekin, Steffen Schumann, Lutz-P. Nolte and Branislav Jaramaz*
***Patient-specific 3D Reconstruction of A Complete Lower Extremity from 2D X-rays: A Cadaveric Validation Study** [PDF]

15:40 ***Malte Asseln**, Christoph Hänisch, Ghaith Al Hares, Jörg Eschweiler and Klaus Radermacher*
Automatic Parameterization Of The Distal Femur Based On 3D Surface Data: A Novel Approach For Systematic Morphological Analysis And Optimization [PDF]

15:50 *Malte Asseln, **Christoph Hänisch**, Ghaith Al Hares, Valentin Quack and Klaus Radermacher*
A Mesh Morphing Based Method To Estimate Cruciate Ligament Attachments Based On Ct-Data [PDF]

16:00-17:00 Session 17A: Extended Talks 1

CHAIRS: *David Kahler and Stephane Lavallée*

LOCATION: Cortes Island

16:00 *Alberto Gregori, **Dr. Julie Smith**, Frederic Picard, Jess Lonner and Branislav Jaramaz*
***Accuracy Of Imageless Robotically Assisted Unicondylar Knee Arthroplasty** [PDF]

16:10 ***Mark Semple** and Antony Hodgson*
Design of a flexible optical tracker for computer assisted orthopaedic surgery [PDF]

16:25 *Wei Tian, Cheng Zeng, **Dr. Yan An** and Yajun Liu*
Accuracy and postoperative assessment of pedicle screw placement in scoliosis surgery with computer-assisted navigation: a meta-analysis [PDF]

16:40 ***Alastair Darwood**, Roger Emery, Peter Reilly, Robin Richards, Ferdinando Rodriguez y Baena and Amol Tambe*
***Moulding the Future of Patient Specific Instrumentation – the Shape of Things to Come** [PDF]

16:00-17:00 Session 17B: Total Knee Arthroplasty 2

CHAIRS: *Michael Conditt and Nobu Sugano*

16:00 **Cyril Hamad**, *Fabrice Bertrand, Jean-Yves Jenny, Michael Cross, Laurent Angibaud, Nicolas Hohl and Yifei Dai*
***Evaluation Of The Kinematic Of The Native Knee And Effect Of The Arthrotomy** [PDF]

16:10 ***Juliana Hsu***, *Matias de La Fuente and Klaus Radermacher*
Determination Of The Mechanical Axis Of The Femur Using 3D-2D Model To X-Ray Registration [PDF]

16:20 *Mohsen Akbari Shandiz, Paul Boulos,* ***Dr. Carolyn Anglin*** *and Stephen Miller*
Relationships Between Shape, Kinematics And Quality Of Life Before And After Total Knee Arthroplasty [PDF]

16:30 ***Dr. Rahul Khare*** *and Branislav Jaramaz*
***Accuracy of estimating femoral and tibial mechanical axes from simulated long standing AP radiographs** [PDF]

16:40 *Jean-Yves Jenny,* ***Dr. Yann Diesinger*** *and Marco De Gori*
***Patient-Specific Templates For Total Knee Replacement - Analysis Of The Learning Curve In An Academic Department** [PDF]

16:50 ***Dr. Lei Jiang***, *Jerry Yongqiang Chen, Hwei Chi Chong, Shi-Lu Chia, Ngai Nung Lo and Seng Jin Yeo*
Clinical outcomes of computer-assisted total knee arthroplasty using pinless navigation [PDF]

17:00-18:00 Session 18A: Extended Talks 2

CHAIRS: *Ido Volk and Guoyan Zheng*

LOCATION: Cortes Island

17:00 ***Robert Grupp***, *Yoshito Otake, Ryan Murphy, Javad Parvizi, Mehran Armand and Russell Taylor*
Pelvis Surface Estimation From Partial CT For Computer-Aided Pelvic Osteotomies [PDF]

17:15 ***Emran Mohammad Abu Anas***, *Alexander Seitel, Abtin Rasoulian, Paul St. John, David Pichora, Kathryn Darras, David Wilson Wilson, Victoria Lessoway, Ilker Hacihaliloglu, Parvin Mousavi, Robert Rohling and Purang Abolmaesumi*
Feasibility Of Statistical Model Registration To Ultrasound For Guidance In Scaphoid Fracture Fixation [PDF]

17:30 ***Moritz Ehlke***, *Mark Heyland, Sven Märdian, Georg N. Duda and Stefan Zachow*
Assessing The Relative Positioning Of An Osteosynthesis Plate To The Patient-Specific Femoral Shape From Plain 2D Radiographs [PDF]

17:45 ***Dr. Ilker Hacihaliloglu***, *Robert Rohling and Purang Abolmaesumi*
Enhancement Of Spine Bone Surfaces From Ultrasound Data Using Improved Local Phase Tensor Filter [PDF]

17:00-18:00 Session 18B: Total Hip Arthroplasty 2

CHAIRS: *Robert Thornberry and Eric Stindel*

17:00 *Niamul Quader,* ***Dr. Antony Hodgson****, Kishore Mulpuri and Rafeef Abugharbieh*
Improving Diagnostic Accuracy of Hip Dysplasia Measures in 2D Ultrasound Scans of Infants to Guide Decisions Regarding Need for Surgery [PDF]

17:10 ***Dr. Jochen Franke****, Nils Beisemann, Jan von Recum, Paul A Grützner and Sven Y Vetter*
***8 Year-Period Comparative Analysis Of Peri- And Post-Operative Complications Of Navigated And Conventional Knee And Hip Arthroplasties Based On Statistics Provided By The Quality Institute Of Health Insurance Organizations In Germany** [PDF]

17:20 ***Dr. Masaki Takao****, Takashi Nishii, Takashi Sakai, Hideki Yoshikawa and Nobuhiko Sugano*
Postoperative Leg Offset Discrepancy Influences Soft Tissue Tension In Total Hip Arthroplasty [PDF]

17:30 *Agnes G. d'Entremont,* ***Carly Jones****, David Wilson and Kishore Mulpuri*
Measures Of Femoral Head Shape In Perthes Disease Using 3D Data Sets [PDF]

17:40 ***Dr. Samy Bendaya****, Carolyn Anglin, Jean-Yves Lazennec, Rachele Allena, Philippe Thoumie and Wafa Skalli*
Good Vs Poor Results After Total Hip Arthroplasty: A Comparison Of Implant And Anatomical Parameters [PDF]

17:50 ***Dr. Shahram Amiri****, Justin Poon, Donald Garbuz and Bassam Masri*
A Robust Fluoroscopic Method For Registering The Anterior Pelvic Plane [PDF]

Gala Dinner at Vancouver Aquarium

18:15	Shuttle pickup at Hotel Vancouver (shuttles circulate until 19:45)
19:30	CAOS Awards Ceremony in Lower Teck Gallery, Vancouver Aquarium
21:30-23:00	Shuttles return to hotel

Saturday, June 20th, 2015

07:30-08:00 Breakfast

08:00-09:00 Session 19: Spine

CHAIRS: *Purang Abolmaesumi and Eun-Kyoo Song*

08:00 ***Dr. John Williams**, Faheem Sandhu, Randal Betz and Keri George*
The Use of Dynamic Surgical Guidance (DSG) Shortens the Learning Curve for Accurate Placement of Pedicle Screws: A Cadaveric Study [PDF]

08:10 *Wei Tian and **Dr. Peihao Jin***
Registration study on CAMISS-TLIF surgery versus OP-TLIF on treatment of adult spondylolisthesis [PDF]

08:20 ***Aubrey Blair-Pattison**, Richard Hu, Kristine Haugo and Carolyn Anglin*
Validation Of Training Effect Of Vertebral Bone Model On Surgical Skills [PDF]

08:30 ***Dr. Philippe Merloz**, Sebastien Ruatti, Caroline Dubois, Emilie Chipon, Gael Kerschbaumer, Michel Milaire, Alexandre Moreau-Gaudry, Jérôme Tonetti and Séverine Dao Lena*
Interest of Intra-operative 3D Imaging In Spine Surgery. A Prospective Randomized Study. [PDF]

08:40 ***Dr. Zhao Lang**, Wei Tian, Yajun Liu, Bo Liu and Qiang Yuan*
Minimally Invasive Pedicle Screw Fixation Using Intraoperative Three-Dimensional Fluoroscopy-Based Navigation (Camiss Technique) For Hangman's Fracture [PDF]

08:50 ***Dr. Stewart Mclachlin**, Brendan Polley, Mirza Beig, Jeremie Larouche and Cari Whyne*
Development and Evaluation of an Open-Source 3D Virtual Simulator with Integrated Motion-Tracking as a Teaching Tool for Pedicle Screw Insertion [PDF]

09:00-10:00 Session 20: Fracture, Fluoroscopy and Assessment

CHAIRS: *Branko Jaramaz and Kamal Deep*

09:00 *Giulio Dagnino, Ioannis Georgilas, Payam Tarassoli, Roger Atkins and **Dr. Sanja Dogramadzi***
Force-Torque Measurement System For Fracture Surgery [PDF]

09:10 ***Dr. Roberto Alho**, Fraser Henderson, Philip Rowe, Angela Deakin, Jon Clarke and Frederic Picard*
***Assessment Of Anteroposterior (AP) Knee Joint Laxity Using Non-Invasive Navigation In Healthy Volunteers** [PDF]

09:20 ***Dr. Ido Volk**, Jonathan Gal, Eran Peleg, Gil Almog and Shai Luria*
Acute Scaphoid Fracture Fixation – Planned Versus Actual Reduction And Fixation - 3D Computer Analysis [PDF]

09:30 ***Dr. Michael Kraus** and Florian Gebhard*
Clinical experience with a fluoroscopy-based guidance system in orthopaedic surgery [PDF]

09:40 *Noor Al-Attar, Gabriel Venne, Ronald Easteal and **Dr. Manuela Kunz***
Accuracy Of Osteophyte Detection In Conventional Computed Tomography And Magnetic Resonance Imaging Of Joints [PDF]

10:00-10:30 Session 21: E-Poster Set 5

Wei En Hsu, Ching Shiow Tseng and Hung-Kang Wu
Novel Path Planning Method For C-Arm Image Based Distal Locking Of Intramedullary Nails [PDF]

Mahmoud Hafez, Sharafeldin Sheikhedrees and Emad Saweeres
Knee morphometry for the Arabian knee with a comparison to 6 knee implants [PDF]

Koji Kato, Yuji Atsuta and Hiroshi Ito
Measurement Of Trunk Deformation By Breathing Of Scoliosis Patients [PDF]

Koji Kato, Yuji Atsuta and Hiroshi Ito
Dynamic Analysis of trunk deformation by breathing of scoliosis patients [PDF]

Satoshi Nakasone, Takayuki Yamauchi, Masaki Ishihara and Fuminori Kanaya
Accuracy Of Cup Alignment Using A Modular Mechanical Navigation Guide Based On Patient-Specific Three-Dimensional CT Imaging [PDF]

Shailesh Joshi and Philip Rowe
Intra-Operative Shape Acquisition Of Tibio-Femoral Joints Using 3D Laser Scanning For Computer Assisted Orthopaedic Surgery: A Proof Of Concept [PDF]

Robert Cohen, Dale Swarts, Jim Nevelos and Michael Conditt
Physical and Mechanical Characteristics of a Porous Structured Titanium Biomaterial [PDF]

Martin Roche, Sharon Branch, Christopher Lightcap and Michael Conditt
Intra-Operative Assessment of the Soft Tissue Envelope is Integral to the Planning of UKA Components [PDF]

Maryam Malmali, Farzam Farahmand, Mahmoud Chizari, Zahra Saghaei and Farid Abbaszadeh
Detailed And Accurate Assessment Of Femur Anatomical Indices Using Ct-Based 3D Models [PDF]

Junghyo Kim, Nishii Takashi and Sugano Nobuhiko
Motion knee MRI [PDF]

10:30-11:00 Coffee Break

11:00-12:30 Session 22: Joint Symposium: Total Knee Replacement Beyond Navigation

CHAIR: *Bassam Masri*

LOCATION: Pacific Ballroom

12:30-13:00 Session 23: Awards Ceremony

CHAIR: *Antony Hodgson*

LOCATION: Vancouver Island

Accreditation Information

Learning Objectives

By participating in the Combined Meeting of the Canadian Orthopaedic Association and the Computer Assisted Orthopaedic Surgery Society, participants will:

- Review and evaluate the results of clinical and technical advances in the diagnosis and management of common orthopaedic diseases in the areas of traumatology, arthroplasty, foot and ankle, upper extremity, spine, sports medicine, paediatrics, and tumour.
- Update and expand their understanding of the advances in basic science research in musculoskeletal health and disease, and apply this understanding to current clinical challenges and the improvement of patient outcomes.
- Establish strategies that balance both benefit and risk in the care of specific orthopaedic maladies and describe the expected patient outcomes.
- Gain knowledge of innovative ideas from thought leaders in the major subspecialties.
- Benefit from opportunities to strengthen professional relationships.
- Compare and evaluate the latest in orthopaedic equipment and services

Continuing Medical Education

This educational event is approved as an Accredited Group Learning Activity under Section 1 of the Framework of Continuing Professional Development options for the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada. Physicians may claim up to one credit per hour for sessions attended in this program. A link to an appropriate certificate will be sent to attendees following the meeting.

Disclosure of Conflicts of Interest

The COA is a Royal College of Physicians and Surgeons of Canada (RCPSC) accredited provider. The Annual Meeting in Vancouver, British Columbia, from June 18-20 2015, is accredited under Section 1 of the RCPSC Maintenance of Certification program. As such, the meeting meets the Canadian Medical Association guidelines governing the relationship between physicians and industry.

All authors and presenters were required to disclose whether they have a financial interest or other relationship with a commercial company related directly or indirectly with the scientific or educational material presented at the Annual Meeting to ensure compliance with the CMA guidelines and Royal College accredited education event requirements. All presenters were required to place any disclosures at the beginning of their presentations.

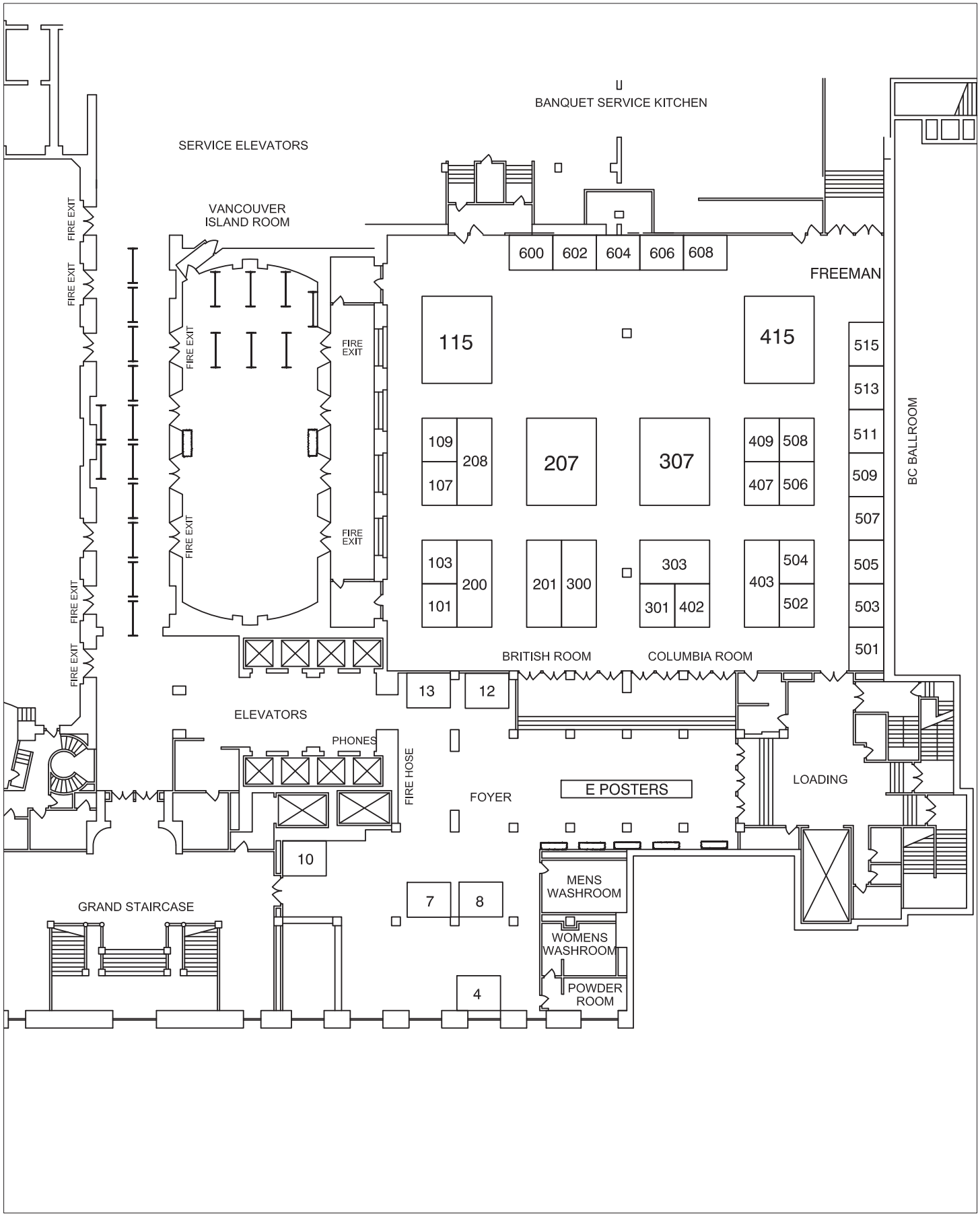
Disclaimer

The material presented at the COA and CAOS Combined Meeting has been made available by the Canadian Orthopaedic Association and the International Computer Assisted Orthopaedic Surgery Society for educational purposes only. The material is not intended to represent the only, nor necessarily best, method or procedure appropriate for medical situations discussed, but rather is intended to present an approach, view, statement, or opinion of the faculty, which may be helpful to others who face similar situations. The COA and CAOS disclaim any or all liability for injury or other damages resulting to any individual attending the Combined Meeting and for all claims that may arise out of the use of the techniques demonstrated therein by such individuals whether these claims shall be asserted by physician or any other person.

Notes:

Exhibitor List

Company Name	Booth #
Actelion Pharmaceuticals Canada	503
Atracsys LLC	101
Össur Canada Inc.	606
Biocomposites	407
Biomet Canada Inc.	409
Blue Belt Technologies	301
Breg, Inc	602
Canadian Institute for Health Information	507
Canadian Orthopaedic Foundation	7
CeramTec Medical Products	201
Citagenix Inc	403
Conmed Corporation	200
Consensus Medical Systems, Inc	504
Delfi Medical Inc.	502
DePuy Synthes Canada	207
DJO Canada Inc	513
EOS Imaging	8
Exactech Canada	12
GE Healthcare	10
HOLOGIC NV	506
Integra Life Sciences	103
Intellijoint Surgical Inc.	109
MedQuest Medical Inc.	608
Medtronic	511
MicroPort Orthopedics	303
OMNI	515
Orthopaedic Market Communications	509
Ostek Orthopaedics Inc.	600
Pendopharm, division of Pharmascience Inc.	402
Sanofi	604
Smith & Nephew Inc.	115
Southmedic Inc.	13
Stryker Canada	415
THINK Surgical, Inc.	4
Tornier Orthopedics Inc*	107
Tribe Medical Group	300
Tribute Pharmaceuticals	501
Urban Poling Inc	508
Wright Medical Technology Canada Ltd.	208
Xediton Pharmaceuticals Inc.	505
Zimmer of Canada Ltd	307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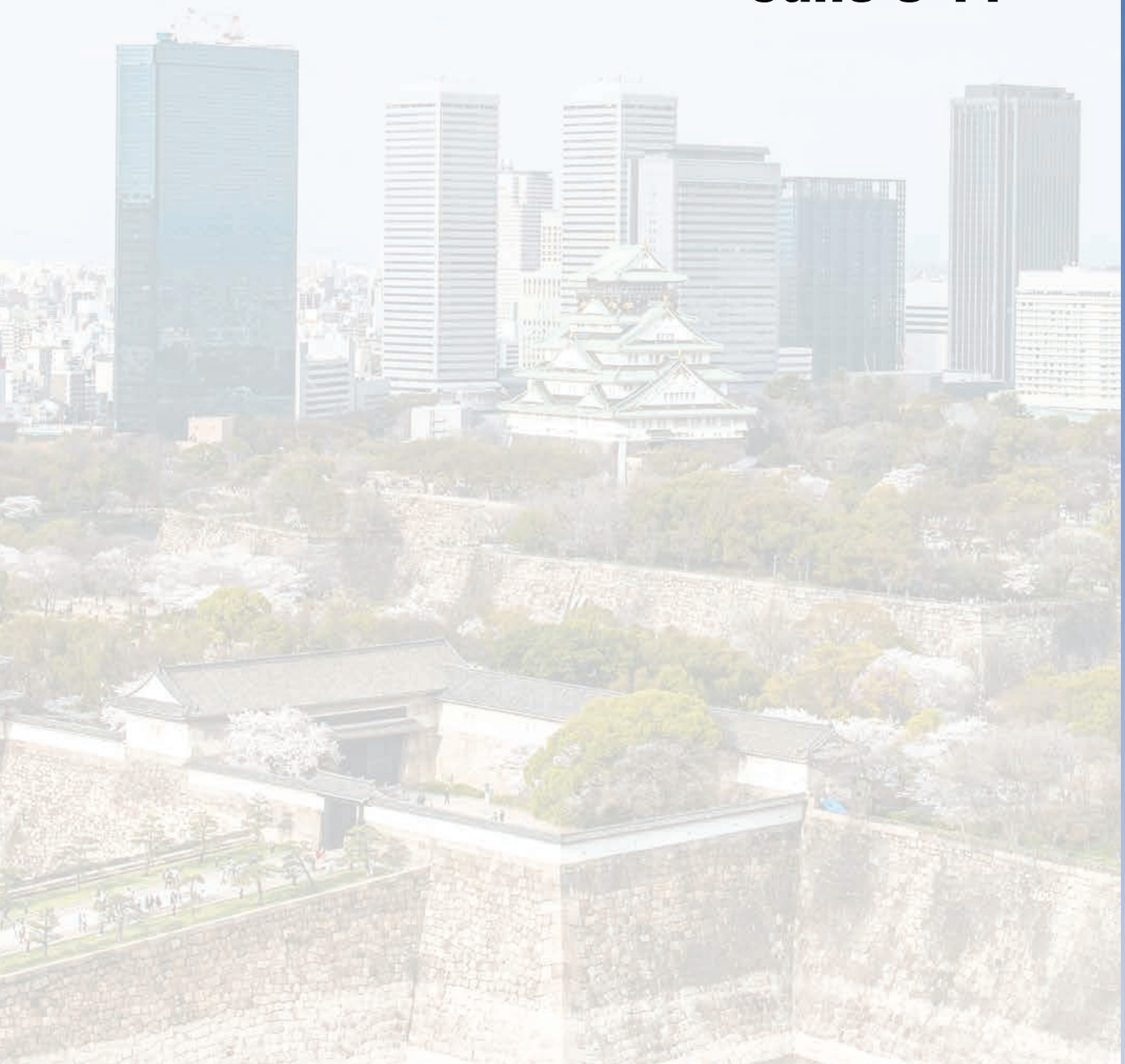
GRAND STAIRCASE

Please mark your calendars:

CAOS 2016 Osaka

International Society for Computer Assisted Orthopaedic Surgery

June 8-11