AO Trauma Course—
Basic Principles of Fracture Management

December 1–6, 2019
Davos, Switzerland

Lecture room:
Aspen 2

Precourse online activities:
November 1–30, 2019
Postcourse online activities:
December 7–20, 2019

Event program
The AO’s flagship educational event, the AO Davos Courses offer surgeons at all stages of their career outstanding educational and networking opportunities. Experience this pioneering spirit of peer-to-peer collaboration and learn skills that will help advance your career.

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<td>Principles of AO educational events</td>
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<td>AO Research Institute Davos (ARI)</td>
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<td>Upcoming AO Davos Courses 2020</td>
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Mission
The AO’s mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

Purpose statement
AO Trauma is committed to improve patient care outcomes through the highest quality education. We strive to combine the right knowledge and surgical skills that empower the orthopedic and trauma surgeons to put theory into practice and to improve fracture management for the benefit of the patient.

The AO principles of fracture management

1. Fracture reduction and fixation to restore anatomical relationships.

2. Fracture fixation providing absolute or relative stability, as required by the “personality” of the fracture, the patient, and the injury.

3. Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4. Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.
Welcome
Dear AO Trauma course participant,

Welcome to AO Trauma’s first-class schedule of activities at the AO Davos Courses 2019. We provide a wide range of relevant courses designed to meet your specific professional needs—and we are confident that you will find your course and the networking experiences professionally rewarding.

With a global reputation for innovation, leadership, and excellence in continuing medical education (CME), AO Trauma and the AO Education Institute are transforming education by expanding the educational activities available to you. CME is not just about face-to-face courses. Our educational opportunities address the specific clinical problems that you encounter daily. Visit our website (www.aotrauma.org) to discover the latest educational activities.

At the AO Davos Courses 2019, AO Trauma offers you a chance to actively engage in your course as well as opportunities to:
• Interact with over 300 international faculty
• Expand your professional network by establishing contacts and new relationships with colleagues, including faculty and participants from over 80 countries
• Meet with staff and surgeons from the AO’s clinical divisions, institutes, and initiatives.
• Visit the AO experience or take a tour of our headquarters, the AO center, to gain insight into the AO’s ongoing activities and resources available to support you in your clinical work
• Experience the AO spirit of collegiality and camaraderie that is felt by participants and faculty alike

Your current level of knowledge, attitudes, and skills will be challenged throughout the week. At the same time, our best-in-class curriculum and faculty will provide you with a memorable learning experience that will remain with you for a lifetime.

Your experiences with us over the next few days will result in the realization of new and meaningful knowledge, skills, and understanding that we hope will translate into improved patient care.

If you enjoy your experience this week and want to stay in touch, we invite you to become a member of AO Trauma. Doctors of medicine and osteopathy who have completed AO Trauma basic principles course are eligible for membership; contact us to learn more.

Yours sincerely,

Wa’el Taha
Chairperson AO Trauma
Education Commission

Kodi Kojima
Chairperson AO Trauma
International Board
Course description

This AO Trauma Course—Basic Principles of Fracture Management is part of AO Trauma’s educational program for residents and based on a specific framework of competencies and learning objectives. They feature a balanced mix of educational methods with a strong focus on interactive sessions.

Online precourse self-assessment prepares participants for the course and allows the faculty to tailor the course to the needs of the participants. Before attending the course, participants are expected to complete online modules on bone healing and classification. The course will consist of several evidence-based lectures, which will cover the key information required. In practical exercises, participants will be trained in the application of various techniques.

The AO Skills Lab consists of ten stations where participants will learn about the principles of fractures and test fracture management options. Discussing cases in small groups will help participants to understand decision-making processes and further develop management skills.

After the course, an online postcourse self-assessment will provide participants with important feedback on how much they have learned.

Goal of the course

The AO Trauma Course—Basic Principles of Fracture Management is part of a newly developed educational program teaching fundamental principles and current concepts in the treatment of injuries, incorporating the latest techniques in operative fracture management. The AO Trauma Basic Principles course is the initial step along the path of lifelong learning in the area of operative fracture management, and the main focus of this course is on teaching the basic principles of fracture management.

Target participants

The AO Trauma Course—Basic Principles of Fracture Management is targeted at surgical trainees and is also open to certified orthopedic and trauma surgeons who are interested in furthering their knowledge and skills in operative fracture management.

Learning objectives

Upon completion of this course, participants will be able to:

- Discuss the concepts of stability, their influence on bone healing, and how to apply implants to achieve appropriate stability
- Plan a treatment based on assessment, imaging, classification, and decision-making
- Apply reduction techniques in fracture management with attention to the importance of the soft-tissue
- Use appropriate fixation techniques to treat diaphyseal and simple (peri)articular fractures
- Identify and discuss the special problems related to:
  - Fractures in the immature skeleton
  - Pelvic injuries
  - Osteoporotic fractures
  - Postoperative infection
  - Delayed union and/or nonunion
- Plan the initial treatment of the polytrauma patient
Chair-person

Sergei Fischer
Universidade Federal do Paraná, Hospital do Trabalhador, Curitiba, Brazil

Nir Cohen
Rabin Medical Center, Beilinson Campus, Petah Tikva, Israel

Co-chair-person

International faculty

Mazen Abdalla
An-Najah University Hospital
Nablus, Palestinian Territory

Francisco Cavalcante
Instituto Ortopédico de Goiânia
Goiânia, GO, Brazil

Maria Virginia Giménez
Hospital Italiano de Buenos Aires
Buenos Aires, Argentina

Yazan Hattar
Private Sector
Amman, Jordan

Thomas Large
Mission Hospital
Asheville, USA

John Munz
University of Texas Health Science Center at Houston
Houston, USA

Tomoyuki Noda
Okayama University Hospital
Okayama, Japan

Mauro Núñez
Hospital del Trauma
San José, Costa Rica

David Rothberg
University of Utah
Salt Lake City, USA

Gillian Soles
University of Rochester
Rochester, USA

Danilo Taype Zamponi
Hospital Italiano de Buenos Aires
Buenos Aires, Argentina

Frank Wurmitzer
South Canterbury DHB
Timaru, New Zealand

Regional faculty

Mikhail Panin
Peoples’ Friendship University of Russia, Hospital №17
Moscow, Russian Federation

Oleksandr Rikhter
Hospital “Boris”
Kyiv, Ukraine

Johan Scheer
University Hospital Linköping
Linköping, Sweden

Bas Twigt
Chirurgenmaatschap Amsterdam (BovenIJ/OLVG)
Amsterdam, The Netherlands

Yoram Weil
Hadassah Hebrew University Medical Center
Jerusalem, Israel

Guest lecturer

Piet De Boer
Medical Education Consultants GmbH
Dietlikon, Switzerland

Markus Windolf
AO Foundation
Davos, Switzerland
Precourse online activities
November 1–30, 2019

Task 1: Online precourse self-assessment (30 minutes)
The online precourse self-assessment consists of questions on your profile and expertise as well as a set of multiple-choice questions with direct feedback. Your participation will help us to focus on your needs at the upcoming event.

Please complete the two eLearning modules “Biology of bone healing” after the precourse self-assessment and before attending the course, because faculty will build on your newly acquired knowledge.

Task 2: eLearning module Biology of bone healing (20 minutes)

Additional information on the 2018 revision of the AO/OTA Fracture and Dislocation Classification Compendium can be found here: https://classification.aoeducation.org

Sunday
December 1, 2019

15:00 Opening of the congress center
15:00–17:00 Registration of participants
17:00–19:00 Opening Ceremony and Founders’ Reception

Monday
December 2, 2019

Location: Aspen 2 (lectures) Foyer C2 (practicals)

Module 1
Moderator: S Fischer
Injury pattern (soft-tissue and bone) and biology of bone healing

Upon completion of this module, participants will be able to:
- Describe how patient-related factors affect the management of fractures
- Describe the importance of soft-tissue in fracture healing
- Use the AO/OTA Fracture and Dislocation Classification to describe a fracture

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<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
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<tr>
<td>08:00–08:15</td>
<td>Welcome and introduction</td>
<td>S Fischer, N Cohen</td>
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<tr>
<td>08:15–08:30</td>
<td>The AO world—from history to lifelong learning</td>
<td>P de Boer</td>
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<tr>
<td>08:30–08:40</td>
<td>Influence of the patient factors and the injury mechanism on fracture</td>
<td>Y Weil</td>
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<tr>
<td></td>
<td>management</td>
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<tr>
<td>08:40–08:55</td>
<td>The (soft-tissue) injury—a high priority consideration</td>
<td>Y Hattar</td>
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<tr>
<td>08:55–09:05</td>
<td>Principles of external fixation</td>
<td>F Cavalcante</td>
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<tr>
<td>09:05–09:20</td>
<td>Updated AO/OTA Fracture and Dislocation Classification Compendium</td>
<td>M Núñez</td>
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<tr>
<td>09:20–09:40</td>
<td>Coffee break</td>
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</table>
Module 2
Moderator: J Munz

Stability and biomechanics of bone healing

Upon completion of this module, participants will be able to:

- Explain the biology of fracture healing and how it is affected by fracture treatment
- Define absolute and relative stability and describe their effects on fracture healing
- Describe the biomechanics of locking compression plates (LCP) and how to achieve different types of stability
- Explain the principles and steps of the lag screw technique

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<td>09:40–10:00</td>
<td>Absolute stability—biomechanics, techniques, and fracture healing</td>
<td>N Cohen</td>
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<tr>
<td>10:00–10:20</td>
<td>Relative stability—biomechanics, techniques, and fracture healing</td>
<td>M Panin</td>
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<td>10:20–10:35</td>
<td>The use of plates in fracture fixation</td>
<td>B Twigt</td>
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<td>10:35–10:40</td>
<td>Location change to practical exercise room</td>
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<td>10:40–12:30</td>
<td>Practical exercise 1: Internal fixation with screws and plates—absolute stability</td>
<td>M Abdalla, T Large</td>
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<td>12:30–13:30</td>
<td>Lunch break</td>
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<tr>
<td>13:30–14:40</td>
<td>Practical exercise 2: Principles of the internal fixator with LCP</td>
<td>F Cavalcante, J Munz</td>
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<tr>
<td>14:40–14:45</td>
<td>Location change to skills lab (Foyer C2)</td>
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<tr>
<td>14:45–16:45</td>
<td>AO Skills Lab</td>
<td>N Cohen</td>
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<td>* Note: participants spend 10 minutes at each station, then rotate</td>
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<td>Station A – Torque measurement of bone screws</td>
<td>F Cavalcante</td>
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<td>Station B – Soft-tissue penetration during drilling</td>
<td>Y Hattar, M Abdalla</td>
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<td>Station C – Heat generation during drilling</td>
<td>T Noda, F Wurmitzer</td>
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<td>Station D – Mechanics of bone fractures</td>
<td>J Munz, O Rikhter</td>
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<td>Station E – Techniques of resection, part 1</td>
<td>T Large, MV Giménez</td>
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<td>Station F – Techniques of resection, part 2</td>
<td>M Núñez, S Fischer</td>
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<td>Station G – Mechanics of intramedullary fixation</td>
<td>D Rothberg, M Panin</td>
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<td>Station H – Mechanics of plate fixation</td>
<td>G Soles, B Twigt</td>
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<td>Station J – Fracture healing and plate fixation</td>
<td>J Scheer</td>
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<td>Station K – Difficult implant removal</td>
<td>Y Weil, D Taype Zamboni</td>
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<td>16:45–17:05</td>
<td>Coffee break</td>
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<tr>
<td>17:05–18:00</td>
<td>Discussion group 1: General principles, classification, concepts of stability, their influence on bone healing, and how to apply implants to achieve appropriate stability</td>
<td>F Cavalcante, T Large</td>
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<td>Group 1 – Landwasser 1</td>
<td>Y Hattar, D Rothberg</td>
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<td>Group 2 – Landwasser 3</td>
<td>J Munz, T Noda</td>
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<td>Group 3 – Landwasser 5</td>
<td>M Núñez, M Abdalla</td>
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<td>Group 4 – Landwasser 7</td>
<td>G Soles, D Taype Zamboni</td>
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<td>Group 5 – Landwasser 9</td>
<td>F Wurmitzer, M Panin</td>
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<td>Group 6 – Landwasser 11</td>
<td>J Scheer</td>
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<td>Group 7 – Landwasser 13</td>
<td>N Cohen</td>
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Module 3
Moderator: T Large
Surgical treatment of diaphyseal fractures

Upon completion of this module, participants will be able to:

- Describe the treatment goals for diaphyseal fractures
- Describe the treatment principle for diaphyseal fractures in the upper and lower extremities
- Determine the type of reduction and stability needed for diaphyseal fractures
- Explain the rationale behind preoperative planning and the importance of careful decision making with regard to reduction technique, implant requirements, and fixation techniques

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<tr>
<td>08:15–08:35</td>
<td>Principles of diaphyseal fracture management—what is important in treating these fractures?</td>
<td>F Wurmitzer</td>
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<tr>
<td>08:35–08:50</td>
<td>Reduction techniques of diaphyseal fractures—principles and methods</td>
<td>D Rothberg</td>
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<td>08:50–09:05</td>
<td>Fractures of the femoral diaphysis (including subtrochanteric)—management principles</td>
<td>D Taype Zamboni</td>
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<tr>
<td>09:05–09:25</td>
<td>Fractures of the humeral diaphysis—management principles</td>
<td>J Scheer</td>
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<tr>
<td>09:25–09:30</td>
<td>Location change to practical exercise room</td>
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<tr>
<td>09:30–10:30</td>
<td>Practical exercise 3</td>
<td>Y Hattar, T Noda</td>
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<td></td>
<td>Reamed intramedullary (IM) nailing</td>
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<td>Tibial shaft fractures—IM nailing with the expert tibia nail (ETN)</td>
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<td>(with reaming) with extractor</td>
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<td>10:30–10:50</td>
<td>Coffee break</td>
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<tr>
<td>10:50–12:05</td>
<td>Discussion group 2</td>
<td>S Fischer, O Rikhter</td>
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<td>Management principles for the treatment of diaphyseal fractures</td>
<td>B Twigt, Y Weil</td>
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<td>Group 1 – Landwasser 1</td>
<td>J Munz, T Noda</td>
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<td></td>
<td>Group 2 – Landwasser 3</td>
<td>M Núñez, D Rothberg</td>
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<td></td>
<td>Group 3 – Landwasser 5</td>
<td>G Soles, D Taype Zamboni</td>
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<td></td>
<td>Group 4 – Landwasser 7</td>
<td>F Wurmitzer, M Panin</td>
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<td></td>
<td>Group 5 – Landwasser 9</td>
<td>J Scheer, N Cohen</td>
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<td>Group 6 – Landwasser 11</td>
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<td></td>
<td>Group 7 – Landwasser 13</td>
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<tr>
<td>12:05–12:10</td>
<td>Location change to lecture room</td>
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<tr>
<td>12:10–12:25</td>
<td>Questions and conclusions—diaphyseal fractures</td>
<td>T Large</td>
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<tr>
<td>12:25–13:25</td>
<td>Lunch break</td>
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## Module 4
**Moderator: S Fischer**

### Treatment of articular fractures

Upon completion of this module, participants will be able to:

- Describe the treatment goals for articular fractures
- Define the key surgical principles of the management of articular fractures
- Determine the type of reduction and stability needed for articular fractures
- Outline the function and clinical indications for the tension band technique

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<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>13:25–13:40</td>
<td>Management principles for articular fractures—how do they differ from diaphyseal fractures?</td>
<td>J Munz</td>
</tr>
<tr>
<td>13:40–13:55</td>
<td>Reduction techniques for articular fractures—principles and methods</td>
<td>T Noda</td>
</tr>
<tr>
<td>13:55–14:10</td>
<td>Distal radial fractures—which to fix, how to fix?</td>
<td>J Scheer</td>
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<tr>
<td>14:10–14:25</td>
<td>Tension band principle and cerclage wiring</td>
<td>F Wurmitzer</td>
</tr>
<tr>
<td>14:25–14:40</td>
<td>Ankle fractures—a systematic approach for their fixation</td>
<td>Y Hattar</td>
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<tr>
<td>14:40–14:45</td>
<td>Location change to practical exercise room</td>
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<tr>
<td>14:45–15:15</td>
<td><strong>Practical exercise 4</strong>&lt;br&gt;Tension band wiring of the olecranon</td>
<td>F Wurmitzer, M Núñez</td>
</tr>
<tr>
<td>15:15–16:15</td>
<td><strong>Practical exercise 5</strong>&lt;br&gt;Management of a malleolar fracture type 44C</td>
<td>D Rothberg, M Panin</td>
</tr>
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<td>16:15–16:35</td>
<td>Coffee break</td>
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<tr>
<td>16:35–16:50</td>
<td>Preoperative planning—rationale and how to do it</td>
<td>N Cohen</td>
</tr>
<tr>
<td>16:50–17:05</td>
<td>Forearm fractures need—understanding of principles for diaphyseal and articular fractures</td>
<td>M Núñez</td>
</tr>
<tr>
<td>17:05–18:05</td>
<td><strong>Practical exercise 6 (part 1)</strong>&lt;br&gt;Preoperative planning—plan your forearm operation</td>
<td>N Cohen, S Fischer</td>
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<tr>
<td>17:45–20:30</td>
<td><strong>AO Davos Courses night</strong></td>
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Wednesday
December 4, 2019

Self-directed learning modules (morning option)
Participants will choose their own program by selecting one of the following three morning modules:

**Chairpersons**

- **Christian Candrian**
  Ospedale Civico Lugano, Lugano, Switzerland
- **Nir Cohen**
  Rabin Medical Center - Beilinson Campus, Petah Tikva, Israel
- **Vincenzo Giordano**
  Serviço de Ortopedia e Traumatologia Prof. Nova Monteiro – Hospital Municipal Miguel Couto, Rio de Janeiro, Brazil

**Faculty**

**Approaches—upper extremity**

- **Ying-Chao Chou**
  Chang Gung Memorial Hospital Linkou Branch, Taoyuan, Taiwan
- **Nir Cohen**
  Rabin Medical Center - Beilinson Campus, Petah Tikva, Israel
- **Marcis Radzins**
  Hospital of Traumathology and Orthopaedics, Clinic Ortomed, Riga, Latvia
- **Martin Richardson**
  University of Melbourne, Epworth Hospital, Melbourne, Australia
- **Johan Scheer**
  University Hospital Linköping, Linköping, Sweden
- **Frédéric Vauclair**
  Centre hospitalier universitaire vaudois, Lausanne, Switzerland

**Intramedullary nailing—principles made easy**

- **Sushrut Babhulkar**
  Sushrut Institute of Medical Sciences, Nagpur, India
- **Paulo Barbosa**
  Hospital Quinta D'Or, Rio de Janeiro, Brazil
- **Gregory Della Rocca**
  University of Missouri, Columbia, USA
- **Sergei Fischer**
  Universidade Federal do Paraná - Hospital do Trabalhador, Curitiba, Brazil
- **Vincenzo Giordano**
  Serviço de Ortopedia e Traumatologia Prof. Nova Monteiro, Rio de Janeiro, Brazil
- **Näder Helmy**
  Bürgerspital Solothurn, Solothurn, Switzerland
- **Mark Lee**
  University of California, Davis, USA
- **Jong-Keon Oh**
  Korea University Guro Hospital, Seoul, South Korea
- **An Sermon**
  University Hospitals Gasthuisberg, Leuven, Belgium
- **Philipp Stillhard**
  Kantonsspital Graubünden, Chur, Switzerland

**Associated shaft and articular fractures**

- **Christian Candrian**
  Ospedale Civico Lugano, Lugano, Switzerland
- **Juan Concha Sandoval**
  Universidad del Cauca, Popayan, Colombia
- **Marcos Leonhardt**
  Instituto de Ortopedia e Traumatologia do HCFMUSP, Sao Paulo, Brazil
- **Eric Moghadamian**
  University of Kentucky, Lexington, USA
- **Jochen Müller**
  Ospedale Regionale Lugano, Lugano, Switzerland
- **Chang-Wug Oh**
  Kyungpook National University Hospital, Daegu, South Korea
- **Dan Putineanu**
  Cliniques Universitaires St. Luc, Brussels, Belgium
- **Paul-Martin Sutter**
  Spitalzentrum Biel, Fribourg, Switzerland
- **Moritz Tannast**
  Hôpital cantonal de Fribourg, Fribourg, Switzerland
Wednesday
December 4, 2019

Self-directed learning modules (afternoon option)
Participants will choose their own program by selecting one of the following three afternoon modules:

Faculty

Approaches—lower extremity

Mazen Abdalla
An-Najah University Hospital
Nablus
Palestinian Territory

Christian Candrian
Ospedale Civico Lugano
Lugano
Switzerland

Jochen Müller
Ospedale Regionale Lugano
Lugano
Switzerland

Danilo Taype Zamboni
Hospital Italiano de Buenos Aires
Buenos Aires
Argentina

Jayne Ward
University Hospital Coventry and Warwickshire
Coventry
United Kingdom

Christian Willy
Bundeswehr Krankenhaus Berlin
Berlin
Germany

Avoiding and treating complications

Juan Concha Sandoval
Universidad del Cauca
Popayan
Colombia

Vincenzo Giordano
Servio de Ortopedia e Traumatologia Prof. Nova Monteiro
Rio de Janeiro
Brazil

Kodi Kojima
University of Sao Paulo
Sao Paulo
Brazil

John McMaster
John Radcliffe Hospital
Oxford
United Kingdom

Marinis Pirpiris
Epworth Hospital
Richmond
Australia

Spence Reid
Pennsylvania State University College of Medicine, Milton S. Hershey Medical Center
Hershey
USA

Tito Rocha
Instituto Nacional de Ortopedia e Traumatologia
Rio de Janeiro
Brazil

Michael Sirkin
New Jersey Medical School
Newark
USA

Leonid Solomin
Vreden Russian Research Institute of Traumatiligy
St.Petersburg
Russian Federation

Andrey Volna
Ilyinsky Hospital
Ilyinskoie
Russian Federation

Management of bone disease and fracture

Matheus Azi
Hospital Manoel Victorino
Salvador
Brazil

Igor Belenkiy
Alexandrovsky City Hospital
St Petersburg
Russian Federation

Lorin Benneker
Inselspital, University of Bern
Bern
Switzerland

Nir Cohen
Rabin Medical Center - Beilinson Campus
Petah Tikva
Israel

Mark Hatton
Nottingham University Hospitals
Nottingham
United Kingdom

Eric Moghadamian
University of Kentucky
Lexington
USA

Mauro Núñez
Hospital del Trauma
San José
Costa Rica

Chang-Wug Oh
Kyungpook National University Hospital
Daegu
South Korea

John Scolaro
University of California, Irvine
Orange
USA

An Sermon
University Hospitals Gaethuisberg
Leuven
Belgium

Yoram Weil
Hadassah Hebrew University Medical Center
Jerusalem
Israel
Wednesday morning
December 4, 2019

Approaches—upper extremity

Location: Davos 1

Module
Moderator: N Cohen
Approaches and positioning of upper extremity trauma made easy

Upon completion of this module, participants will be able to:

- Describe the different ways to position patients for surgery of the upper extremity
- Apply the different surgical approaches used for the upper extremity based on their indications
- Identify structures at risk for the different surgical exposures
- Recognize the limitations of the different surgical exposures of the upper extremity
- Explain how to obtain intraoperative imaging

08:00–08:05 Introduction N Cohen
08:05–08:15 Soft tissue in upper extremity trauma YC Chou
08:15–08:40 Approaches to the shoulder:
  - Deltoidectomy
  - Deltoid split
  - Dorsal/Thompson
  - Flexor carpi radialis (FCR)
08:40–09:05 Approaches to the humerus:
  - Anterolateral
  - Lateral
  - Medial
  - Posterior

09:05–09:30 Approaches to the elbow:
  - Lateral
  - Medial
  - Posterior

09:30–09:50 Approaches to the forearm:
  - Volar/Henry
  - Dorsal/Thompson

09:50–10:10 Approaches to the distal radius:
  - Flexor carpi radialis (FCR)
  - Dorsal (volar lateral)

10:10–10:40 Coffee break
10:40–11:40 Practical exercise—demonstration of supine, prone, beach chair, and lateral positions for upper extremity surgery with intraoperative imaging

11:40–12:00 Questions and closing remarks N Cohen
12:00–13:30 Lunch break

Intramedullary nailing—principles made easy

Location: Aspen 2

Module
Moderator: V Giordano
Intramedullary (IM) nailing—principles made easy

Upon completion of this module, participants will be able to:

- Treat fractures and other musculoskeletal problems with IM nailing when indicated
- Select the IM nailing procedure based on the fracture, the patient, and the best available evidence
- Prepare the patient for the IM nailing procedure and plan and provide postoperative care
- Recognize IM canal anatomy and the correct entry point for common situations
- Achieve reduction for diaphyseal fractures and maintain reduction during IM fixation

08:00–08:05 Welcome and introduction V Giordano
08:05–08:20 Biomechanical principles and nail design—how does it work? A Sermon
08:20–08:35 Patient positioning and reduction for nailing P Stillhard
08:35–08:50 Entry points selection—how to avoid complications? S Babhulkar
08:50–09:05 Case-based lecture—reduction techniques for diaphyseal fractures—nailing P Barbosa
09:05–10:05 Plenary case discussions
  - Tibial shaft fracture
  - Femoral shaft fracture
  - Proximal femoral fracture

10:05–10:25 Coffee break
10:25–10:40 Fractures of the proximal 1/3 of the femur—tips to improve implant positioning and results JK Oh
10:40–10:55 Segmentary fracture of the femoral shaft—how to ream the intercalary fragment S Fischer
10:55–11:10 Fracture around a fixed femoral stem—extreme nailing fixation—when and how M Lee
11:10–11:25 Nailing under plate—a good option for periplate fracture in the femur V Giordano
11:25–11:40 Questions from the participants V Giordano
11:40–11:55 Limits of indications for tibial fractures and “Poller screw” technique G Della Rocca
11:55–12:00 Evaluation and summary V Giordano
12:00–13:30 Lunch break
## Associated shaft and articular fractures

**Location: Schwarzhorn**

### Module
Moderator: C Candrian

**Associated shaft and articular fractures—rationale for the management**

Upon completion of this module, participants will be able to:

- Identify the injury pattern and its associated musculoskeletal problems
- Apply correct principles for fracture approach and reduction
- Discuss the management options and the adequate strategy of fracture fixation
- Avoid pitfalls and complications related to the injury itself

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
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</thead>
<tbody>
<tr>
<td>08:00–08:05</td>
<td>Welcome and introduction</td>
<td>C Candrian</td>
</tr>
<tr>
<td>08:05–08:20</td>
<td>Associated distal clavicle and glenoid neck fracture</td>
<td>PM Sutter</td>
</tr>
<tr>
<td>08:20–08:35</td>
<td>Associated proximal and shaft humeral fracture</td>
<td>J Concha Sandoval</td>
</tr>
<tr>
<td>08:35–08:50</td>
<td>Associated distal humeral and forearm shaft fracture</td>
<td>M Leonhardt</td>
</tr>
<tr>
<td>08:50–09:40</td>
<td>Case-based discussion—complex distal and shaft humeral fracture</td>
<td>D Putineanu</td>
</tr>
<tr>
<td>09:40–10:00</td>
<td>Coffee break</td>
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<tr>
<td>10:00–10:15</td>
<td>Associated acetabular and femoral shaft fracture</td>
<td>M Tannast</td>
</tr>
<tr>
<td>10:15–10:30</td>
<td>Associated femoral neck and shaft fracture</td>
<td>CW Oh</td>
</tr>
<tr>
<td>10:30–10:45</td>
<td>Associated distal femoral and tibial shaft fracture</td>
<td>C Candrian</td>
</tr>
<tr>
<td>10:45–11:00</td>
<td>Associated tibial shaft and posterior malleolar fracture</td>
<td>J Müller</td>
</tr>
<tr>
<td>11:00–11:55</td>
<td>Case-based discussion—complex femoral shaft and tibial plateau fracture</td>
<td>E Moghadamian</td>
</tr>
<tr>
<td>11:55–12:00</td>
<td>Evaluation and summary</td>
<td>C Candrian</td>
</tr>
<tr>
<td>12:00–13:30</td>
<td>Lunch break</td>
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</tbody>
</table>

**Wednesday morning**

December 4, 2019
Approaches—
lower extremity

Location: Davos 1

Module
Moderator: C Candrian

Approaches and positioning of lower extremity trauma made easy

Upon completion of this module, participants will be able to:
• Describe the different ways to position patients for surgery of the lower extremity
• Explain how to obtain imaging for intraoperative use
• List the different surgical approaches used in trauma surgery for the lower extremity and their indications
• Explain the limitations of exposures for the different approaches of the lower extremity

13:30–13:35 Introduction C Candrian
13:35–13:50 Soft tissue in lower limb trauma J Ward
13:50–14:10 Approaches to the hip:
  • Kocher
  • Anterior—Smith-Peterson
  • Lateral—Watson-Jones D Taype Zamboni
14:10–14:20 Approaches to the femoral shaft:
  • Lateral extensile M Abdalla
14:20–14:30 Supine approaches to the knee:
  • Anterolateral
  • Medial C Candrian
14:30–14:50 Prone approaches to the knee:
  • Posteromedial
  • Direct posterior C Willy
14:50–15:10 Approaches to the ankle:
  • Anterolateral
  • Posteromedial J Müller
15:10–15:40 Coffee break
15:40–16:40 Practical exercise—
  demonstration of supine, prone, and lateral positions for lower extremity surgery with intraoperative imaging C Candrian, J Müller, M Abdalla
16:40–17:10 Questions and closing remarks C Candrian

Avoiding and treating complications

Location: Aspen 2

Module
Moderator: V Giordano

Avoiding and treating complications of fracture management

Upon completion of this module, participants will be able to:
• Identify and discuss the methods of staged fracture care
• Apply operative care according to the location and soft-tissue condition of the fracture
• Recognize the indications and contraindications of osteotomy in the management of malunion
• Identify and discuss the indications for amputation

13:55–14:15 Do you need to stage all periarticular fractures? M Sirkin
14:15–14:35 What to do when periarticular wounds break down and fractures become infected? J Concha Sandoval
14:35–14:55 The management of open bony deficits—the place of shortening—Masquelet and transport K Kojima
14:55–15:15 The place of external fixation in definitive management of delayed presentation of open limb injuries A Volna
15:15–15:35 Osteotomies in the correction of diaphyseal injuries S Reid
15:35–15:55 Questions and answers V Giordano
15:55–16:15 Coffee break
16:15–16:35 Amputations or salvage—how to decide? J McMaster
16:35–16:55 Osteotomies in the correction of articular fractures L Solomin
16:55–17:15 Repair or replace?—options for cartilage resurfacing M Pirpiris
17:15–17:45 Questions and closing remarks V Giordano
Management of bone disease and fracture

Location: Schwarzhorn

Module
Moderator: N Cohen
Management of bone disease and fracture

Upon completion of this module, participants will be able to:
- Define the normal physiology of bone modeling and remodeling
- Explain the differences between normal bone turnover and some common bone diseases
- Discuss the current protocols for those bone diseases
- Identify the problems of fracture-related infection
- List the existing options for the management of fracture-related infection

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:55–14:10</td>
<td>Bone turnover—an overview</td>
<td>M Azi</td>
</tr>
<tr>
<td>14:10–14:25</td>
<td>The diamond concept—is it affected by bone remodeling disorders?</td>
<td>E Moghadamian</td>
</tr>
<tr>
<td>14:25–14:40</td>
<td>Assessing the risk of bone disease and fracture—is there a rationale for that?</td>
<td>M Núñez</td>
</tr>
<tr>
<td>14:40–14:55</td>
<td>Metastatic fractures—do I need to do anything special?</td>
<td>N Cohen</td>
</tr>
<tr>
<td>14:55–15:10</td>
<td>Osteoporotic fractures—what’s hot, what’s not?</td>
<td>L Benneker</td>
</tr>
<tr>
<td>15:10–15:25</td>
<td>Atypical femoral fractures—pearls and pitfalls</td>
<td>CW Oh</td>
</tr>
<tr>
<td>15:25–15:40</td>
<td>Medical management of bone remodeling disorders—what really works?</td>
<td>C Kammerlander</td>
</tr>
<tr>
<td>15:40–16:00</td>
<td>Coffee break</td>
<td></td>
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<tr>
<td>16:00–16:20</td>
<td>Case-based discussion—Fracture related infection—introduction and diagnosis</td>
<td>I Belenky</td>
</tr>
<tr>
<td>16:20–16:35</td>
<td>Hardware considerations: keep, remove, exchange</td>
<td>Y Weil</td>
</tr>
<tr>
<td>16:35–16:50</td>
<td>Antibiotic treatment and clinical strategies for post-osteosynthesis osteomyelitis</td>
<td>A Sermon</td>
</tr>
<tr>
<td>16:50–17:05</td>
<td>The role of cement beads and cement spacers in the treatment of bone defects associated with post-osteosynthesis osteomyelitis</td>
<td>M Azi</td>
</tr>
<tr>
<td>17:05–17:15</td>
<td>Cased based discussion</td>
<td>M Hatton</td>
</tr>
<tr>
<td>17:15–17:30</td>
<td>Questions and closing remarks</td>
<td>N Cohen</td>
</tr>
</tbody>
</table>
## Thursday
### December 5, 2019

**Location:** Aspen 2 (lectures) Foyer C2 (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Instructor(s)</th>
</tr>
</thead>
</table>
| 08:00–09:10   | **Practical exercise 6 (part 2)**
Operate your plan—fixation of a 2R2A, 2U2C forearm fractures using the LCP 3.5 (8 and 11 holes) | MV Giménez, J Scheer           |
| 09:10–09:15   | Location change to lecture room                                                            |                                |
| 09:15–09:30   | Femoral neck fractures                                                                     | M Abdalla                      |
| 09:30–09:45   | Trochanteric fractures                                                                     | O Rikhter                      |
| 09:45–10:00   | Distal femoral fractures—management principles                                           | J Munz                         |
| 10:00–10:15   | Tibial plateau fractures                                                                   | S Fischer                      |
| 10:15–10:30   | Distal tibia fractures                                                                     | F Cavalcante                   |
| 10:30–10:50   | Interactive case discussion                                                                | D Rothberg                     |
| 10:50–11:20   | Coffee break                                                                              |                                |
| 11:20–12:30   | **Discussion group 3**
Management principles for the treatment of articular fractures                             | S Fischer, O Rikhter           |
|               | Group 1 – Landwasser 1                                                                      | B Twigt, Y Weil                |
|               | Group 2 – Landwasser 3                                                                      | M Abdalla, F Cavalcante        |
|               | Group 3 – Landwasser 5                                                                      | Y Hattar, T Large              |
|               | Group 4 – Landwasser 7                                                                      | G Soles, D Taype Zamboni       |
|               | Group 5 – Landwasser 9                                                                      | F Wurmitzer, M Panin           |
|               | Group 6 – Landwasser 11                                                                     | J Scheer, N Cohen              |
|               | Group 7 – Landwasser 13                                                                     |                                |
| 12:30–13:40   | Lunch break                                                                               |                                |
| 13:55–14:00   | Location change to practical exercise room                                                 |                                |
| 14:00–15:10   | **Practical exercise 7**
IM nailing of a proximal femur using a trochanteric femoral nail antirotation (TFNA)     | G Soles, O Rikhter             |
| 15:10–15:15   | Location change to lecture room                                                            |                                |
Upon completion of this module, participants will be able to:

- Identify indications for minimally invasive osteosynthesis (MIO) and when to use it
- Outline differences of fracture treatment in children and the elderly compared to those in adults
- Understand the danger of radiation in the operating room and how to avoid it
- Outline the algorithm for polytrauma management and discuss the roles of the team members
- Recognize the pathology of severe pelvic trauma and identify the reasoning behind emergency pelvic stabilization
- Outline the treatment plan and priorities for open fractures
- List the causes and factors that lead to postoperative infection
- Name factors leading to delayed union and/or malunion

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:15</td>
<td>Minimally invasive osteosynthesis (MIO)—when to use it?</td>
<td>D Taype Zamboni</td>
</tr>
<tr>
<td>15:30</td>
<td>Radiation hazards in the operating room—how to minimize?</td>
<td>MV Giménez</td>
</tr>
<tr>
<td>15:45</td>
<td>Fractures in the growing skeleton—how are they different?</td>
<td>O Rikhter</td>
</tr>
<tr>
<td>16:00</td>
<td>Fixation principles in osteoporotic bone—the geriatric patient</td>
<td>G Soles</td>
</tr>
<tr>
<td>16:15</td>
<td>Implant removal—why, when, and how?</td>
<td>B Twigt</td>
</tr>
<tr>
<td>16:30</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>16:50</td>
<td>Treatment algorithms for the polytrauma patient</td>
<td>G Soles</td>
</tr>
<tr>
<td>17:05</td>
<td>Indications and techniques for external fixation for damage control</td>
<td>M Panin</td>
</tr>
<tr>
<td>17:20</td>
<td>Emergency management of pelvic fractures—a critical skill can save lives</td>
<td>T Noda</td>
</tr>
<tr>
<td>17:35</td>
<td>Management of open fractures</td>
<td>MV Giménez</td>
</tr>
<tr>
<td>17:50</td>
<td>Question and answer session</td>
<td>S Fischer, N Cohen</td>
</tr>
<tr>
<td>18:05</td>
<td>Summery, evaluation, and take-home messages</td>
<td>S Fischer, N Cohen</td>
</tr>
</tbody>
</table>
Friday
December 6, 2019

Location: Aspen 2 (lectures) Foyer C2 (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter(s)</th>
</tr>
</thead>
</table>
| 08:00–09:00 | Practical exercise 8  
Fixation of a tibial shaft fracture using a large external fixator  
(modular frame construct) | D Taype Zamboni, J Scheer            |
| 09:00–10:10 | Practical exercise 9  
Stabilization of the pelvic ring using a large external fixator | B Twigt, Y Weil                        |
| 10:10–10:30 | Coffee break                                                         |                                        |
| 10:30–10:45 | Infection after osteosynthesis—how to diagnose and manage           | M Abdalla                              |
| 10:45–11:00 | Delayed healing—causes and treatment principles                     | T Large                                |
| 11:00–11:15 | Research and development of smart systems to help the surgeon advance patient care | M Windolf                              |
| 11:15–11:25 | Location change to discussion groups                                |                                        |
| 11:25–12:35 | Discussion group 4  
Final case discussion on selected topic:  
• Polytrauma  
• Complications  
• Special fractures, eg, geriatric, osteoporotic, and periprosthetic fractures | S Fischer, O Rikhter, B Twigt, Y Weil, M Abdalla, F Cavalcante, Y Hattar, T Large, J Munz, T Noda, M Núñez, D Rothberg, F Wurmitzer, MV Giménez |
| 12:35–12:45 | Location change to lecture room                                      |                                        |
| 12:45–13:00 | Violation of AO principles—when it goes wrong                       | Y Weil                                 |
| 13:00–13:15 | Summery, evaluation, and take-home messages                          | S Fischer, N Cohen                     |
| 13:15–13:30 | Sandwich break                                                       |                                        |

Postcourse online activities
December 7–20, 2019

Online postcourse self-assessment (10 minutes)

Upon completion of this course, you will receive an e-mail link to the postcourse self-assessment. Please take the opportunity to complete the self-assessment. This will help you to reflect on what you have learned during the event and also help us to improve future events.
Event organization

AO Trauma Education
Jana Kamber
Clavadelerstrasse 8
7270 Davos Platz
Switzerland
Phone +41 81 414 27 10
Fax +41 81 414 22 84
E-mail jkamber@aotrauma.org

AO funding sources
Unrestricted educational grants from different sources are collected and pooled together centrally by the AO. All events are planned and scheduled by local and regional AO surgeon groups based on local needs assessments. We rely on industrial commercial partners for in-kind support to run simulations and/or skills training if educationally necessary.

Event venue and opening times

Congress Centre Davos
Talstrasse 49A
7270 Davos, Switzerland
Phone +41 81 414 62 00
Fax +41 81 414 62 29

General information
Sunday 12:00–19:00
Monday through Thursday 07:30–19:00
Friday 07:30–16:00

The AO experience
Sunday 14:00–17:00
Monday through Thursday 09:00–18:30 (Tuesday –20:30)
Friday 09:00–16:00

Industry exhibition
Sunday 14:00–17:00
Monday through Thursday 09:00–18:30
Friday 09:00–16:00
Exhibitions

The AO experience
The AO experience offers you the chance to view the latest publications in the AO library, see what benefits you are eligible for in the community and membership area and take a selfie with your new colleagues. Explore AO teaching and learning resources and find out about our new digital gateway myAO at the digital zone’s interactive stations. Visit the innovation in research and development zone, to take part in hands on demos featuring some of our newest innovations, and join the AO Technical Commission’s popular Meet the Experts sessions. Don’t forget to purchase any mementos at our store in the main entrance. Experience the AO spirit, walk the timeline of AO history, and mingle with other participants. AO staff will be on-hand to help you get the most out of this experience.

Exhibition partners
Visit the exhibitions of our trusted partner DePuy Synthes, Siemens, and other exhibitors: SPI, Invibio, Precision OS, Synoste, Rimasys, AO Alliance.

Media exhibitors
Lehmanns Media is in the welcome area.

Sponsors

We thank our trusted partner DePuy Synthes, and Siemens, for contributing in-kind support (materials and logistics) without which this event would not be possible. A special thanks to DePuy Synthes and Siemens for providing an unrestricted educational grant for this event.

We also extend our thanks to the following co-sponsors (educational grants, in-kind support):

DePuy Synthes
Siemens Healthineers
Credit Suisse
Synbone
Business center

The business center facilities in the Congress Centre Davos are accessible to everyone.

Services
- Internet and e-mail access
- Printer access
- www.aodavoscourses.org
  AO Davos Courses website offering course-related information

Opening hours
The business center is open 30 minutes before the first course of the day starts until 30 minutes after the end of the last course of the day.

Disclaimer
The use of your own computer in the business center network is inherently not secure. We strongly recommend that you take appropriate actions to protect your computer against unauthorized use or theft (e.g., firewall, virtual private network [VPN] connection, virus scanner). AO cannot be held responsible for any data loss or theft.

For further information or support, please contact:
Phone +41 81 414 28 70
E-mail it.helpdesk@aofoundation.org

Wireless network

How to connect to the AO wireless local area network (LAN)

1. Open the Wireless Network Connection window
2. Choose the AO Business network as shown in the image below and click on the Connect button
3. Our AO Business wireless network requires a wireless protected access (WPA) network key: Network key: aowireless
4. Then click on the OK button
Event information

**Event fee**
AO Trauma Course—Basic Principles of Fracture Management: CHF 2,250
The event fee covers the conference bag, documentation, coffee breaks, lunches, participation in AO Davos Courses, and the course certificate.

**European CME Accreditation**
For this course the UEMS-EACCME® in Brussels have granted 33 European CME credits (ECMEC).

**Swiss CME Accreditation**
Additionally, an application has been made to the following Swiss societies:
Schweizerische Gesellschaft für Chirurgie (SGC/SSC)
Schweizerische Gesellschaft für Orthopädie und Traumatologie (SGO/SSO).

**Conflicts of Interest (COI)**
All disclosure information can be viewed at the event webpage: http://AOTRAUMA10009578.aotrauma.org

**Course certificate**
Course certificates will be available at the end of the event at the general information desk.

**Evaluation guidelines**
All AO Trauma events apply the same evaluation process, which includes pre- and post-event online evaluation and on-site written questionnaires. These evaluation tools help ensure that AO Trauma continues to meet your training needs.

**Use of social media**
During the AO Davos Courses 2019, you can post about your experience using the #AODavosCourses2019 hashtag. While we encourage you to share your AO Davos Courses 2019 experience with your online network, it is expressly forbidden to share any images or recordings from inside the course.

**Intellectual property**
Event materials, presentations, and case studies are the intellectual property of the event faculty. All rights are reserved. For more information, please see: www.aofoundation.org/legal.

Recording, photographing, or copying lectures, practical exercises, case discussions, or any event materials is strictly forbidden. Participants violating intellectual property will be dismissed.

The AO Foundation reserves the right to film, photograph, and audio record during its events. Participants must understand that in this context they may appear in these recorded materials. The AO Foundation assumes participants agree that these recorded materials may be used for the AO’s marketing and other purposes, and that they may be made available to the public.

**Security**
Security checks will be conducted at the building entrance. Wearing a name tag is compulsory at all times in the congress center and hospital.

**Insurance**
The event organization does not take out insurance to cover any individual against accident, theft, or other risks.

**Use of mobile phones**
Use of mobile phones is not permitted in the lecture halls or in other rooms during educational activities. Please be considerate of others by turning off your mobile phone.

**Picture gallery**
Check out aodavoscourses.org for a daily selection of pictures from the AO Davos Courses 2019, the best from last year’s courses, and a selection of photographs from the first-ever AO Davos Courses.

**Dress code**
Warm clothes and suitable shoes are recommended.
Principles of AO educational events

1. Academic independence
Development of all curricula, design of scientific event programs, and selection of faculty are the sole responsibilities of volunteer AO network surgeons. All education is planned based on needs assessment data, designed and evaluated using concepts and evidence from the most current medical education research, and reflects the expertise of the AO Education Institute (www.aofoundation.org). Industry participation is not allowed during the entire curriculum development and planning process to ensure academic independence and to keep content free from bias.

2. Compliance to accreditation and industry codes
All planning, organization, and execution of educational activities follow existing codes for accreditation of high-quality education:
- Accreditation Criteria of the Accreditation Council for Continuing Medical Education, US (www.accme.org)
- ACCME Standards for Commercial Support: Standards to Ensure Independence in CME Activities (www.accme.org)
- Criteria for Accreditation of Live Educational Events of the European Accreditation Council for Continuing Medical Education (www.uems.eu)

Events that receive direct or indirect unrestricted educational grants or in-kind support from industry also follow the ethical codes of the medical industry, such as:
- Eucomed Guidelines on Interactions with Healthcare Professionals (www.medteceurope.org)
- AdvaMed Code of Ethics on Interactions with Health Care Professionals (advamed.org)
- Mecomed Guidelines on Interactions with Healthcare Professionals (www.mecomed.org)

3. Branding and advertising
No industry logos or advertising (apart from the AO Foundation and its clinical divisions) are permitted in the area where educational activities take place. Sponsors providing financial or in-kind support are allowed to have a promotional booth or run activities outside the educational area with approval from the event chairperson.

4. Use of technologies and products in simulations
In case simulations are chosen as an educational method to educate skills, we only use technology approved by the AO Technical Commission—a large independent group of volunteer surgeons developing and peer reviewing new technology. More information about the AO Technical Commission and its development and approval processes can be found on the AO’s website: www.aofoundation.org.

5. Personnel
Industry staff members are not permitted to interfere with the educational content or engage in educational activities during the event.
AO Research Institute Davos (ARI)

Mission
The AO mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

AO Research Institute Davos (ARI)
In its work to further the AO mission, ARI’s purpose is to advance patient care through innovative orthopedic research and development.

Orthopedics concerns musculoskeletal, spine and craniomaxillofacial trauma, degenerative musculoskeletal diseases, infections, and congenital disorders.

Goals
• Contribute high-quality, applied preclinical research and development focused toward clinical applications/solutions.
• Investigate and improve the performance of surgical procedures, devices and substances.
• Foster a close relationship with the AO medical community, academic societies, and universities.
• Provide research environment/support/training for AO clinicians.

Meet with our team including our ARI Medical Research Fellows, establish contacts, freely discuss your clinical problems and ideas, and learn about the latest results from ARI.

Collaborative research programs
• Annulus fibrosus rupture
• Acute cartilage injury
• Osteochondral defect

Craniomaxillofacial
• Imaging and planning of surgery, computer aided preoperative planning
• Medication-related osteonecrosis of the jaw
• Bone regeneration and 3D printing

Spine
• Degeneration and regeneration of the intervertebral disc
• Biomarkers and patient outcomes

Trauma
• Bone infection, including the development and testing of active anti-infective interventions
• Sensing implants for objective monitoring of fracture healing
• Development of smart surgical tools
• New implant concepts for optimized bone healing
• Prediction of subject-specific risk of proximal humeral fixation failure via computational tools
• Development of generic Asian pelvic bone model
• Patient outcomes and biomarkers

Veterinary medicine
• Improving osteosynthesis for small and large animals

Multidisciplinary
• 3R principles: refinement of preclinical studies
• Bioreactor culture systems and mechanobiology
• Development, standardization, optimization, and improvement of preclinical models and methods
• Ex vivo testing using advanced biomechanical models
• Gene transfer: non-viral and viral
• Implant design using the finite element methods
• Implant positioning assistance, C-arm guided implant placement
• In-vivo and in-vitro quantification of bone turnover and scaffold degradation
• Medical additive manufacturing and biofabrication
• Medical computed tomography (CT) image processing and analysis
• Polymers to deliver cells and biological factors, create potential space for tissue development, and guide the process of tissue regeneration
• Prototype development and production
• Stem cell therapies for the treatment of bone, intervertebral disc, and cartilage defects

For the AO Research Institute Davos Activity Report 2018 and recent publications, go to www.aofoundation.org/ari/publications.
Notes
Notes
Save the date: Madrid, April 2020
Sharing a world of knowledge

AO Trauma provides an outstanding selection of AO Trauma courses designed to meet your specific professional needs. We are confident that you will find the course offerings as well as the networking opportunity professionally rewarding. Your current level of knowledge, attitudes, and skills will be challenged throughout the week. The best-in-class curriculum and faculty will provide you with a memorable learning experience that will remain with you for a lifetime.

AO Trauma Masters Course—Shoulder Trauma
Chairpersons:
Stefaan Nijs (BE), Ashraf Moharram (EG)
AOTRAUMA10010974.aotrauma.org

AO Trauma Masters Course—Fractures around the Elbow
Chairpersons:
Gregory Della Rocca (US), Pedro Labronici (BR)
AOTRAUMA10010997.aotrauma.org

AO Trauma Masters Course—Hip Fractures
Chairpersons:
Michael Baumgaertner (US), Rodrigo Pesantez-Hoyos (CO)
AOTRAUMA10010971.aotrauma.org

AO Trauma Masters Course—Knee Injuries and Deformities
Chairpersons:
Hans Philipp Lobenhoffer (DE), Steffen Schröter (DE)
AOTRAUMA10010972.aotrauma.org

AO Trauma Masters Course—Foot and Ankle
Chairpersons:
Mandeep Dhillon (IN), Stefan Rammelt (DE)
AOTRAUMA10010973.aotrauma.org

For more information visit: www.aotrauma.org

All courses include one day of anatomical specimen lab.
Upcoming AO Davos Courses 2020

AO Davos Courses—November 29–December 4, 2020
- AO Trauma Course—Basic Principles of Fracture Management
- AO Trauma Course—Advances Principles of Fracture Management
- AO Trauma Course—Advanced Principles of Fracture Management for Swiss residents
- AO Trauma Masters Course—Current Concepts
- AO Trauma Course—Pelvic and Acetabular Fracture Management
- AO Trauma Masters Kurs (German speaking)
- AO Trauma Course—Managing Pediatric Musculoskeletal Injuries
- AO Trauma and AO Recon Course—Comprehensive Periprosthetic Fracture Management of the Hip and Knee

AO Davos Courses—December 6–9, 2020
- AO Trauma Course—Basic Principles of Fracture Management for Swiss Surgeons
- AO Spine Courses
- AO CMF Courses
- AO VET Masters Course—Small Animal
- AO VET Masters Course—Large Animal
- AO Recon Course—Principles in Shoulder Arthroplasty
- AO Recon Course—Complex Total Hip and Knee Arthroplasty
- AO PEER Course—Level 1 Principles of Clinical Research
- AO PEER Course—Level 2 Grant writing
- AO PEER Course—Level 2 GCP and study management
- AO PEER Course—Level 2 Publication writing course

This course list is subject to further change.
The final list of AO Davos Courses and worldwide courses will be available on www.aotrauma.org in January 2020.
Expanding precision medicine in image-guided surgery

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Expanding precision medicine through a complete imaging portfolio for orthopedic trauma, spine and CMF surgery ranging from mobile C-arms and robotic angiography systems to computed tomography and magnetic resonance imaging, as well as multi-modality suites.

Engineered to be truly patient-oriented, ARTIS pheno® is a unique floor-mounted robotic C-arm system for individualized preprocedural planning, intraoperative guidance, and immediate checkup in 2D and 3D directly in the hybrid operating room – regardless of patient condition or procedure complexity.

To provide 3D capabilities that can be seamlessly integrated into clinical routine, we developed Cios Spin®: a mobile 2D and 3D C-arm for intraoperative quality assurance. Delivering new insights and perspectives, Cios Spin gives you more certainty in surgical routine – and full control over your procedures.

ARTIS pheno
As individual as your patients

Cios Spin
New perspectives. Full control.
AO Trauma membership
Driving excellence and empowering the next generation

Discover the advantages of joining the leading global trauma and orthopedic community, providing its members with education, research, and networking opportunities worldwide. Join us and share your passion.