EORS 2023



27-29 SEPTEMBER | PORTO, PORTUGAL

Com o Alto Patrocínio
de Sua Excelência

Under the High Patronage of the
President of the Portuguese Republic

O Presidente da República

All the information contained in this book is accurate at the time of its publication. The Conference Organizers reserve the right to make modifications during the time of the Conference.

MESSAGE FROM THE EORS PRESIDENT

Dear EORS members, delegates and friends,

On behalf of the Executive Committee of the European Orthopaedic Research Society, it is my great pleasure to cordially welcome you all to our 31st Annual Meeting in the Congress Centre Alfândega do Porto at the shore of the river Douro in the historic and scenic Northern coastal region of Portugal.

EORS gratefully acknowledges the effort by Manuela Gomes and her team from the Research Institute for Biomaterials, Biodegradable and Biomimetics (I3Bs) of the University of Minho, in organizing and chairing our meeting that expects more than 400 delegates.

This year's conference program is an exciting assembly of plenary, keynote and invited lectures, symposia, open abstract sessions as well as poster presentations. We are looking forward to a thrilling three-day program packed with contributions to 80 different musculoskeletal themes and topics. Overarched by EORS' three research pillars *biology*, *biomechanics*, and *clinical*, the conference will address current and future Orthopedic challenges from nano- to tissue-scale and beyond.

In 2023, we are further looking forward to 35 thematically very diverse keynotes, one of which will be given by OARSI President and ICORS' Past-President Gun-il Im from Korea from this year's Guest Nation South Korea. We are further honored to welcome many other renowned delegates in Porto, like ICORS President Bernd Grimm, OARSI Past President Ali Mobasheri, ORS President Kurt Hankenson, and TERMIS Past President Geoff Richards to name just a few.

EORS is a proud and active founding society of ICORS. We are thus delighted that the Korean Orthopaedic Research Society (KORS) and the Taiwanese Orthopaedic Research Society (TORS) contributed Special Symposia to Porto. Next to a traditionally strong participation from Southern and Western Europe, I am glad to welcome so many Nordic countries like Denmark, Finland, Norway and Sweden this year. In this light, symposia organized by the EU COST action NetwOArk and our sister society TERMIS hold tremendous collaborative potential.

We are looking forward to vivid discussions on musculoskeletal pathologies, improved diagnostics thereof, latest insights into underlying causes of degeneration, and how this knowledge can be translated into potential future clinical solutions. Interactive sessions on biomaterials, 3D biofabrication and other additive manufacturing

techniques will provide guidance to develop the next generation of orthopedic implants.

Last-not-least, I would like to thank all our sponsors for their much-appreciated support and especially the AO Research Institute and the ON Foundation for their invaluable strategic alliance with EORS.

I hope to see all our last year's EORS awardees and the 2023 ON Foundation travel award winners. Please note our fantastic social program, including our legendary New Investigator night, our Congress Dinner in the Caves Ferreira and plenty of opportunities to explore and appreciate the world of famous Port wines.

I am looking forward to seeing you all at the EORS 2023 and wish you a safe journey and wonderful and inspiring days in Porto.

Holger Jahr
EORS President (2022-24)

MESSAGE FROM THE CHAIRS

We would like to welcome you all, clinicians and researchers, gathered in Porto for a high-level scientific meeting!

We have organized an outstanding meeting by means of promoting the close contact between scientists, clinicians and industries interested in the most recent and innovative therapies designed to improve and revolutionize healthcare in Orthopaedics. We are also very keen on engaging the younger scientists working in the field having them participating actively in the Conference.

The conference takes place in the Porto Congress Center, Alfândega do Porto (Old Customs House), in the historic city center of Porto, classified as World Heritage by UNESCO since 1996. The city has been going through a renaissance in the last few years and is considered an emerging capital of food and fashion. Additionally, Porto is famous by the Port wine cellars that can be found across the south Douro river shore. In summary, a wonderful city providing a unique atmosphere and character together with an outstanding perspective of history, food and wine.

We wish that all of you enjoy great science, share ideas and network, while experiencing our hospitality, our cuisine and (of course) our Porto wine, overlooking the Douro River, in a unique environment.
Therefore, we hope that this Conference provides you a delightful scientific experience in this beautiful historical city of Porto!

The Meeting President & Scientific Chair,

Manuela Gomes

The Meeting Co-Chair,

Ana Gonçalves

SCIENTIFIC AND ORGANIZING COMMITTEE

MEETING PRESIDENT & SCIENTIFIC CHAIR

Manuela E. Gomes, University of Minho, Portugal

MEETING CO-CHAIR

Ana I. Gonçalves, University of Minho, Portugal

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Holger Jahr, President, Germany
Boyko Gueorguiev, 1st Vice-President, Switzerland
Eduardo García-Rey, 2nd Vice-President, Spain
Gianluca Vadalà, Past President, Italy
Gabriela Graziani, Secretary-General, Italy
Stijn Bolink, Treasurer, The Netherlands

LOCAL ORGANIZING COMMITTEE

Adriana Vinhas, University of Minho, Portugal
Alberto Pardo-Montero, University of Minho, Portugal
Ana Almeida, University of Minho, Portugal
Ana Luísa Graça, University of Minho, Portugal
Baltazar Leal, University of Minho, Portugal
Mahwish Bakht, University of Minho, Portugal
Márcia Rodrigues, University of Minho, Portugal
Margarida Miranda, University of Minho, Portugal
Ozgen Ozturk, University of Minho, Portugal
Rui Domingues, University of Minho, Portugal
Rosa Monteiro, University of Minho, Portugal
Simão Teixeira, University of Minho, Portugal

NEW INVESTIGATOR AND SOCIAL MEDIA COMMITTEE OF EORS 2023

Ana Gonçalves, University of Minho, Guimarães, Portugal
Ana Luisa Graça, University of Minho, Guimarães, Portugal/ University of Würzburg, Germany
Carlos Peniche, Maastricht, The Netherlands
Gabriela Graziani, Instituto Ortopedico Rizzoli, Bologna, Italy
Luca Ambrosio, University of Rome, Italy
Girish Pattappa, University of Regensburg Medical centre, Germany

ORGANIZING SECRETARIAT

Maria João Coelho, Congress Coordinator, Abreu Events, Portugal

SCIENTIFIC PROGRAM

Manuela Gomes, University of Minho, Portugal
Ana Gonçalves, University of Minho, Portugal

ADVISORY BOARD

Abhay Pandit, National University of Ireland Galway, Ireland
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Jeannette Østergaard Penny, Zealand University Hospital Køge, Denmark
Jess Snedeker, Swiss Federal Institute of Technology (ETH), Switzerland
Jorge Mineiro, University of Lisbon, Portugal
João Espregueira Mendes, Clínica Espregueira, Portugal
João Mano, University of Aveiro, Portugal
Varejão Pinto, Hospital da Prelada, Portugal
Martijn Van Griensven, Institute for Technology-Inspired Regenerative Medicine (MERLN), The Netherlands
Roger Smith, The Royal Veterinary College, UK

GUEST NATION AT EORS 2023

South Korea as the Guest Nation

We are very honoured to have the Korean Orthopaedic Research Society (KORS) to represent South Korea as the Guest Nation at the EORS 2023.

Since 1995, the KORS has promoted and advanced basic research related to the musculoskeletal system. Current research is focused on various areas including stem cell research, musculoskeletal disease and treatment, biomaterials and tissue engineering, fracture healing and biology for bone/cartilage/tendon.

In the Guest Nation symposium, we will firstly discuss the results of study on enhancing osteogenic differentiation of adipose-derived stromal/stem cells as a keynote lecture. Second, we will focus on sclerostin-mediated impaired osteogenesis by fibroblast-like synoviocytes in the particle-induced osteolysis model. Third, we will discuss possible roles of antioxidants in rotator cuff tendinopathy. Lastly, we will then discuss role of polaprezinc in fracture healing by differentiations of osteoblast and osteoclast.

Therefore, the Korean Orthopaedic Research Society has organized the following Program for a session aimed at showcase their most recent research update in orthopaedics.

SPONSORS

The EORS 2023 would like to sincerely thank the following support:

GENERAL INFORMATION

CONFERENCE VENUE

The conference will be held in Alfândega do Porto Congress Center, Rua Nova da Alfândega, Edifício da Alfândega, 4050-430 Porto, Portugal.

REGISTRATION

The organizing secretariat desk will be open for registration and information according to the following time schedule:
Wednesday, 27th September 8.00 – 18:00h
Thursday, 28th October 9:30 – 18:00h
Friday, 29th October 9:30 – 17:30h

Please address yourself to the Registration desk to collect your badge and documentations.

WELCOME COCKTAIL, BUFFET LUNCHES AND COFFEE BREAKS

Welcome cocktail, buffet lunches and coffee breaks planned for the Conference are included in the Registration and will be at the Alfândega do Porto Congress Center.

DIETARY REQUIREMENTS

Please inform Organizing Secretariat by email or at the Registration desk as soon as possible in case you have any dietary requirements.

PRESENTATIONS

- The Plenary Lectures consist in 20 min lecture + 10 min Q&A.
- The Keynote Lectures consist in 15 min lecture + 5 min Q&A.
- The Oral presentations consist in 8 min talk + 2 min Q&A.
- The Rapid Fire format consist in a short oral of 4 min presentation of the poster (maximum 2 slides) + 1 min Q&A. The printed poster will be displayed at the Posters session as usual.

INSTRUCTIONS FOR PRESENTERS AND CHAIRS

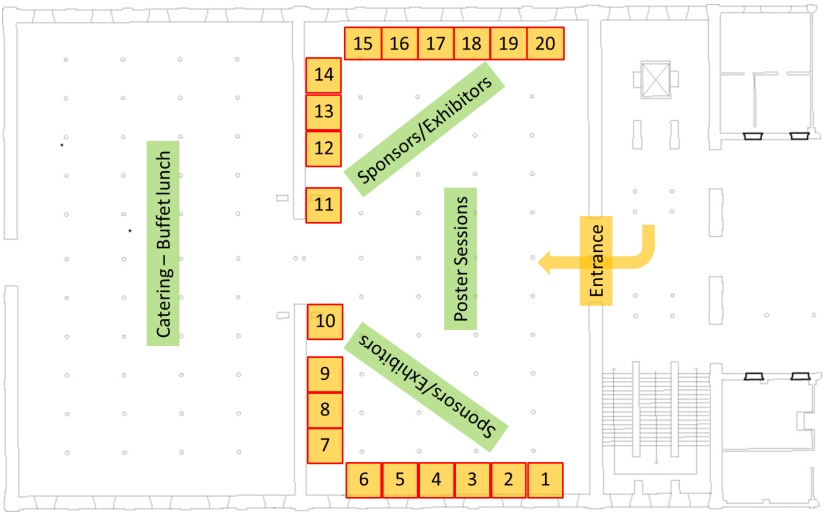
A computer will be available for your PowerPoint presentation. All presentations should be brought to the IT Room and uploaded into the central system no later on the day prior to your presentation. Speakers and chairs are requested to be in their session room 10 minutes before the start of the session. Please make sure to keep the schedule of your session!

POSTER SESSIONS

The Posters will be displayed in the Alfândega do Porto Congress Centre Floor 0 – West. Please check your poster code in the Posters List herein included.

The Posters should comply with the following dimensions: Portrait format of 90cm width and 120cm height.

VENUE MAP



ON FOUNDATION & EORS AWARDS

ON AWARDS

The ON Awards that will be delivered at the EORS 2023 are:

- 10 ON/EORS Education Grants for Travel Support To (500€);
- 1 ON/EORS Orthoregeneration Award (1000€) for the Best Abstract;
- 1 ON/EORS Kick-Starter Research Grant Tank Competition (10 000€) – Novel Regenerative Techniques and Materials For The Clinical Application In Musculoskeletal Diseases.

EORS AWARDS

The best overall Oral presentation of the meeting will receive the Edward R. Valstar Award.

The best Oral and Poster communications presented by New Investigators (NI) will be selected for the following awards:

- Best Biology NI Oral presentation & NI Poster
- Best Biomaterials and Biomechanics NI Oral presentation & NI Poster
- Best Clinics NI Oral presentation & NI Poster

- EORS 2023 New Investigator Award: a special NI Award session, in which three previously selected NI Abstracts will orally present in front of a Juri in order to attribute the NI Award of this year's meeting. Sponsorship: Journal Coatings (MDPI), 500€.

The awardees have the opportunity to attend the next Annual Meeting free of charge (Registration waived).

All winners (ON and EORS awards) will be announced in the closing ceremony session.

CERTIFICATE OF ATTENDANCE

Registered participants will receive a Certificate of Attendance to the EORS 2023, that will be sent by email after the Meeting.

PHOTOGRAPHY POLICY

Recording and photographing the EORS 2023 conference presentations will not be allowed.

LIABILITY

The Organising Committee of the Conference accepts no liability for participant personal injuries or loss/damage to personal property either during or as a result of the Conference, or during the social events. They are entitled to make any changes, modifications or omissions with respect to the information published in this book.

INSURANCE

The Conference Organisers cannot accept any responsibility for personal accidents and damage to the private property.

SOCIAL PROGRAM

WELCOME RECEPTION

Day 1 – Wednesday, 27thSeptember – 18:00 to 19:00h

The **Welcome Reception** will be held in the "**Salão Nobre**" of the **Alfândega Porto Congress Center**.

NEW INVESTIGATORS NIGHT

Day 1 – Wednesday, 27th September – 19:30 to 22:00
Address: Passeio dos Clérigos, R. das Carmelitas 151, Porto

The **New Investigators Night** will be held at "**Base Porto**", located in the heart of Porto. Base Porto is renowned for its vibrant atmosphere, diverse music genres, and energetic crowd, it has become a popular destination for music lovers and party enthusiasts in the city. Base Porto offers an unforgettable nightlife experience in the heart of Porto.

CONGRESS DINNER - CAVES FERREIRA

Day 2 – 28th September – 20:00 to 23:00
Address: Avenida Ramos Pinto, 70, Vila Nova de Gaia

The Congress Dinner will be at Caves Ferreira. Founded in 1751 are one of the oldest and most prestigious port wine producers in the world. Caves Ferreira is a captivating destination that offers an enchanting blend of history, wine, and culture. With its rich heritage, stunning cellars, wine tastings, guided tours, wine museum, and picturesque location, it beckons wine enthusiasts and curious travelers alike to explore and appreciate the world of port wines in all its glory.

TRAVELLING

SMOKING POLICY

From 1st January 2008 legislation was introduced in Portugal, which makes it forbidden to smoke in all public places. This includes cafes, bars and restaurants (excluding those with signalized smoking areas). Smoking is only allowed outside the conference building.

ELECTRICITY SUPPLY

220V is the standard power supply throughout Portugal. If you need a plug or a power adapter, you may find in electronic specialty retailers or ask in the registration desk.

TOURISM AND LEISURE

For further information about the city, please visit the following websites:
www.portoturismo.pt
www.portoenorte.pt
http://www.lonelyplanet.com/portugal/the-north/porto/things-to-do

EORS 2024 in Denmark – Save the date!

We are excited to welcome you to the European Orthopedic Research Society meeting in Aalborg, Denmark on 18th - 20th September 2024.

Aalborg is a vibrant city with a rich history going back to the Vikings and a modern edge. It has charming cobblestone streets lined with colorful buildings and lively cafées. From its beautiful waterfront to its cultural offerings, Aalborg is a delightful destination for both locals and visitors alike.

This is of course not the only reason for going to the first Scandinavian EORS meeting. Aalborg University has some of the finest engineers in the world, who work in close collaboration with the Department of Orthopaedics at Aalborg University Hospital. The conference is situated in the heart of the engineering campus of the university at the new AAU Innovate building.

AAU Innovate provides easy access to research labs for breakout sessions and workshops. AAU Innovate is a dynamic platform at Aalborg University that fosters creativity, entrepreneurship, and innovation. It provides students with the tools and support to develop their ideas into tangible solutions and ventures.

The conference themes are:

- AI in Orthopaedics
- Wearables
- Musculoskeletal infection
- 3D modelling
- Tissue engineering

We strive to make the conference friendly and “hyggelig"! Hygge is a Danish concept that encompasses coziness, contentment, and a feeling of well-being. It is all about creating a warm and inviting atmosphere and enjoying simple pleasures like good company, beers and comfort food. Therefore, the conference dinner will be held at a local café with free burgers and beers or soft drinks. A perfect place to mingle and make new friends and contacts.

Aalborg is easily accessible. KLM operates 8 daily connections between Aalborg and Schiphol Airport in Amsterdam. One of the world’s busiest airports with more than 200 international flight connections. Flight time is only 65 minutes.

We hope to welcome you in Aalborg for the EORS meeting 2024. We will make it worthwhile.

Warm regards,
Ole Rahbek and Søren Kold,
Orthopaedic Professors at Aalborg University Hospital, Denmark

EORS 2024

32nd annual meeting of the European Orthopaedic Research Society

European Orthopaedic Research Society – Your Orthopaedic Research Network

SAVE THE DATE!

18 - 20 September 2024

Aalborg University Hospital · Aalborg University · Denmark

Dear colleagues and friends,

It is a great honour to host and organise the 32nd Annual Meeting of the European Orthopaedic Research Society.

Our health care system more than ever needs solutions building on combined domain knowledge from clinicians and medical scientists.

This conference strives for accelerating the solutions for tomorrows orthopaedics.

We look forward to welcoming you to Aalborg.

Ole Rahbek and Søren Kold
Local organizing committee

Scan and save the date!

www.eors2024.org

Important dates

Open abstract submission
December 2023

Preliminary Programme
Spring 2024

Abstract Submission Deadline
15th April 2024

Early Registration Deadline
24th June 2024

Included in the registration fee
Admission to the full conference programme, programme and abstract book, coffee & lunch breaks and Welcome reception on 18th September.

EORS Executive Comittee

Holger Jahr
President
Germany

Boyko Gueorguiev
1st Vice-President
Switzerland

Eduardo García-Rey
2nd Vice-President
Spain

Gianluca Vadalà
Past President
Italy

Gabriela Graziani
Secretary-General
Italy

Stijn Bolink
Treasurer
The Netherlands

Read more!

For more information about abstract submission, registration as well as programme updates, please visit the conference website:

www.eors2024.org

Main Topics

AI in Orthopaedics · Wearables
Musculoskeletal infection
3D modelling · Tissue engineering

General information

Conference venue
AAU Innovative
Thomas Manns vej 25
9220 Aalborg

Conference language
The conference language is English.

CME credits
(European Continued Medical Educational Credits) EORS 2024 is expected to receive the EACCME® accreditation of the conference and associated CME points/credits.

Social events
Welcome reception
18th September 2024

Conference dinner
19th September 2024

EUROPEAN ORTHOPAEDIC RESEARCH SOCIETY

Partnerships & exhibition
Are you interested in a partnership package or exhibiting at EORS 2024?

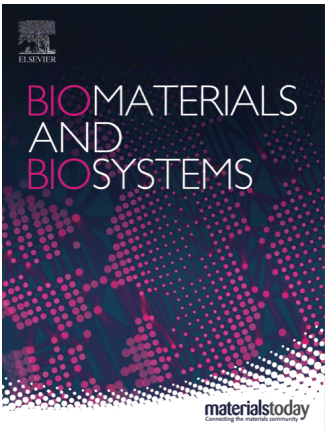
Please contact:
Mona Ibsgaard,
Sales Manager
mi@cap-partner.eu

Contact
Conference Organiser
c/o CAP Partner
Tel.: +45 7020 0305
E-mail: info@cap-partner.eu
www.eors2024.org

www.eors2024.org

SPECIAL ISSUE - Biomaterials and Biosystems, Elsevier

31st Annual Meeting of the European Orthopaedic Research Society 2023



This Special Issue will collect papers from authors presenting their works at the 31st Annual Meeting of the European Orthopaedic Research Society (EORS 2023) held in Porto, Portugal, from the 27-29th of September 2023.

Guest editors:

Professor Manuela E. Gomes
3B's Research Group, University of Minho, Guimarães, Portugal

Dr. Ana I. Gonçalves
3B's Research Group, University of Minho, Guimarães, Portugal

The submitted papers must report on recent and innovative therapies designed to improve and revolutionise healthcare in orthopaedics and musculoskeletal tissues regeneration. We encourage the participants of EORS 2023 to contribute to this Special Issue with original research or review articles along the described topics and keywords, and within the scope of the Journal.

We are pleased to inform you that this Special Issue will waive 100% of the APC (Article Publishing Charge). This will be applicable to all submissions prior to the submission deadline, which are accepted for publication after peer review.

Topics should relate to biological, clinical, and applied research aspects related to orthopedic and musculoskeletal tissues, including: Soft tissues, Muscle, Bone, Tendon & Ligament, Cartilage, Knee, Joints, Interfaces.
Topic include, but are not limited to: anti-infective therapies, inflammation, stem/progenitor cells, extracellular matrix, 3D niche, biomechanics, biomaterials, biofabrication, biophysical/external stimuli.

SCIENTIFIC PROGRAM

Day 1 | Wednesday, September 27th	
08:00 - 10:00	**Registration**
10:00 - 10:30	**Opening Ceremony** **Manuela E. Gomes, 3B´s Research Group, University of Minho, Portugal**
10:30 - 11:00 **Room Arquivo**	**Plenary Lecture I** Denitsa Docheva, University Wuerzburg, Germany **Chairs:** Holger Jahr, RWTH Aachen University, Germany Manuela Gomes, 3B's Research Group, University of Minho, Portugal
11:00 - 11:30	**Coffee-Break & Poster Session**
11:30 - 12:30 **Room Arquivo**	**OS01: Clinical Trials** **Chairs:** Elizabeth R. Balmayor, RWTH Aachen University Hospital, Aachen, Germany Denitsa Docheva, University Wuerzburg, Germany
20' **Keynote lecture:** **Arthritis Gene Therapy: From Concept to Clinical Trials** Chris Evans, Mayo Clinic, USA **10'** **A Prospective Study Evaluating Outcomes of Acute Ulnar Collateral Ligament Repair in The Thumb Using Suture Anchors** Charles N Wallace (Ireland), Alexandra Foley, Johan Van Der Stok **10'**	

Osteoarthritis patients develop an autonomic dysfunction
Rebecca Sohn, Tina Assar, Sebastian Braun, Marco Brenneis, Isabelle Kaufhold, Frank Zaucke, Georg Pongratz, Zsuzsa Jenei-Lanzl (Germany)

10'
A single intra-articular injection of JTA-004 is efficient for alleviating pain in patients with severe knee OA – a multicenter, randomized, double-blind, placebo- and active-treatment controlled phase III clinical trial
François Rieger (Belgique), Carole Nicco, Dominique Gaida, Melanie Uebelhoer, Yves Henrotin

10'
Results of Biphasic Calcium Phosphate Bone Graft with Submicron-Sized Needle-Shaped Surface Topography as Standalone Alternative to Autograft are Favorable in a Prospective, Multi-center, Randomized, Intra-patient Controlled Trial
Kucko NW. (The Netherlands), Sage K., Delawi, D., Hoebink E., Kempen, DHR.,Van Susante, J., de Bruijn, J., Kruyt. M.

11:30 - 12:30 **Room D. Luís**	**OS02: Osteoarthritis** **Chairs:** Holger Jahr, RWTH Aachen University, Germany Clara RUIZ-FERNANDEZ, University Clinical Hospital of Santiago de Compostela

20'
Keynote lecture:
Clinical Phenotypes, Anatomical Morphotypes, Molecular Endotypes and Therapeutic Subtypes: Pathways to Personalized Medicine in Osteoarthritis
Ali Mobasheri, University of Oulu, Oulu, Finland

10'
Expression of CD5L and Its Role in Chondrocytes during OA
Benjamin Brigant (Norway), Kashif Rasheed, Diana Carolina Gomez Ortega, Claire Vinatier, Marie-Astrid Boutet, Jérôme Guicheux, Erlend Tande, Victor Boyartchuk

10'
Does Inflammatory and Metabolomic Activity on Normal and Osteoarthritic Chondrocytes differ between Mesenchymal Stem Cells (MSCs) derived from the Infrapatellar Fat, Synovium and Subcutaneous Tissues?
Levend Karaçoban, Merve Gizer, Bilge Basak Fidan (Turkey), Ozan Kaplan, Mustafa Çelebier, Petek Korkusuz, Egemen Turhan, Feza Korkusuz

10'
Lipid inhibition in high glucose condition contributes osteoarthritis derived progenitor cells chondrogenesis
Wenguang Liu (China), Meng Feng, Peng Xu

10'
How could MSC-polarised macrophages promote cartilage repair?
Alexandra Macmillan (UK), Hayat Muhammad, Rawiya Al Hosni, Mohammed Alkhayref, Andrew Hotchen, Eve Robertson-Waters, Estelle Strangmark, Ben Gompels, Jia Hua Wang, Steven McDonnell, Wasim Khan, Menna Clatworthy, Mark Birch, Andrew McCaskie

11:30 - 12:30 **Room D. Maria**	**OS03: Spine** **Chairs:** Gianluca Vadalà, Università Campus Bio-Medico di Roma, Italy Luca Ambrosio, Università Campus Bio-Medico di Roma, Italy

20'
Keynote lecture:
Title:
Makarand V. Risbud, Thomas Jefferson University, USA

10'
The Bone Morphogenetic Protein L51P Enhances Spinal Fusion in Combination with BMP2 - An *In Vivo* Rat Spinal Fusion Model of the Elderly
Benjamin Gantenbein (Switzerland), Katharina A. C. Oswald, Sebastian F. Bigdon, Georg F. Erbach, Andreas S. Croft, Paola Bermudez-Lekerika, Franziska Strunz, Niklas Rutsch, Christoph E. Albers

10'
Prevalence and severity of intra-discal vacuum phenomenon in a normal aging population
Habash M (Ireland), Cawley D, Devitt A

10'
Evaluation of clinical outcomes and accuracy in transpedicular screw fixation using intraoperative CT-guided navigation for lumbar spondylolisthesis

Gianluca Vadalà, Giuseppe Francesco Papalia (Italy), Fabrizio Russo, Luca Ambrosio, Domenico Franco, Paolo Brigato, Rocco Papalia, Vincenzo Denaro

10'

Calcium sulfate/hydroxyapatite mediated controlled co-delivery of BMP-2 and zoledronic acid enhances spinal fusion

Xinggui Tian (Germany), Corina Vater, Deepak B. Raina, Lisa Findeisen, Lucas-Maximilian Matuszewski, Magnus Tägil, Lars Lidgren, Klaus-Dieter Schaser, Alexander C. Disch, Stefan Zwingenberger

10'

Depression influences postoperative pain and disability in patients undergoing lumbar spinal fusion: preliminary data of a prospective study

Giorgia Petrucci (Italy), Giuseppe Francesco Papalia, Fabrizio Russo, Luca Ambrosio, Rocco Papalia, Gianluca Vadalà, Vincenzo Denaro

11:30 - 12:30 **Room Arrábida**	**OS04: In vitro models (I)** **Chairs:** Rui Domingues, 3B's Research Group, University of Minho, Portugal Simão Teixeira, 3B's Research Group, University of Minho, Portugal

20'

Keynote Lecture:

Title:

Javier Ramón Azcón, Institute for Bioengineering of Catalonia, Barcelona

10'

3D dynamic culture of Tendon Stem/Progenitor Cells from tendinopathic explants: a new tool for advanced *in vitro* studies

M. C. Ciardulli (Italy), V. Giudice, F. Oliva, C. Selleri, N. Maffulli, G. Della Porta

10'

The potential of Magnesium-based micro cylinder for cartilage and bone regeneration utilizing an *in vitro* Osteoarthritis model

Helmholz H (Germany), Mavila Chathoth B, Angrisani N, Reifenrath J, Willumeit-Römer R

10'

Antimicrobial nanogels to prevent Orthopedic Device-Related Infections

B. Costa, P. Alves, D. Fonseca, F. Campos, Ana C. Monteiro, R. Pereira, F. Costa, P. Gomes, Guillermo Martínez-de-Tejada, C. Monteiro, M.C.L. Martins (Portugal)

10'
Development of a Bone-On-A-Chip microfluidic device as a model of osteoporosis
Lipreri M.V.[1], Pasquarelli A. (Italy), Scelfo D., Baldini N., Avnet S.

11:30 - 12:30 **Room Porto**	**OS05: Anti-infective therapies** **Chairs:** Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy Janin Reifenrath, Hannover Medical School, Clinic for Orthopaedic Surgery

20'
Keynote Lecture:
Implants: don´t let the bacteria grow!
Britt Wildemann, University Hospital Jena, Germany

10'
Customized coatings functionalized with metals to prevent prostheses infections caused by multidrug-resistant bacteria
Daniele Ghezzi (Italy), Maria Sartori, Marco Boi, Matteo Montesissa, Enrico Sassoni, Milena Fini, Nicola Baldini, Martina Cappelletti, Gabriela Graziani

10'
From novel coating strategy on biodegradable Mg based orthopaedic implant material towards clinical trial
Rachel W, Li (Australia), Jizhou Zheng, Paul N. Smith, Xiaobo Chen

10'
The course of septic arthritis following anterior cruciate ligament reconstruction: Infectious agents, clinical presentation and treatment: A case-series of 158 patients.
Osama Omar (Stockholm), Jesper Kraus-Schmitz , Björn Barenius, Karl Eriksson, Anders Stålman

10'
Visualization of nanoporous silica nanoparticle distribution for implant-directed magnetic drug targeting by ^{68}Ga-labeling and PET/CT

Heidi Harting, Andras Polyak, Nina Angrisani, Timo Herrmann, Nina Ehlert, Jessica Meißner, Michael Willmann, Silav Al-Bazaz, Tobias L Ross, Jens P Bankstahl, Janin Reifenrath (Germany)

12:30 - 14:00	**Lunch & Poster Session**
14:00 - 15:00 **Room Arquivo**	**OS06: Hip** Chairs: Boyko Gueorguiev, AO Research Institute Davos Fabrizio RUSSO, Università Campus Bio-Medico di Roma, Rome, Italy

20'
Keynote Lecture:
Is total hip arthroplasty fixation associated with osteoblasts activity in patients with osteonecrosis of the femoral head? A prospective case-control study
Eduardo García-Rey, Hospital Universitario La Paz in Madrid, Spain

10'
Metal-On-Metal Hip Prosthesis: A Retrospective Study On 681 Implants With A Follow-Up Of Between 12 And 22 Years
Corrado Ciatti (Italy), Fabrizio Quattrini, Chiari Asti, Pietro Maniscalco

10'
Does Delay from Injury to Surgery Increase the Risk of Dislocation of a Hip Hemiarthroplasty?
Jacob N. (Peterborough), Ghobrial M., Parker M.

10'
Transcriptomic analysis in trabecular bone of patients with idiopathic osteonecrosis of the femoral head
Saldaña L. (Spain), N. Vilaboa, E. García-Rey

14:00 - 15:00 **Room D. Luís**	**OS07: Pre-clinical models** **Chairs:** Mariana Tryfonidou, Utrecht University, The Netherlands Annemarie, University of Pennsylvania, USA

20'
Keynote Lecture:
Title:
Roger Smith, The Royal Veterinary College, London

10'
Influence of Mg-Cylinders on bone and cartilage in osteoarthritis
Angrisani N (Germany), Helmholz H, Windhagen H, von der Ahe C, Scheper V, Willumeit-Römer R, Mavila Chathoth B, Reifenrath J

10'
Gluing osteochondral fragments: development of a novel dual adhesive preclinical model strategy
Alicja Bojan (Sweden), Philip Procter, Peyman Karami, Dominique Pioletti

10'
A novel biomimetic bone adhesive: translation from small to large animal preclinical model on the path to first in human use
Philip Procter (Sweden, Ireland), Gry Hulsart-Billström, Antoine Alves, Michael Pujari-Palmer, David Wenner, Gerard Insley, Håkan Engqvist, Sune Larsson, Benjamin Pippenger, Dieter Bossard

10'
Preclinical Evaluation of 3D Printed Bone Graft Substitute Biomaterials: A Rabbit Critical-Size Long Bone Segmental Defect
Sara Hassouna Elsayed (UK), Ming Yang, Fernando Constantino-Casas, James Tapia-Dean, Hani Awad, Stephan Zeiter, Matthew Allen

14:00 - 15:00 **Room D. Maria**	**OS08: EVs** **Chairs:** Manuel Gomez-Florit, Health Research Institute of the Balearic Islands Ana L. Graça, University Wuerzburg, Germany

20'
Keynote Lecture:
Advanced tendon repair strategies – from EVs to mRNA-based approaches
Andreas Traweger, Paracelsus Medical University, Austria

10'

Extracellular vesicles from Tie2-overexpressing nucleus pulposus progenitors for intervertebral disc regeneration: an in vitro study
Luca Ambrosio (Italy, Japan), Jordy Schol, Gianluca Vadalà, Rocco Papalia, Daisuke Sakai, Vincenzo Denaro

10'
Mesenchymal Stem Cells-Derived Extracellular Vesicle Mimetics as Osteoinductive Mediators: An In Vitro Investigation
Antoine Karoichan (Quebec), Maryam Tabrizian

10'
Reactivation of the Nucleus Pulpous cells by platelet derivatives as a new tool in intervertebral disc regeneration
Nardini M., Gentili C., Muraglia A., Zanirato A., Ferrari P., Formica M., Cancedda R.Mastrogiacomo M. (Italy)

14:00 - 15:00 **Room Arrábida**	**OS09: Traumatology** **Chairs:** Eduardo García-Rey, Hospital Universitario La Paz in Madrid, Spain Lachlan Arthur, University of Oxford, UK

20'
Keynote Lecture:
Title
Jorge Mineiro, Hospital CUF Descobertas, Portugal

10'
Does the extent of bone defects affect the time to reach full weight-bearing after treatment with the Masquelet technique?
J. Frese (Germany), AP Schulz, B. Kowald, U.-J. Gerlach ,K.-H. Frosch, R. Schoop

10'
Training with a novel Digitally Enhanced Hands-on Surgical Training (DEHST) enhances the performance during intramedullary nail distal interlocking
Torsten Pastor (Switzerland), Emanuele Cattaneo, Tatjana Pastor MD, Boyko Gueorguiev, Markus Windolf, Jan Buschbaum

10'
Xxx

10'
A Novel Technique of Multiple Cantilever K-Wiring for Fracture Fixation in Severely Comminuted Metaphyseal Fractures
Sushmit Singh (UK), Sanjay Dhar, Sachin Kale

14:00 - 15:00 **Room Arrábida**	**OS10: Sports Medicine** **Chairs:** Gianluca Vadalà, Università Campus Bio-Medico di Roma, Italy Giorgia PETRUCCI, Università Campus Bio-Medico di Roma, Italy

20'
Keynote Lecture:
Surgical treatment of knee cartilage injuries in high-demanding athletes
Renato Andrade, Clínica Espregueira – FIFA Medical Centre of Excellence, Porto

10'
Accelerations Recorded by Low-Frequency Wearable Sensors as Effective Discriminators of Knee and Hip Osteoarthritis
Arash Ghaffari (Denmark), Pernille Damborg Clasen, Rikke Vindberg Boel, Andreas Kappel, Thomas Jakobsen, Søren Kold, Ole Rahbek

10'
Can Kinetics and Kinematics of Single Leg Forward and Crossover Triple Hop Tests Determine Recreational Male Athletes Return to Sports after ACL Reconstruction?
Ömer Faruk İlicepinar, Mehmet Imir, Berat Can Cengiz, Senih Gürses, Yigitcan Menderes, Egemen Turhan, Gürhan Dönmez, Feza Korkusuz (Turkey)

10'
Effect of blood flow restriction on the painful knee after knee arthroplasty in patients without mechanical failure: preliminary results of a prospective cohort study.
Lenka Stroobant (Belgium), Ewoud Jacobs, Nele Arnout, Stefaan Van Onsem, Arne Burssens[1], Jan Victor

10'
Lateral rim variable angle locked plating versus tension band wiring of simple and complex patella fractures – a biomechanical study

Ivan Zderic (Switzerland), Stephen Warner, Karl Stoffel, William Woodburn, Richard Castle, Jessica Penman, Eladio Saura-Sanchez, David L. Helfet, Boyko Gueorguiev[1] Christoph Sommer

15:00 - 16:00 **Room Arquivo**	**S01: Soft tissue joint disease: towards a cellular & molecular basis of disease** **Chairs:** Andreas Traweger, Paracelsus Medical University, Institute of Tendon and Bone Stephanie Dakin, University of Oxford

20'
Keynote Lecture:
Primed to resolve: the shoulder capsule reveals a cellular basis for resolving inflammatory fibrosis
Stephanie Dakin, University of Oxford

10'
HIF-1α initiates vascular recruitment and irreversible fibrosis in tendon
Greta Moschini, University Hospital Balgrist, University of Zurich; Institute for Biomechanics, ETH Zurich

10'
Tenocytes through space and time – determining the fate of tendon healing
Jessica Ackerman, University of Oxford

10'
SPARC - a modulator of tendon homeostasis and healing
Renate Gehwolf, Paracelsus Medical University; Institute of Tendon and Bone Regeneration

10'
Towards Functional Patient Derived Organoids as Models for Soft Tissue Joint Disease
Peter Johnson, University of Oxford

15:00 - 16:00 **Room D. Luís**	**S02: Shape modelling for orthopaedic clinical** **Chairs:** Audenaert Emmanuel, University of Ghent Jonas Grammens, University of Antwerp Kate Duquesne, University of Ghent

20'
Keynote Lecture:
Clinically relevant performance evaluation of automatic segmentation
Jonas Grammens, University of Antwerp, Vision Lab

10'
Non-linear applications of statistical shape analysis in orthopedic research
Audenaert Emmanuel, University of Ghent

10'
Using Shape Modeling Techniques for Markerless Motion Analysis
Kate Duquesne, University of Ghent, BioMics, Biomechancis, Insilico medicine, and Computational studies

10'
Personalized Statistical Modeling of Meniscal Kinematics
Aline Van Oevelen, University of Antwerp, Belgium

10'
Patient-Specific Contact Mechanics in Syndesmotic Ankle Lesions
Matthias Peiffer, Foot and Ankle Research Innovation and Research Laboratory (FARIL), Boston, USA

10'
Geometrics Deep Learning Applications in Orthopedic Research
Ide Van den Borre, University of Ghent, Group for Artificial Intelligence and Sparse Modeling

15:00 - 16:00 **Room D. Maria**	**S03: Cancer in Orthopaedics - How far are we from understanding and treating cancer in musculoskeletal tissues?** **Chairs:** Márcia T. Rodrigues, 3B´s Research Group, University of Minho, Portugal Giuseppe PAPALIA, Università Campus Bio-Medico di Roma, Rome, Italy

20'
Title
Vânia Oliveira, Hospital de Santa Maria, Porto, Portugal

10'

Design and Development of a custom platform to growth and characterize osteosarcoma spheroids
Maria Veronica Lipreri (Italy), Margherita Cortini, Nicola Baldini, Sofia Avnet

10'
Novel CB65-loaded liposome formulation as a chemotherapeutic candidate for osteosarcoma
Başak Işıl ZORBA, Özge BOYACIOĞLU, Tuğba ÇAĞLAYAN, Tuba REÇBER, İpek EROĞLU, Emirhan NEMUTLU, Petek KORKUSUZ (Turkey)

10'
Vascular Malformations and Tumors of the hand: A therapeutical approach
Angela Sofia Cesar Faustino (Ireland), Judit Reka Hetthessy

15:00 - 16:00 **Room Arrábida**	**S04: Additively manufactured othopaedic implants: current and future solutions** **Chairs:** Holger Jahr, RWTH Aachen University, Germany Fatma Nur Depboylu, Hacettepe University, Turkey

20'
Keynote Lecture:
Conception, implementation and pre-clinical testing of 3D-printed custom-made orthopaedic implants in complex knee & hip revision arthroplasty – Challenges in treatment of peri-prosthetic fractures and severe bone defect situations
Thomas M Grupp, Aesculap AG Research & Development, Tuttlingen, Germany

10'
3D printing technology in orthopaedic solutions: materials, implants, and instruments
Berna Richter, Aesculap AG Research & Development, Tuttlingen, Germany

10'
Production and Characterization of Coated Porous Titanium Implants by Laser Powder Bed Fusion (L-PBF) Technology
Fatma Nur Depboylu, Hacettepe University, Turkey

10'
3D-printed absorbable metallic medical devices and their application potential
Holger Jahr, RWTH Aachen University, Germany

10'

Additive manufacturing of biomimetic nanostructured materials for bone modelling and regeneration
Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy

15:00 - 16:00 **Room Porto**	**S05: TERMIS-EU/EORS Symposium** **Chairs:** Catherine Le Visage, INSERM, France

20'
Keynote Lecture:
Piezoelectric scaffolds in dynamic cultures promote the osteogenic differentiation of cells
Maria Chatzinikolaidou, University of Crete, Heraklion, Greece

10'
Mechanically evolutive 3D-printed scaffolds for bone regeneration
B. Charbonnier (France), L. Guyon, N. Touya , M. Dutilleul, J. Véziers , P. Maitre , O. Gauthier , P. Corre, P. Weiss

10'
Tenogenic regenerative potential of remotely-activated MNPs-labelled hASCs
Ana I. Gonçalves, 3B's Research Group, University of Minho, Portugal

10'
Geometric control of bone tissue growth and organisation
S.J.P. Callens (UK), R. Burdis, M. Cihova, J.A. Kim, Q.Y. Lau, M. M. Stevens

10'
Three Dimensional, Porous Composite Scaffolds with High Calcium Phosphate Content and Addition of Inorganic Ions for Bone Regeneration Applications
Martyna Nikody (The Netherlands), Jiaping Li, David Koper, Elizabeth Rosado Balmayor, Pamela Habibovic, Lorenzo Moroni

16:00 - 16:30	**Coffe-Break & Poster Session**
16:30 - 17:30 **Room Arquivo**	**OS11: Mechanobiology** **Chairs:** Stephanie Dakin, University of Oxford

	Syeda M. Bakht, 3B's Research Group, University of Minho, Portugal

20'
Keynote Lecture:
Multiscale assessment of Achilles Tendon mechanics and mechanobiology
Hanna Isaksson, Biomedical Engineering Lund University

10'
An ex vivo study investigating the degenerative impact of MMPs-2, -3, and -7 on the biomechanical properties of the pericellular matrix in articular cartilage
Benjamin Baumann (Germany), Marina Danalache

10'
Mechanical regulation of matrix remodeling in tendon wound healing
Alina M. Dintheer (Switzerland), Patrick K. Jaeger, Amro A. Hussien, Jess G. Snedeker

10'
Chondrocyte-Specific Knockout of Piezo Ion Channels Protects Against Post-Traumatic Osteoarthritis
Erica V. Ely (USA), Kelsey H. Collins, Kristin Lenz, Sophie Paradi, Wolfgang Liedtke, Yong Chen, Farshid Guilak

10'
The Role of Mechanosensory Neurons in Musculoskeletal Diseases
Shang Ma (Southwestern), Adrienne Dubin, Luis Romero, Meaghan Loud, Alexandra Salazar, Sarah Chu, Nikola Klier, Sameer Masri, Yunxiao Zhang, Yu Wang, Alex Chesler, Katherine Wilkinson, Valeria Vásquez, Kara Marshall, Ardem Patapoutian

16:30 - 17:30 **Room D. Luís**	**OS12: Tendon Aging and Degeneration** **Chairs:** Britt Wildemann, University Hospital Jena, Germany Ana Almeida, 3B's Research Group, University of Minho, Portugal

20'
Keynote Lecture:
Age-related mechanisms of altered tendon structure and function
Alayna Loiselle, University of Rochester Medical Center, NY

10'
TRP-channels in tendons: first insights, novel questions
Christine Lehner (Austria), Bruno Benedetti, Herbert Tempfer, Andreas Traweger

10'
HIF-1α initiates vascularization and irreversible fibrosis in tendon
Greta Moschini (Zurich), Amro A. Hussien, Maja Wolleb, Patrick K. Jaeger, Stefania L. Wunderli, Fabian S. Passini, Katrien De Bock, Jess G. Snedeker

10'
Rapamycin has a limited effect on tendon healing in a rodent model
Neil Marr, Danae E. Zamboulis, Ross E. Beaumont, Zofia J. Tatarczyk, Richard Meeson, Chavaunne T. Thorpe (UK)

10'
Establishing Novel Markers of Tendon Cell Populations
Zamboulis D.E., Ali F.S.S., Thorpe C.T. (UK)

16:30 - 17:30 **Room D. Maria**	**OS13: In silico models** **Chairs:** Catherine Le Visage, Nantes Université, INSERM, France Matteo MONTESISSA, University Clinical Hospital of Santiago de Compostela

20'
Keynote Lecture:
Biomechanics and Design of Intramedullary Nails
Boyko Gueorguiev, AO Research Institute Davos, Switzerland

10'
Machine learning can predict difficulty in anterior approach total hip arthroplasty, to improve patient safety and surgical training
Hariharan Subbiah Ponniah (UK), Thomas Edwards, Jonathan Lex, Ross Davidson, Mustafa Al-Zubaidy, Irrum Afzal, Richard Field, Alexander Liddle, Justin Cobb, Kartik Logishetty

10'
Thoracolumbar Spine Patient-Specific Finite Element Model Repository with Online User-Interface Platform

Morteza Rasouligandomani (Spain), Francis Chemorion, Marc-Antonio Bisotti, Jérôme Noailly, Miguel A. González Ballester

10'
Validated finite element simulations predict overloading failure of osteosynthesis plates
Dominic Mischler, Markus Windolf, Boyko Gueorguiev, Peter Varga (Switzerland)

10'
Fatigue life prediction of 3D-printed porous titanium implants using validated finite element analyses
Antoine Vautrin (Switzerland), Jensen Aw, Ed Attenborough, Peter Varga

16:30 - 17:30 **Room Arrábida**	**OS14: Clinical OA** **Chairs:** Feza Korkusuz, Hacettepe University Medical Faculty Gundula Rösch, University Hospital Frankfurt

20'
Keynote Lecture:
Title:
Matthias Schieker, Novartis Institute of Biomedical Research, Switzerland

10'
A precision health approach for osteoarthritis: prediction of rapid knee osteoarthritis progression using automated machine learning.
Simone Castagno (UK), Mark Birch, Mihaela van der Schaar, Andrew McCaskie

10'
Does Lower Extremity Skeletal Muscle Mass Determine Osteoarthritis Risk?
Yasemin Polat Özer, Didem Karaduman, Yigitcan Karanfil, Emine Çiftçi, Cafer Balci, Burcu Balam Doğu, Meltem Gülhan Halil , Mustafa Cankurtaran, Feza Korkusuz (Turkey)

10'
Characterization of clinical data for in moderate osteoarthritis with support vector machines and regulatory network models
Maria Segarra-Queralt (Spain), Mar Galofré, Laura Tio, Jordi Monfort, Joan Carlos Monllau, Gemma Piella and Jérôme Noailly

10'
Subchondral microchannel network changes in early osteoarthritis

Shahed Taheri (Germany), T Yoshida, Kai Oliver Böker, Robert Hermann Foerster, Lina Jochim, Anna Lena Flux, Birgit Grosskopf, Thelonius Hawellek, Wolfgang Lehmann, Arndt Friedrich Schilling

16:30 - 17:30 **Room Porto**	**OS15: Cell therapies** **Chairs:** Kurt D. Hankenson, University of Michigan Medical School, USA Morena Francesca Fiordalisi, i3S Porto, Portugal

20'
Keynote Lecture:
Spinal Fusion – a Clinical Challenge: Surgical and Biological Options
Stefan Zwingenberger, University Hospital Carl Gustav Carus at Technische, Universität Dresden, Germany

10'
Mesenchymal Stem Cells Maintain Articular Stabilization and Promote Endogenous Cartilage Repair after High Tibial Osteotomy: a Second-look Arthroscopy Study
Meng Feng (China), Sheng Dai, Jianlong Ni, Genwen Mao, Xiaoqian Dang, Zhibin Shi

10'
Comparison of Autologous Adipose-Derived Tissue Stromal Vascular Fraction (AD-tSVF) Biomedical Instruments for their Stem Cell Content
Ibrahim Vargel, M. Furkan Açil, S. Ali Tuncel, Nilsu Baysal, Irem Hartuç (Turkey), Hamza Okur, Feza Korkusuz

10'
Optimal concentration of mesenchymal stem cells for fracture healing in a rat model with long bone fracture
Myung-Seo Kim (South Korea), Kang-Il Kim

10'
Nr4a1 promotes osteogenic differentiation of mesenchymal stem cells and improves inflammation-inhibited bone regeneration
Yangshuai Gao (China), Xiuhua Wu, Zhongmin Zhang, Jiajia Xu

17:30 - 18:00 **Room Arquivo**	**Plenary Lecture II** **Biomaterials for Tissue Engineering**

	Antonios G. Mikos, Department of Bioengineering, Rice University, Houston, Texas **Chairs:** Manuela Gomes, 3B's Research Group, University of Minho, Portugal Dimitrios Zeugolis, UCD, Dublin, Ireland
18:00 - 20:00	**Welcome Reception**
20:00 - 22:00	**NI Get-together (Base Porto)**

Day 2 | Thursday, September 28th

09:30-10:00 **Room** **Arquivo**	**Plenary Lecture III** **Translating knowledge to power: Preparing a road from discovery to daily clinical practice** Jess Snedeker, ETH Zurich, Switzerland **Chairs:** Denitsa Docheva, University Wuerzburg, Germany
10:00-11:00 **Room** **Arquivo**	**S06: EVs in Orthopaedics** **Chairs:** Manuel Gomez-Florit, Health Research Institute of the Balearic Islands Andreas Traweger, Paracelsus Medical University, Austria

20'
Keynote lecture:
Nanovesicular therapeutics and drug delivery systems in orthopaedics
Mario Gimona, Paracelsus Medical University

10'
Polarized macrophages-derived extravellular vesicles as potential mediators of tendon repair
Manuel Gomez-Florit, Health Research Institute of the Balearic Islands

10'
Comparing extracellular vesicles derived from platelets and mesenchymal stromal cells for therapeutic use
Marian Forteza-Genestra, xxx

10'
Production of clinical grade extracellular vesicles (EVs) secreted by induced pluripotent stem cell-derived mesenchymal stem cells and mesenchymal stem cells for the treatment of osteoarthritis
Palamà MEF., Gorgun C., Shaw G., Mauphy M., Gentili C. (Italy)

10'
Platelet-derived Extracellular Vesicles Promote Stem Cells Tenogenic Commitment in a Bioengineered Tendon 3D Model
Ana Luísa Graça (Portugal), Rui M. A. Domingues, Denitsa Docheva, Manuel Gomez-Florit, Manuela E. Gomes

10:00-11:00 **Room D. Luís**	**S07: Understanding mesenchymal stem cell-mediated bone regeneration from clinical and preclinical data** **Chairs:** Kamal Mustafa, University of Bergen, Norway Mohammed A. Yassin, University of Bergen, Norway

20'
Keynote lecture:
Stem cells in bone regeneration, the future is NOW
Cecilie Gjerde, University of Bergen, Norway

10'
Extracellular Vesicles Secreted by Osteogenic-Differentiated Mesenchymal Stem Cells Promote Bone Formation in Rat Calvarial Defect
Niyaz Al-Sharabi, University of Bergen, Norway

10'
Source of mesenchymal stem cells is vital for bone regenerative applications
Samih Mohamed-Ahmed, University of Bergen, Norway

10'
Phase separation and particulate leaching integrated 3D printing of porous scaffolds for bone tissue engineering applications
Mehmet Serhat Aydin, University of Bergen, Norway

10'
Triazine-trione based composite materials for potential bone tissue engineering
Åshild Johansen, University of Bergen, Norway

10:00-11:00 **Room D. Maria**	**S08: Nanostructured thin films for orthopaedic implants** **Chairs:** Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy Julietta V. Rau, Italian National Research Council, Institute of the Structure of Matter, Rome, Italy

20'
Keynote lecture:
Unmet clinical needs and challenges in orthopaedic implants
Gianluca Vadalà, Campus Biomedico University, Rome, Italy

10'

Biodegradable Magnesium Alloys as orthopedic biomaterials: from basic science to medical clinic
Julian Vasile Antoniac, Department of Metallic Materials Science and Physical Metallurgy, University Politechnica of Bucharest, Romania

10'
Double doped calcium phosphate coatings with antimicrobial efficacy for biodegradable metal biomedical implants
Julietta V. Rau, Italian National Research Council, Institute of the Structure of Matter, Rome, Italy

10'
New zinc-bone apatite films show anti-tumor efficacy against bone metastases in vitro
Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy

10'
xxx
Donato Monopoli, Osteobionix and ITC Canary-Islands Institute of Technology

10:00-11:00 **Room** **Arrábida**	**S09: Current research update in Korean Orthopaedic Research Society (KORS)** **Chairs:** Lee Jin Woo, Department of Orthopaedic Surgery, Yonsei University College of Medicine, Seoul, Korea Bae Ji-Hoon, Department of Orthopaedic Surgery, Korea University Guro Hospital, Seoul, Korea

20'
Keynote lecture:
Bone from fat: enhancing osteogenesis from adipose stem cells
Gun-Il Im, Research institute for Covergence Life Science Dongguk University, Goyang, Korea

10'
Sclerostin-Mediated Impaired Osteogenesis by Fibroblast-Like Synoviocytes in the Particle-Induced Osteolysis Model
Lee Sang-Soo, Institute for Skeletal Aging and Orthopedic Surgery, Hallym University-Chuncheon Sacred Heart Hospital, Chuncheon, Korea

10'
Possible Roles of Antioxidants in Rotator cuff tendinopathy

Hyung Bin Park, Gyeongsang National University Changwon Hospital, Korea

10'
Feasibility of Loop-Mediated Isothermal Amplification for Rapid Detection of Methicillin-Susceptible and Methicillin-Resistant Staphylococcus aureus in Tissue Samples
Sang-Gyun Kim, Department of Orthopaedic Surgery, National Medical Center, Seoul, Korea

10'
Role of polaprezinc in fracture healing by differentiations of osteoblast and osteoclast
Kwang Hwan Park, Department of Orthopaedic Surgery, Yonsei University College of Medicine, Seoul, Korea

10:00-11:00 **Room Porto**	**Short Oral Session I** **Chairs:** Tobias Winkler, Charité – Berlin, BIH: Berlin Institute of Health, ATiO Foundation Stijn Bolink, Maastricht University, The Netherlands

20'
Keynote lecture:
Evaluation of a Calcium Phosphate-collagen Matrix Bone Graft with Needle-shaped Submicron Surface Topography in a Clinically Relevant Sheep Posterolateral Lumbar Spine Fusion Model
Nathan W. Kucko (Kuros Bioscience, The Netherlands), James Crowley, Daniel Wills, Tian Wang, Matthew Pelletier, Huipin Yuan, Guido Houtzager, Charlie Campion, William R. Walsh, Joost de Bruijn, Florence Barrère-de Groot

10'
Novel Piezoelectric and Osteoconductive Nanofibers for Bone Tissue Engineering
Frederico Barbosa (Portugal), Fábio F. F. Garrudo, Paola S. Alberte, Marta S. Carvalho, Frederico Castelo Ferreira, João C. Silva

10'
Investigation of intervertebral disc herniation through a human Anulus Fibrosus pro-inflammatory model
AL Castro (Portugal), MA Barbosa, RM Gonçalves

10'

Quantifying Variability in Daily Accelerations Recorded by Inertial Sensors in Healthy Individuals: Implications for Gait Measurement in Free-Living Environments
Arash Ghaffari (Denmark), John Rasmussen, Søren Kold, Ole Rahbek

10'
ADVANCED IN VITRO 3D TISSUE CULTURE MODEL FOR THE ASSESSMENT OF TITANIUM IMPLANT OSTEOINTEGRATION
Maglio M (Italy), Tschon M, Sartori M, Martini L, Rocchi M, Dallari D, Giavaresi G, Fini M

11:00-11:30	**Coffee-Break & Poster Session**
11:30 – 12:30 Room Arquivo	**OS16: Biomechanics** **Chairs:** Alayna Loiselle, University of Rochester Medical Center, NY João Silva, Institute for Bioengineering and Biosciences, Universidade de Lisboa, Portugal

20'
Keynote lecture:
Title
Hazel Screen, Queen Mary University of London

10'
Calcaneal osteosynthesis fracture fixation with filigree plates – a preliminary study
Beatriz Correia (Portugal), Olga Noronha, António Ramos, José Simões, José Carlos Noronha

10'
Title
Heungsoo Shin, Department of Bioengineering, Hanyang University, Korea

10'
New generation superior single plating versus low-profile dual mini-fragment plating of diaphyseal clavicle fractures – a biomechanical study
Tatjana Pastor (Switzerland), Ivan Zderic, Till Berk, Firas Souleiman, Esther Vögelin, Frank J P Beeres, Boyko Gueorguiev, Torsten Pastor

10'

The relation between microstructure and mechanical response in the human meniscus

Maria Pierantoni (Sweden), Hector Dejea, Lisa Geomini, Martin Abrahamsson, Stefan Gstöhl, Christian M. Schlepütz, Martin Englund, Hanna Isaksson

11:30 – 12:30 **Room D. Luís**	**OS17: IVD** **Chairs:** Jerome Guicheux, Nantes Université, France Catarina Milheiro, ICBAS, i3S, Porto, Portugal

20'

Keynote lecture:

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Marianna Tryfonidou, Utrecht University, The Netherlands

10'

Clinical Trial Quality Assessment in Intervertebral Disc Regeneration: Insights from Publication Status and Funding Sources

Luca Ambrosio (Italy), Gianluca Vadalà, Giorgia Petrucci, Fabrizio Russo, Rocco Papalia, Vincenzo Denaro

10'

Galectins -4 and -8 in Human Intervertebral Disc Degeneration

Strauss C (Austria), Djojic, Grohs J, Schmidt S, Windhager R, Stadlmann J, Toegel S

10'

Anti-inflammatory effects of preconditioned Bone Marrow MSCs derived secretome on degenerated human nucleus pulposus cells in vitro

V. Tilotta (Italy), G. Di Giacomo, C. Cicione, L. Ambrosio, F. Russo, R. Papalia, G. Vadalà and V. Denaro

10'

A MODEL TO EXPLORE INTERVERTEBRAL DISC CELL ACTIVITY IN ADVERSE BIOCHEMICAL ENVIRONMENTS

Sofia Tseranidou (Spain), Paola Bermudez-Lekerika, Maria Segarra-Queralt, Benjamin Gantenbein, Christine Le Maitre, Janet Piñero, Jérôme Noailly

11:30 – 12:30 **Room D. Maria**	**OS18: In vitro models (II)** **Chairs:** Cristina Barrias, i3S - Instituto de Investigação e Inovação em Saúde, Porto, Portugal Veronica TILOTTA, Università Campus Bio-Medico di Roma, Italy

20'
Keynote lecture:
In vitro models mimicking the bone remodeling cycle
Sandra Hofmann, Eindhoven University of Technology, The Netherlands

10'
Modelling paracrine chondrocyte communication effects at the tissue level
Andreu Pascuet-Fontanet (Spain), Maria Segarra-Queralt, Jérôme Noailly

10'
2D static and 3D dynamic co-cultures of human bone marrow mesenchymal stem cells as novel in vitro bioengineered myogenic models
Pasqualina Scala (Italy), Valentina Giudice, Carmine Selleri, Nicola Maffulli, Laura Rehak, Giovanna Della Porta

10'
Antihypertrophic effect of PGE2 on chondrocytes suggests adjustments of OA analgesia
Schmidt S (Heidelberg), Klampfleuthner F, Diederichs S

10'
Senescence or apoptosis: chondrocyte response to inflammation *in vitro* is dependent on its dimensional environment
Estelle Strangmark (UK), Jia Hua Wang, Rawiya Al Hosni, Hayat Muhammad, Mohammad Alkhrayef, Eve Robertson-Waters, Alexandra MacMillan, Benjamin Gompels, Antonia Vogt, Wasim Khan, Mark Birch, Andrew McCaskie

11:30 – 12:30 **Room Arrábida**	**OS19: Bioprinting** **Chairs:** Lorenzo Moroni, MERLN Maastricht University, The Netherlands Pedro J. Díaz-Payno, IMDEA Materials, Madrid, Spain

20'
Biofabrication and 3D Bioprinting Strategies for Musculoskeletal Tissue Regeneration
Daniel Kelly, Trinity College Dublin, Ireland

10'
Fabrication of a high-throughput 3D printed osteogenic coral-containing scaffold
Stephanie E. Doyle (Ireland), Deirdre Winrow, Temi Aregbesola, James Martin, Elin Pernevik, Volodymyr Kuzmenko, Linda Howard, Kerry Thompson, Martin Johnson, Cynthia Coleman

10'
Development of 4D Printing Strategy for Skeletal Muscle Tissue Engineering
Emre Ergene (Turkiye), Gorkem Liman, Gokhan Demirel, Pinar Yilgor

10'
3D Bioprinting Tissue Engineered Meniscal Constructs
Grace McDermott (UK), Marco Domingos, Bilal Barkatali, Stephen Richardson

10'
The impact of metabolism dysregulation in scaffold-guided large volume bone regeneration
Daniela B. Dias, Raphaela Fritsche-Guenther, WingLee Chan, Agnes Ellinghaus, Georg N. Duda, Jennifer Kirwan and Patrina S.P. Poh (Germany)

11:30 – 12:30 **Room Porto**	**OS20: Stem Cells** **Chairs:** Gerjo van Osch, Delft University of Technology, The Netherlands Paola Bermudez-Lekerika, University of Bern

20'
Keynote lecture:
Regenerative engineering: designing grafts, processes and signals
Ivan martin, University of Basel, Switzerland

10'
Exploring the ECM from young donors to enhance the impaired osteogenic properties of aged cells
Marta S. Carvalho (Lisboa), Joaquim M.S. Cabral, Cláudia L. da Silva

10'

Deciphering cell–cell interactions of human bone marrow mononuclear cells in 3D culture to enhance the regenerative potential of bone marrow autografts
Sebastian Häusner (Würzburg), Konstantin Horas, Torsten Blunk, Marietta Herrmann

10'
Effect of PPARG inhibition on human BMSC cell fate
Maria Rosa Iaquinta, Carmen Lanzillotti, Mauro Tognon, Fernanda Martini, Martin J Stoddart, Elena Della Bella (Switzerland)

10'
Mapping the spatial and temporal heterogeneity of mesenchymal stromal cells when used as a cell therapy in osteochondral repair
M Seah (UK), M Birch, I Moutsopoulos, I Mohorianu, A McCaskie

12:30-13:30	**Lunch & Poster Session**
13:30-14:00 Room D. Luís	**S10: Diversity efforts and its impact in orthopaedic and musculoskeletal reserach** **Chairs:** Elizabeth R. Balmayor, RWTH Aachen University Hospital, Aachen, Germany Federica Francesca Masieri, University of Suffolk, UK

20'
Speaker:
There is no such thing as luck. There are only choices.
José Micard Teixeira, Author, Mentor & Coach, Portugal

13:30-14:00 Room D. Maria	**Rapid Fire Session I** **Chairs:** Girish Pattappa, University of Regensburg Medical centre, Germany Alberto Pardo, 3B's Research Group, University of Minho, Portugal

5'
Can we use smartphones to monitor orthopaedic patients' physical activities during the perioperative period? A prospective observational study.
Arash Ghaffari (Denmark), Rikke Emilie Kildahl Lauritsen, Michael Christensen, Trine Rolighed Thomsen, Harshit Mahapatra, Robert Heck, Søren Kold, Ole Rahbek

5'
Mining of biomechanical and geometry data of IVD FE simulations
Estefano Muñoz-Moya (Spain), Carlos Ruiz, Gemma Piella, Jérôme Noailly

5'
Chronic stress results in increased pain perception in osteoarthritis *in vivo*
G. Rösch (Germany), A. E. Rapp, P. Tsai, H. Kohler, S. Taheri, A. F. Schilling, F. Zaucke, D. Slattery, Z. Jenei-Lanzl

5'
Real World Validation of an Machine Learning Algorithm Predicting Treatment Strategy for Hip Osteoartritis
Walter van der Weegen (The Netherlands), Tristan Warren, Rintje Agricola, Dirk Das en Michiel Siebelt

5'
Gait Analysis in your hand: feasibility study evaluating an AI approach to gait analysis using monocular video from mobile phones
Robert Wendlandt (Germany), Tabea Volpert, Jörg Schroeter, Arndt Peter Schulz, Andreas Paech

5'
Mid-Term Survivorship and Outcomes for Handheld Robotics Assisted Unicompartmental Knee Arthroplasty and Its Learning Curve – A Single Surgeon Study of 100 Knees
Soon Yaw Walter WONG (Singapore), Stephen Grant

13:30-14:00 Room Arrábida	**Rapid Fire Session II** **Chairs:** Luca Ambrosio, Università Campus Bio-Medico di Roma, Italy Maria Segarra-Queralt, Pompeu Fabra University (UPF)

5'
Fully automatic system to detect and segment the proximal femur in pelvic radiographic images for Legg-Calve-Perthes Disease
Ditmer, S. (Denmark), Dwenger, N., Jensen, L. N. , Ghaffari, A., Rahbek, O.

5'
The effect of geometries and gradient of strain-dependent solute diffusivity on the metabolic transport in patient-specific intervertebral discs
Zerihun G. Workineh (Spain), Estefano Muñoz-Moya, Carlos Ruiz Wills, Jérôme Noailly

5'
Subject Specific Knee Joint Modeling between Young and Elderly
Sang Kuy Han, YeonWoo Yoo, Heawon Choi, Ki Kwang Lee, Rami K. Korhonen, Amir Esrafilian (Finland)

5'
Application of External Torque Enhances the Detection of Subtle Syndesmotic Ankle Instability in a Weightbearing CT
M. Huyghe (Belgium), M. Peiffer, F. Cuigniez, T. Tampere, S. Ashkani-Esfahani, P. D'Hooghe, E. Audenaert, A. Burssens

5'
3D Quantitative characterization of the human meniscal vascular network using X-ray micro-Computed Tomography
Federica Orellana (Switzerland), Alberto Grassi, Peter Wahl, Katja Nuss, Antonia Neels, Stefano Zaffagnini, Annapaola Parrilli

5'
Alternation of the Three-Dimensional Subtalar Joint Alignment after Inframalleolar Osteotomy in Progressive Collapsing Flatfoot Deformity
Loïc Raes (Belgium), Matthias Peiffer, Peter Kvarda, Tim Leenders, Emanuel A. Audenaert, Arne Burssens

13:30-14:00 **Room Porto**	**Rapid Fire Session III** **Chairs:** Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy Daniele Ghezzi, Rizzoli Orthopaedic Institute, Bologna, Italy

5'
Human monocytes and mesenchymal stem/stromal cells co-cultured in fibrin have a pro-repair phenotype that influences chondrocyte activity
Mohammad Alkhrayef (UK), Hayat Muhammad, Rawiya Al Hosni, Andrew McCaskie and Mark Birch

5'
Determining the Function of Matrix Bound and Secreted Vesicles in Mineralisation
Anghileri, G. (UK), DeVoogt, W., Seinen CS., Peacock, B., Vader P., Martin-Fabiani, I., Davies, O.G.

5'
Donor Age Matters: Intervertebral Disc Decellularization for Tissue Regeneration
Fiordalisi Morena Francesca (Portugal), Ferreira Joana Rita, Pinto Marta Laranjeiro, Ribeiro-Machado Cláudia, Pinto Marta Teixeira, Oliveira Maria José, Barbosa Mário Adolfo, Gonçalves Raquel Madeira, Caldeira Joana

5'
Evaluation of the antibacterial efficacy of using a bone allograft developed according to the Marburg system of bone bank on a model of chronic osteomyelitis
Amina Koshanova (Kazakhstan), Berik Tuleubayev, Dina Saginova, Saule Akhmetova, Elyarbek Tashmetov

5'
3D Printed Polyether-ether-ketone (PEEK) Mechanical-adaptive Implants for Immunomodulatory Osseointegration
Hongyun Ma (China), Bo Lei, Yingang Zhang

5'
Extracellular Vesicle-functionalized fibrinogen and magnesium scaffolds to promote bone regeneration
Cardona-Timoner M, Bessa-Gonçalves M, Nogueira F, Barbosa MS, Santos SG (Portugal)

14:00 – 15:00 **Room** **Arquivo**	**OS21: Additive manufacturing** **Chairs:** Jos Malda, University Medical Center Utrecht, The Netherlands Miguel Castilho, Eindhoven University of Technology, The Netherlands

20'
Keynote lecture:
xx
Lorenzo Moroni, MERLN Institute for Technology-Inspired Regenerative Medicine, The Netherlands

10'
3D printing of PCL to fabricate porous scaffolds for bone tissue engineering applications
Mehmet Serhat Aydin (Norway), Theo Luciani, Samih Mohamed-Ahmed, Mohammed A. Yassin, Kamal Mustafa, Ahmad Rashad

10'
Multilayer dual-porosity 3D-printed scaffolds to recreate the anisotropic microenvironment of the cartilage
Sandra Ramos-Díez (Spain), Sandra Camarero-Espinosa

10'
Combination of 3D printing and cryostructuring technologies to improve spine fusion and prevent infection occurrence
T. Fischetti (Italy), G. Graziani, D. Ghezzi, F. Kaiser, S. Hoelscher-Doht, M. Cappelletti, G. Barbanti Brodano, N. Baldini, U. Gbureck, T. Jüngst

10'
3D printed hybrid scaffolds for cartilage regeneration
Silvia A. Ferreira (UK), Francesca Tallia, Agathe Heyraud, Simone A. Walker, Christoph Salzlechner, Julian R. Jones, Sara M. Rankin

14:00 – 15:00 **Room D. Luís**	**OS22: ON Grant Tank / NI Award session** **Chairs:** Holger Jahr, RWTH Aachen University, Germany Manuela Gomes, 3B's Research Group, University of Minho, Portugal XX

ON Grant Tank Competition

10'
Glycosylation mediated IVD regeneration
Kieran Joyce, CÚRAM, SFI Research Centre for Medical Devices, Ireland

10'
MuSculpt – Magnetic sculpting of vascularized skeletal muscle tissue
Isabel Calejo, i3S - Institute for Research and Innovation in Health of the University of Porto, Portugal

10'

3D Bioprinting of Magnetoelectric Composites Resembling Anisotropic Piezoelectric Tissues
Alberto Pardo, 3B's Research Group, University of Minho, Portugal

EORS NI Award Session

10'
Xxx
Xx

10'
Xxx
Xx

10'
Xxx
Xx

14:00 – 15:00 **Room D. Maria**	**OS23: Elbow & Shoulder** **Chairs:** Chris Evans, Mayo Clinic, USA Fabrizio RUSSO, Università Campus Bio-Medico di Roma, Rome, Italy

20'
Keynote lecture:
Title
Sebastian Muller, Kantonsspital Baselland, University of Basel, Switzerland

10'
Revision of Shoulder Replacements using Modular Components: A systematic review
Dragonas C (UK), Waseem S, Simpson A, Leivadiotou D

10'
Xx

10'
Early Mobilisation versus Immobilisation after Reverse Shoulder Arthroplasty and Total Shoulder Arthroplasty – A Systematic Review
Lily Nolan MB BCh (Galway), John Mahon MB BCh MRCSI, Rayyan Mirdad MB BCh, Rafee Alnajjar, Adam Galbraith FRCSI, Ken Kaar FRCSI

10'
Influence of Knot Number on Holding Capacity of two High Strength Sutures Tapes – A Biomechanical Analysis
Tatjana Pastor, Ivan Zderic, Peter Varga, Boyko Gueorguiev, Torsten Pastor (Switzerland)

14:00 – 15:00 **Room** **Arrábida**	**OS24: Tendinopathy** **Chairs:** Andreas Traweger, Paracelsus Medical University, Austria Adriana Vinhas, 3B's Research Group, University of Minho, Portugal

20'
Keynote lecture:
Mechanical stiffness or resolved inflammation – what is more important for tendon rehabilitation?
Kirsten Legerlotz, Humboldt Universität zu Berlin, Germany

10'
Animal Component-Free Workflows to Derive Tenocyte-Like Cells from Human Mesenchymal Stromal Cells and Pluripotent Stem Cells
Alessandro Dei (UK), Mark Hills, Wing Chang, Ravenska Wagey, Allen Eaves, Sharon Louis, Dimitrios I. Zeugolis, Arthur V. Sampaio

10'
Remnant-preserved Acute Anterior Cruciate Ligament Reconstruction with Concomitant Medial and Lateral Meniscal Tear Repair: Radiographic, Functional and Patient Reported Outcomes after 12 Month Follow-up
Sheng Dai, Jianlong Ni, Genwen Mao, Cuiping Mao, Ruiyu Liu, Zhibin Shi, Meng Feng (China)

10'
Increased $CD4^+$ to $CD8^+$ T-cell ratio as a driver of impaired Achilles tendon healing in human patients
Franka Klatte-Schulz (Germany), Tobias Gehlen, Nicole Bormann, Serafim Tsitsilonis, Sebastian Manegold, Aysha Schmock, Josephine A. Melzer, Katharina Schmidt-Bleek, Sven Geißler, Georg N. Duda, Birgit Sawitzki, Britt Wildemann

10'

Glutamate Expression in Subacromial Bursa is Associated with Rotator Cuff Tear and with Shoulder Pain
Hyung Bin Park (Republic of Korea), Ra Jeong Kim

14:00 – 15:00 **Room Porto**	**OS25: Biomaterials (I)** **Chairs:** Stefan Zwingenberger, University Center of Orthopaedic, Trauma and Plastic Surgery, Germany Clemens Gögele, Paracelsus Medical University, Nuremberg, Germany

20'
Keynote lecture:
AO Fracture Monitor: Continuous sensor monitoring for personalised fracture care
R. Geoff Richards, AO Research Institute Davos, Switzerland

10'
Commercially Pure (Cp-Ti) Titanium Medical Implant Production using Laser Powder Bed Fusion (L-PBF) Technology
Fatma Nur Depboylu (Turkey), Evren Yasa, Özgür Poyraz, Feza Korkusuz

10'
Influence of fluid uptake on the mechanical and thermal properties of PMMA-based bone cement
Crystal Emonde (Germany), Magnus Reulbach, Patrick Evers, Hannah Behnsen, Florian Nürnberger, Eike Jakubowitz, Henning Windhagen

10'
Development of a dynamic coil-shaped scaffold for articular cartilage tissue engineering
Pedro J. Díaz-Payno (Spain), Javier Llorca, Andrés Díaz Lantada, Jennifer Patterson

10'
Stability of biofunctionalized high-performance oxide ceramics against radiation sterilization
Philipp Schräder (Germany), Alejandro Gómez Montoya, Norina Labude-Weber, Jörg Eschweiler, Sabine Neuss, Horst Fischer

15:00-16:00	**S11: Novel insights into osteoarthritis and cartilage regeneration**

Room Arquivo	Chairs: Feng-Sheng Wang, Chang Gung University College of Medicine, Kaohsiung, Taiwan Holger Jahr, Aachen University, Germany

20'
Keynote lecture:
New ATMPs to treat osteoarthritis
Yves Henrotin, University of Liège Motricity Sciences Liège, Belgium

10'
Microenvironmental dependence of proper chondrocytic maturation
Holger Jahr, Aachen University, Germany

10'
The role of histone modifiers and oxidative stress in osteoarthritis
Wei-Shiung Lian, Gung Memorial Hospital, Kaohsiung, Taiwan

10'
Myokine Fundc5 compromises mitochondrial dysfunction in osteoarthritis
Yu-Shan Chen, Memorial Hospital, Kaohsiung, Taiwan

10'
Novel insights from the gut-joint axis: microbial contribution to skeletal homeostasis
Feng-Sheng Wang, Memorial Hospital, Kaohsiung, Taiwan

15:00-16:00 Room D. Luís	S12: New Investigators (NI) symposium: Entrepreneurship Chairs: Ana Gonçalves, 3B's Research Group, University of Minho, Portugal Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy

20'
Controlling tissue organization by sound
Tiziano Serra, mimiX Biotherapeutics, Switzerland

20'
Title
Catarina Custódio, Metatissue, Aveiro, Portugal

20'
Title
Xiang Li, ZuriMED Technologies, Switzerland

15:00-16:00 **Room D. Maria**	**S13: ON/EORS Collaborative Orthoregeneration Symposium** **Chairs:** Jerome Guicheux, Nantes Université, France Manuela E. Gomes, 3B's Research Group, University of Minho, Portugal

20'
Title
Marianna Tryfonidou, Utrech University

20'
Title
Ivan Martin, University of Basel, Switzerland

20'
Title
Elizabeth Rosado Balmayor, RWTH Aachen University, Germany

15:00-16:00 **Room Arrábida**	**S14: Applications of Weightbearing CT imaging in the musculoskeletal system** **Chairs:** Claudio Belvedere, Instituto Ortopedico Rizzoli, Bologna, Italy Arne Burssens, University Hospital of Ghent, Belgium

20'
Keynote lecture:
Application of Weightbearing CT in Corrective Osteotomies
Arne Burssens, University Hospital of Ghent, Belgium

10'
Traditional and novel three-dimensional Measurements using cone-beam CT in Weight-bearing conditions
Claudio Belvedere, Instituto Ortopedico Rizzoli, Bologna, Italy

10'
Diagnostic applications of Weightbearing CT per Anatomical Area
Jing Li, University Hospital of Ghent, Belgium

10'
Effect of total ankle replacement on the 3-dimensional subtalar joint alignment in varus ankle osteoarthritis
Peter Kvarda, Department of Orthopaedics, Kantonsspital Baselland, Switzerland

10'
Applications of Weighbearing CT in Joint Instability
Matthias Peiffer, Research Fellow FARIL Massachusetts General Hospital Harvard Medical School

15:00-16:00 **Room** **Arrábida**	**S15: P4FIT: Perspectives for future innovation in tendon repair** **Chairs:** Valentina Russo, University of Teramo, Italy Giovanna Della Porta, University of Salerno, Italy

20'
Keynote lecture:
Nanomedicine and Drug delivery system for Tendon Repair: new tools, strategies and perspectives
Giovanna Della Porta, University of Salerno, Italy

Tenocytes: first responders in tendon injury or structural bystanders?
Nicholas Forsyth, Keele University, UK

10'
3D dynamic culture of Tendon stem cells from Tendinopathic explant: a new toll for advanced *in vitro* studies
Maria Camilla Ciardulli, University of Salerno, Italy

10'
Novel stem cell strategies for tendon regenerative medicine
Arlette Haidar Montes, University of Teramo, Italy

10'
A role for perfusion delivered shear force in the promotion of TPSC EV production
Marta Clerici, University of Salerno, Italy

10'
The secretome of AEC: challenges and opportunities in cell free regenerative medicine in tendon disorders
Adrián Cerveró-Varona, University of Teramo, Italy

	10' **The effect of PCL/PGS-based electrosun he effect of PCL/PGS-based electrospun scaffolds on tenogenic differentiation and immunomodulatory profile of amniotic epithelial stem cells** Iorio Francesco, University of Erlangen-Nuremberg, Germany **10'** **Movement data analysis as a novel predictive technology for tendon repair** Melisa Faydaver, University of Teramo, Italy
16:00-16:30	**Lunch & Poster Session**
09:30-10:00 **Room Arquivo**	**Plenary Lecture IV** **TITLE** Brian Johnstone, Department of Orthopaedics and Rehabilitation Oregon Health & Science University, Portland **Chair:** Boyko Gueorguiev, AO Research Institute Davos, Switzerland
17:00-18:00	**General Assembly**
20:00-23:00	**Congress Dinner (Caves Ferreira)**

Day 3 | Friday, September 29th	
09:30 - 10:00 **Room Arquivo**	**Plenary Lecture V** **Bridging the gap: Skeletal cell based strategies for bone repair from bench to clinic** Richard Oreffo, University of Southampton, Southampton, UK **Chair:** Geoff Richards, AO Research Institute Davos, Switzerland
10:00-11:00 **Room Arquivo**	**S16: NetwOARK** **Chairs:** Feza Korkusuz, Hacettepe University Medical Faculty Denitsa Docheva, University Wuerzburg, Germany
20' **Patients Perspectives on Orthobiologics for Osteoarthritis** Feza Korkusuz, Hacettepe University Medical Faculty **20'** **Cellular and Molecular Endotypes for Osteoarthritis** Girish Pattappa, University Medical Centre Regensburg **20'** **Translational Models for OA: Speeding up from Bench to Bedside** Sylvia Nürnberger, Medical University Vienna	
10:00-11:00 **Room D. Luís**	**S17: Translationally-targeted preclinical models in orthopedics and musculoskeletal regeneration** **Chairs:** Esther Wehrle, AO Research Institute Davos and Institute for Biomechanics, ETH Zurich Martin Stoddart, AO Research Institute Davos
20' **Keynote Lecture:** **Intravital imaging in preclinical models to advance translational bone research** Cristina Barrias, i3S - Instituto de Investigação e Inovação em Saúde, Porto, Portugal **10'** **Employing clinically-relevant transgenic animal models – Musculoskeletal regeneration in the PolgA mouse model of aging**	

Neashan Mathavan, Institute for Biomechanics, ETH Zurich

10'
The avian organotypic and chorioallantoic membrane (CAM) assay as an addition to preclinical models in bone research
Richard Oreffo, Bone and Joint Research Group, Centre for Human Development, Stem Cells and Regeneration, Institute of Developmental Sciences, University of Southampton, Southampton, UK

10'
Omics-based preclinical models of musculoskeletal regeneration
Esther Wehrle, AO Research Institute Davos and Institute for Biomechanics, ETH Zurich

10'
Masquelet technique using a mouse's femur critical-sized bone defect model - Characterization of macrophage expression in induced membrane
Yota Kaneko (Japan), Hiroaki Minehara, Tatsuru Sonobe, Takuya Kameda, Miho Sekiguchi, Takashi Matsushita, Shinichi Konno

10:00-11:00 **Room D. Maria**	**S18: Biofabrication in Orthopedic Research and Regeneration** **Chairs:** Rui Domingues, 3B's Research Group, Univeristy of Minho, Portugal Lorenzo Moroni, MERLN Maastricht University, The Netherlands

20'
Keynote Lecture:
Title
Jos Malda, University Medical Center Utrecht, The Netherlands

10'
Electrowriting (cell-laden) natural-derived polymer fibers
Miguel Castilho, Eindhoven University of Technology, Eindhoven, The Netherlands

10'
Title
Sandra Camarero-Espinosa, POLYMAT-Basque Center for Macromolecular Design and Engineering, Donostia-San Sebastian, Spain

10'

Combining Magnetically-Assisted and Matrix-Assisted 3D Bioprinting for Anisotropic Tissue Engineering
Syeda M. Bakht (Portugal), Alberto Pardo, Rui L. Reis, Rui M. A. Domingues and Manuela E. Gomes

10'
Post-printing chondrogenic differentiation of stem cell spheroid constructs for cartilage tissue engineering
Decarli M. C., Seijas-Gamardo, A., Morgan, F. L. C. , Wieringa, P. , Baker, M. B. , Silva J.V.L, Moraes A.M., Lorenzo M.[1], Mota C. (The Netherlands)

10:00-11:00 **Room Arrábida**	**S19: ATiO: Pushing Advanced Therapy Development in Orthopaedics** **Chairs:** Tobias Winkler, Charité – Berlin, BIH: Berlin Institute of Health ATiO Foundation Andrew Williamson, Heraeus Medical, ATiO Foundation

20'
Keynote Lecture:
The Alliance for Advanced Therapies in Orthopaedics – AtiO
Tobias Winkler, Charité – Berlin, BIH: Berlin Institute of Health, ATiO Foundation

10'
Advanced Therapies in Orthopaedics – A demanding market of the future
Andrew Williamson, Heraeus Medical, ATiO Foundation

10'
HIPGEN – A phase III study on placental cell therapy for improving muscle regeneration in hip fracture patients
Tobias Winkler, Charité – Berlin, BIH: Berlin Institute of Health, ATiO Foundation

10'
Creating a new approach towards bone healing – can we derive advanced products from the immune system?
Katharina Schmidt-Bleek, Charité – Berlin, ATiO Foundation

10'
PROTO - Advanced PeRsOnalized Therapies for Osteoarthritis
Tazio Maleitzke, MD, Charité – Berlin, ATiO Foundation

10:00-11:00 **Room Porto**	**S20: Regenerative approaches for acute articular cartilage injury** **Chairs:** Sylvia Nürnberger, Medical University of Vienna; Department of Orthopedics and Trauma Surgery Martin Stoddart, AO Research Davos, Switzerland

20'
Keynote Lecture:
Recapitulating articulating joint motion ex vivo to better understand chondrogenic differentiation
Martin Stoddart, AO Research Davos, Switzerland

10'
Shedding light on chondrogenesis – the impact of low-level laser on the chondrogenic differentiation
Sylvia Nürnberger, Medical University of Vienna; Department of Orthopedics and Trauma-Surgery

10'
Liraglutide's in vitro anti-inflammatory and regenerative properties on inflammatory human osteoarthritic chondrocytes- on behalf of the OA-BIO Consortium
Eda Ciftci (Switzerland), Sibylle Grad, Mauro Alini, Zhen Li

10'
Determining the accuracy of the smart brace using multi-frequency bioimpedance analysis to measure knee swelling
R.M. Gilsing, M. Hoogeveen, H. Boers, W. van der Weegen (The Netherlands)

10'
Articular chondrocytes from diabetic and non diabetic rats exposed to normo- or hyperglycemia respond differentially to the complement split fragment anaphylatoxin C5a and TNFα
Fleischmann N, Braun T, Reinhardt A, Schotte T, Wehrmann J, Rüdig V, Gögele C, Kokozidou M, Werner C, Schulze-Tanzil G (Germany)

11:00 – 11:30	**Coffee-Break & Poster Session**

11:30 - 12:30 **Room Arquivo**	**OS26: TERM (II)** **Chairs:** Maria Chatzinikolaidou, University of Crete, Heraklion, Greece Sven Schmidt, Orthopaedic University Hospital Heidelberg, Germany

20'
Keynote lecture:
Macromolecular crowding and other in vitro microenvironment modulators in tenocyte cultures
Dimitrios I. Zeugolis, University College Dublin (UCD), Dublin, Ireland

10'
Multilineage Differentiation of C2C12 Cells and Monocytes In Vitro within a 6-BromoIndirubin-3'-Oxime Incorporated Chitosan-Based Scaffold for Enhanced Bone Regeneration
Celine J. Agnes (Canada), Monzur Murshed, Bettina M. Willie, Maryam Tabrizian

10'
Calcium phosphates-based nanocoating in orthopaedics: influence of composition and substrate heating on films properties and BM-MSC behavior
Montesissa M. (Italy), Graziani G., Borciani G., Boi M., Rubini K., Valle F., Boanini E. and Baldini N.

10'
miRNA-laden magnetic-responsive bioink for tendon and enthesis tissue-engineering
Peniche Silva, C.J. (The Netherlands), Dominguez R., Bakht S.M., Pardo A., Gonçalves A.I., Texeira S.P.B., Balmayor E.R., Gomes M.E., van Griensven M.

10'
Kartogenin-encapsulated coaxial PGS/PCL aligned nanofibers for articular cartilage regeneration
João C. Silva (Portugal), Ranodhi N. Udangawa, Joaquim M. S. Cabral, Frederico Castelo Ferreira and Robert J. Linhardt

11:30 - 12:30 **Room D. Luís**	**OS27: Biomaterials (II)** **Chairs:** Martin Stoddart, AO Research Davos, Switzerland Miguel Angel LERMA, Hospital Universitario La Paz, Spain

20'
Keynote lecture:
A Microphysiological System of Inflammation and Fibrosis in Tendon Fibrovascular Scar
Hani Awad, University of Rochester, USA

10'
Octacalcium Phosphate Embedded Hydrogels on 3D Printed Titanium Improve the Corrosion Performance in Simulated Biological Media
Aydin Bordbar Khiabani, Ilijana Kovrlija, Janis Locs, Dagnija Loca, Michael Gasik (Finland)

10'
Enhancing cartilage tissue formation in GelMA/Alginate-Tyramine Interpenetrated Networks (IPNs) with Low Intensity Pulse Ultrasound Stimulation (LIPUS)
Garazi Larrañaga-Jaurrieta (Spain), Ander Abarrategui, Sandra Camarero-Espinosa

10'
Development of photo-crosslinkable decellularized extracellular matrix hydrogels for cartilage tissue engineering
Tosca Roncada (Ireland), Daniel J. Kelly

10'
Near infrared-responsive hydrogels containing adenoviral vectors. Application in bone regeneration
Lerma-Juárez MA (Spain), Escudero-Duch C, Serrano-Yamba R, Moreno-García A, Yus C, Arruebo M, Vilaboa N

11:30 - 12:30 **Room D. Maria**	**OS28: Bone** **Chairs:** Sebastian Muller, Kantonsspital Baselland, University of Basel, Switzerland Laura Saldaña, Hospital Universitario La Paz-IdiPAZ, Madrid, Spain

20'
Keynote lecture:
Title
Martijn van Griensven, MERLN-Institute for Technology- Inspired Regenerative Medicine, Maastricht University, The Netherlands

10'
The effect of immediate and delayed mechanical stimulation on secondary bone healing
Jan Barcik (Switzerland), Manuela Ernst, Tim Buchholz, Caroline Constant, Karen Mys, Devakar Epari, Stephan Zeiter, Boyko Gueorguiev, Markus Windolf

10'
Scoping Review of rotational guided growth in the growing bone
Ahmed Halloum (Denmark), Søren Kold, Jan D. Rölfing, Ahmed A. Abood, Ole Rahbek

10'
Determining The Optimum Dimensions Of 3D-Printed Patient-Specific Instrument (PSI) Surgical Jigs For Use In Orthopaedic Surgery: A Biomechanical Study
Yiu Hin Kwan, Dean Owyang (Singapore), Wei Loong Sean Ho, Gui Jie Michael Yam

10'
The Correlation between Electrical Impedance and Callus Quality. An In Vivo Study of Tibial Fractures in Rabbits
Markus Winther Frost, Maria Tirta (Denmark), Ole Rahbek, Laura Amalie Rytoft, Ming Ding, Ming Shen, Kirsten Duch, Søren Kold

11:30 - 12:30 **Room Arrábida**	**OS29: miRNA** **Chairs:** Neal Millar, University of Glasgow, Glasgow, UK Carlos Peniche, MERLN Institute for Technology-Inspired Regenerative Medicine, The Netherlands

20'
Keynote lecture:
Title
Elizabeth R. Balmayor, RWTH Aachen University Hospital, Aachen, Germany

10'
A novel non-coding RNA-based approach to modulate osteoclasts behavior
Sara R. Moura, Jacob B. Olesen, Mario A. Barbosa, Kent Soe, Maria Inês Almeida (Portugal)

10'
MicroRNAs 125b, 199a-5p and 214 as modulators of bone homeostasis
Virginie Joris (the Netherlands), Elizabeth Rosado Balmayor, Martijn van Griensven

10'
Transfection of hMSCs with chemically modified mRNA coding for BMP-7 enhances osteogenesis
Claudia Del Toro Runzer (the Netherlands), Joanna Sadowska, Christian Plank, Fergal J. O'Brien, Martijn van Griensven, Elizabeth Rosado Balmayor

10'
Precision Magnetoplexes for microRNA Delivery Targeting Tendon Inflammation
Ana F. Almeida (Portugal), Margarida S. Miranda, Lindsay A.N. Crowe, Moeed Akbar, Márcia T. Rodrigues, Neal L. Millar, Manuela E. Gomes

11:30 - 12:30 **Room Porto**	**OS30: Metabolites** **Chairs:** Andreas Traweger, Paracelsus Medical University, Austria Baltazar Leal, 3B's Research Group, University of Minho, Portugal

20'
Keynote lecture:
Title
Nathaniel Dyment, University of Pennsylvania, USA

10'
Does Leucocyte Rich and Poor Platelet Rich Plasma differ by their Metabolites?
Bilge Basak Fidan (Turkey), Ilayda Demirdis, Emine Çiftçi, Hakan Aydinli, Ozan Kaplan, Mustafa Çelebier, Özge Boyacioglu, Petek Korkusuz, Yigitcan Karanfil, Feza Korkusuz

10'
The metabolic role of IL-4 and IL-10 in Intervertebral Disc Degeneration
Paola Bermudez-Lekerika (Switzerland), Sofia Tseranidou, Exarchos Kanelis, Katherine B. Crump, Christine Le Maitre, Karin Wuertz-Kozak, Leonidas G. Alexopoulos, Jérôme Noailly and Benjamin Gantenbein

10'
Chronic High-Fat Diet Consumption Accelerates Osteoblast Dysfunction and Osteoporosis by Gut Microbial Metabolite Trimethylamine-N-Oxide
Yu-Han Lin (Taiwan), Wei-Shiung Lian, Yu-Shan Chen, Holger Jahr, Feng-Sheng Wang

10'

STAT3 activation in the synovial tissues from the hip joint in the early stage of rapidly destructive coxopathy Tadashi Yasuda (Japan), Shigeo Hara, Shinnosuke Yamashita, Sadaki Mitsuzawa, Yoshihiro Tsukamoto, Hisataka Takeuchi, Satoshi Ota, and Eijiro Onishi	
12:30 - 13:30	**Lunch & Poster Session**
13:30 – 14:00 **Room D. Luís**	**Horizon Europe session** **Chairs:** Manuela Gomes, 3B's Research Group, University of Minho, Portugal
Title Raquel Almeida, xxx	
13:30 – 14:00 **Room D. Maria**	**Rapid fire session IV** **Chairs:** Rui Domingues, 3B's Research Group, University of Minho, Portugal Janin Reifenrath, Hannover Medical School, Clinic for Orthopaedic Surgery
5' **Impact of Mincing Techniques on Chondrocyte Viability in Bovine Articular Cartilage: A Comparative Study between Commercially Available Shavers and Scalpel Mincing** C. Bauer (Austria), L.Moser, A. Otahal, D. Kern, D. Dammerer, T. Zantop, S. Nehrer **5'** **Psychological and clinical issues in octogenarians and nonagenarians patients addressing elective total hip arthroplasty** A. Camera, S. Biggi (Italy), A. Capuzzo, G. Cattaneo, R. Tedino, G. Bolognesi **5'** **DUAL MOBILITY ARTICULATION CONFERS LOWER DISLOCATION AND REVISION RATES: A STUDY USING REVIEW OF REVIEWS METHODOLOGY** S. Mehta, A. Goel (UK), U. Mahajan, N.R. Reddy, D. Bhaskar	

5'
Comparing the risk assessments of iatrogenic peroneal nerve injury in all-inside lateral meniscal repair between standard knee MRIs and simulated actual arthroscopic lateral meniscal repair position MRIs
Chaiwat Chuaychoosakoon (Thailand), Tanarat Boonriong, Wachiraphan Parinyakhup

5'
ORTHOPOD: Predicting injury proportionality from Neck of Femur Fractures
Morris, T.; Fouweather, M. (UK); Walshaw, T.; Baldock, T. ; Wei, N.; Eardley, W.

5'
Adjunct CPM therapy does not appear improve the ROM achieved after MUA for stiffness in Total Knee Arthroplasty.
K. Lee, B.H. van Duren (UK), R. Berber, H.E. Matar, B.V. Bloch

13:30 – 14:00 **Room Arrábida**	**Rapid fire session V** **Chairs:** Stijn Bolink, Maastricht University, The Netherlands Andreu Pascuet-Fontanet, Pompeu Fabra University (UPF)

5'
Safe use of intra-operative tourniquet, does orthopaedic practice need guidance to prevent rare complications?
Amr Elbahi (UK), Mohamed Wasim, Karshe Yusuf, Michael Thilagarajah

5'
Gabapentinoids in the Symptomatic Management of Canal Stenosis: A Comparative Study on Pain Relief, Ambulation, and Safety Profile
Telmo Martínez, Gonzalo Mariscal, Eduardo Hevia (Spain), Carlos Barrios

Xx
Xx
Xx
xx

13:30 – 14:00 **Room Porto**	**Short Oral Session II**

	Chairs: Girish Pattappa, University of Regensburg Medical centre, Germany Margarida S. Miranda, 3B's Research Group, University of Minho, Portugal

10'
Thermally disinfected human femoral head as scaffold for osteoinductive substances
Elyarbek Tashmetov (Kazakhstan), Dina Saginova, Yevgeniy Kamyshanskiy, Azim Saginov, Amina Koshanova

10'
Fusionless all pedicle screws posterior deformity correction in AIS immature patients permits restauration of the normal vertebral morphology and removal of the instrumentation once bone maturity is reached
Jesús Burgos (Spain), Gonzalo Mariscal, Luis Miguel Antón-Rodrigálvarez, Ignacio Sanpera, Eduardo Hevia, Vicente García, Carlos Barrios

10'
Abolition of Sagittal T7-T10 Dynamics During Forced Ventilation in AIS Patients with Lenke 1A curves
Gonzalo Mariscal, Jesús Burgos, Luis Antón-Rodrigálvarez, Eduardo Hevia (Spain), Carlos Barrios

14:00 - 15:00 **Room Arquivo**	**OS31: Inflammation** **Chairs:** Márcia T. Rodrigues, 3B's Research Group, University of Minho, Portugal Daniele Ghezzi, Rizzoli Orthopaedic Institute, Bologna, Italy

20'
Keynote Lecture:
Title
Neal Millar, University of Glasgow, Glasgow, UK

10'
The epigenetic landscape in soft-tissue fibrosis
Akbar M (UK), Crowe LAN, Woolcock K, Cole J, McInnes IB, Millar NL

10'
Monitoring *in vitro* and *ex vivo* inflammation using single-walled carbon nanotubes (SWCNTs) sensor technology
Laura Belcastro, Vitalijs Zubkovs, Miha Markocic, Sayyed Hashem Sajjadi, Christian Peez, Riccardo Tognato, Ardemis Anoush Boghossian, Stefano Cattaneo, Sibylle Grad, Valentina Basoli (Davos)

10'
Towards understanding how neutrophil instruct the immune response to biomaterials
Ezgi Irem Bektas, Marinus A. Wesdorp, Andrea Schwab, Martin J. Stoddart, Alvaro Mata, Gerjo J.V.M. Van Osch, Matteo D'Este (Switzerland)

10'
The role of pericytes in regulating cartilage degradation and fibrosis
Huan Meng (Switzerland), Sophie Verrier, Sibylle Grad, Zhen Li

14:00 - 15:00 **Room D. Luís**	**OS32: Recent advances in Guided bone growth for deformity correction** **Chairs:** Sylvia Nürnberger, Medical University of Vienna Clara RUIZ-FERNANDEZ, University Clinical Hospital of Santiago de Compostela

20'
Keynote Lecture:
Recent advances in guided bone growth for deformity correction
Ole Rahbek, Aalborg University Hospital, Denmark

10'
Novel Mineralized Electroactive PAN/PEDOT:PSS Nanofibers for Bone Tissue Engineering
Frederico Barbosa (Portugal), João C. Silva, Fábio F. F. Garrudo, Joaquim M. S. Cabral, Jorge Morgado, Frederico Castelo Ferreira

10'
Technical Note For The Novel Osteopore® Wedge In Medial Opening Wedge High Tibial Osteotomy
Soon Yaw Walter WONG (Singapore), Kong Hwee LEE, Hamid Rahmatullah BIN ABD RAZAK

10'

A novel selective prostaglandin-receptor EP4-agonist promotes spinal fusion in rats
Corina Vater, Xinggui Tian, Lisa Findeisen, Deepak Bushan Raina, Hannes Kern, Julia Bolte, Luisa Straßburger, Lucas-Maximilian Matuszewsk, Niels Modler, Robert Gottwald, Anja Winkler, Klaus-Dieter Schaser, Alexander C. Disch, Stefan Zwingenberger (Germany)

10'
The knee-hip-spine trilemma in patients with severe congenital dysplasia of the hip undergoing total hip arthroplasty. 77 hips followed-up for a minimum of five years.
Eduardo García-Rey (Spain), Enrique Gómez-Barrena

14:00 - 15:00 **Room D. Maria**	**OS33: Intervertebral disc** **Chairs:** Makarand V. Risbud, Thomas Jefferson University, USA Giorgia PETRUCCI, Università Campus Bio-Medico di Roma, Italy

20'
Keynote Lecture:
Injectable microgels for cell encapsulation and joint regeneration
Catherine Le Visage, Nantes Université, INSERM, France

10'
A fetal-based injectable biomaterial to treat Intervertebral Disc degeneration
Morena F. Fiordalisi, Inês Sousa, Mário A. Barbosa, Raquel M. Gonçalves, Joana Caldeira (Portugal)

10'
Cell-derived extracellular matrix tailoring for intervertebral disc regeneration
Catarina Milheiro (Portugal), Raquel M. Gonçalves, Mario Amendola, Mário Barbosa, Joana Caldeira

10'
Distinctive neuronal and immune system signatures, predisposed by genetic background, associate with discogenic intervertebral disc herniation.
Emanuel J. Novais (USA), Eric Brown, Olivia K. Ottone, Victoria A. Tran, Angelo C. Lepore, Makarand V. Risbud

10'
Advanced bioreactor studies of region-specific response in the intervertebral disc to compression, flexion/extension and torsion
Šećerović A (Switzerland), Ristaniemi A, Crivelli F, Heub S, Weder G, Ferguson SJ, Ledroit D, Grad S

14:00 - 15:00 **Room Arrábida**	**OS34: Knee** **Chairs:** Jess Snedeker, ETH Zurich, Switzerland Ali Yalcinkaya, Aalborg University Hospital, Denmark

20'
Keynote Lecture:
Title:
Kurt D. Hankenson, University of Michigan Medical School, USA

10'
Optimising the Tibial Keel Slot for the Oxford Unicompartmental Knee Replacement
Lachlan Arthur (UK), Xiaoyi Min, Shihfan Jack Tu, Stefano Campi, Stephen Mellon, David Murray

10'
Incidence and surgical treatment of component breakage after unicompartmental and total knee arthroplasty. A single centre long-term experience
A. Camera, S. Biggi (Italy), A. Capuzzo, G. Cattaneo, R. Tedino

10'
Radiosynoviorthesis is effective in patients with knee replacement and chronic synovitis
Liepe K (Germany), Baehr M

10'
In vivo posterior stabilized total knee kinematics: it is not all about the implant design
Lenka Stroobant (Belgium), Matthias Verstraete, Stefaan Van Onsem, Jan Victor, Amélie Chevalier

14:00 - 15:00 **Room Arrábida**	**OS35: TERM (I)** **Chairs:** Ivan Martin, University of Basel, Switzerland Ozgen Ozturk, 3B's Research Group, University of Minho, Portugal

20'
Keynote Lecture:
Targeting hypertrophic chondrocytes in osteoarthritis – the role of inflammation and the use of a multi-model approach in search of pharmacological treatments
Gerjo van Osch, Delft University of Technology, Delft, the Netherlands

10'
A comparative study of three different bioactive glass scaffolds tailored for cartilage tissue Engineering
Clemens Gögele (Germany), Silvana Müller, Sven Wiltzsch, Armin Lenhart, Kerstin Schäfer-Eckart, Gundula Schulze-Tanzil

10'
Could a decellularization protocol be validated without talking about HLA?
Julie Manon (Bruxelles), Robin Evrard, Lies Fievé, Daela Xhema, Louis Maistriaux, Thomas Schubert, Benoît Lengelé, Catherine Behets, Olivier Cornu

10'
A New Tissue-Engineered Product Indicated For Bone Reconstruction: A Proof-Of-Concept
Randy Buzisa Mbuku, Christelle Sanchez, Robin Evrard, Alexandre Englebert, Julie Manon, Valentin Henriet, Gregory Nolens, Khanh Tran Duy, Thomas Schubert, Yves Henrotin (Belgium), Olivier Cornu

10'
Bone tissue regeneration induced by local delivery of bone morphogenetic protein 2 from pro-angiogenic near infrared-responsive hydrogels
Escudero-Duch C, Serrano-Yamba R, Sánchez-Casanova S, Falguera-Uceda M, Yus C, Lerma-Juárez MA, Arruebo M, Vilaboa N (Spain)

15:00 - 16:00 **Room Arquivo**	**S21: Upcoming stars in orthopaedics** **Chairs:** Dimitrios Zeugolis, UCD, Dublin, Ireland

10'
Nanocomposite material design for bone regeneration
Sabine van Rijt, Maastricht University

10'
Addressing the unmet scientific challenges and medical needs in the treatment of osteosarcoma
Fiona Freeman, University College Dublin

10'
Molecular characterisation of infrapatellar fat pad: Can we predict treatment efficacy of cartilage-defect patients?
Berta Cillero-Pastor, Maastricht University

10'
From fetus to aged bovines: Lessons for intervertebral disc regeneration
Raquel Gonçalves, University of Porto

10'
Printing and imprinting the in vitro biophysical and biochemical cues of tendon microenvironments
Rui Domingues, 3B's Research Group, University of Minho

10'
Novel antimicrobial coating on titanium with stable non-antibiotic quaternary ammonium compounds to prevent implant-associated infection
Martijn Riool, University of Amsterdam, The Netherlands

15:00 - 16:00 **Room D. Luís**	**S22: Spine regeneration: novel translational considerations** **Chairs:** Makarand V. Risbud, Thomas Jefferson University, USA Holger Jahr, RWTH Aachen University, Germany

20'
Keynote Lecture:
Role of Mitochondria in intervertebral disc health and disease
Makarand V. Risbud, Thomas Jefferson University, USA

10'

Anatomy and microenvironment of the intervertebral disk
Holger Jahr, RWTH Aachen University, Germany

10'
Applications of artificial intelligence in the early diagnosis of chronic low back pain
Luca Ambrosio, Università Campus Bio-Medico di Roma, Italy

10'
Translational potential of mesenchymal stem cell therapy for intervertebral disc regeneration
Gianluca Vadalá, Università Campus Bio-Medico di Roma, Italy

10'
MESENDODERM PROGENITOR CELLS DERIVED FROM PLURIPOTENT STEM CELLS FOR DISC REGENERATION: A PRELIMINARY STUDY IN A OVINE MODEL
C. Cicione (Italy), V. Tilotta, G. Di Giacomo, L. Ambrosio, F. Russo, R. Papalia, G. Vadalà and V. Denaro

15:00 - 16:00 **Room D. Maria**	**S23: External stimuli in Orthopaedic Research and Regeneration** **Chairs**: Ana I. Gonçalves, 3B's Research Group, University of Minho Manuela E. Gomes, 3B's Research Group, University of Minho

20'
Keynote lecture:
Translation of mechanotherapies to the clinic in Orthopaedics
Alicia El Haj, Healthcare Technology Institute, University of Birmingham, UK

10'
In vitro 3D study of the effect of uniaxial loading on naïve MSC differentiation fate
Priscilla Füllemann, Thomas Jörimann, Martin Stoddart, Romano Matthys, Sophie Verrier (Switzerland)

10'
Ultrasound counteracts inflammation and induces chondrogenic differentiation of ASCs in 3D piezoelectric hydrogels
Cristina Manferdini (Italy), Elena Gabusi, Paolo Dolzani, Diego Trucco, Enrico Lenzi, Giovanni D'Atri, Lorenzo Vannozzi, Andrea Cafarelli, Leonardo Ricotti, Gina Lisignoli

10'
Mechanical stimulation of piezoelectric scaffolds promotes the cells osteogenic differentiation
Nikoleta Natalia Tavernaraki, Varvara Platania, Maria Chatzinikolaidou (Greece)

10'
Electrical stimulation combined with additive manufactured 3D conductive scaffolds towards improved bone tissue engineering strategies
João C. Silva (Lisboa), Fábio F.F. Garrudo, João Meneses, Pedro Marcelino, Frederico Barbosa, Carla S. Moura, Nuno M. Alves, Paula Pascoal-Faria, Frederico C. Ferreira

15:00 - 16:00 **Room Arrábida**	**S24: Often forgotten yet so relevant in bone repair: local immune factors, blood vessels, and nerves** **Chairs:** Elizabeth R. Balmayor, RWTH Aachen University Hospital, Aachen, Germany Martijn van Griensven, MERLN-Institute for Technology-Inspired Regenerative Medicine, Maastricht University, The Netherlands

20'
Keynote Lecture:
Bone and its interaction with other organ systems in health and disease
Martijn van Griensven, MERLN-Institute for Technology-Inspired Regenerative Medicine, Maastricht University, The Netherlands

10'
The immune system and bone: interactions in health and disease
Anita Ignatius, Institute of Orthopaedic Research and Biomechanics at the University of Ulm, Germany

10'
The interplay of angiogenesis and osteogenesis for bone regeneration
Andrea Banfi, Department of Biomedicine, University Hospital, University of Basel, Basel, Switzerland

10'
Interaction between the nervous system and bone in health and disease
Aaron Watkins James, Department of Pathology, Johns Hopkins University, USA

10'
Functional activity of mCRP in intervertebral disc

Clara Ruiz-Fernández (Spain), Djedjiga Ait Eldjoudi, María Gonzalez-Rodríguez, Alfonso Cordero Barreal, Yousof Farrag, Ali Mobasheri, Jesús Pino, Daisuke Sakai, Oreste Gualillo

15:00 - 16:00 **Room Porto**	**S25: ISSLS Translational Symposium on Low Back Pain Research** **Chairs:** Stefan Dudli, University of Zurich, Switzerland Gianluca Vadalà, Università Campus Bio-Medico di Roma, Italy

20'
Keynote Lecture:
Developing regeneration therapies for the intervertebral disc
Benjamin Gantenbein, University of Bern, Switzerland

10'
Title
Luca Ambrosio, Università Campus Bio-Medico di Roma, Italy

10'
Therapeutic potential of mesenchymal stem cell-derived bioactive factors: impact on intervertebral disc degeneration
Graciosa Teixeira, University of Ulm, Germany

10'
Simulation of physiological and detrimental loading in whole intervertebral disc organ models
Sibylle Grad, AO Research Institute, Switzerland

10'
Comparison of degenerative MRI features of the intervertebral disc between those with and without chronic low back pain. An exploratory study of two large female populations using automated annotation
Jeremy Fairbank, University of Oxford, United Kingdom

16:00 - 16:30	**Coffe-Break & Poster Session**

16:30 - 17:00 **Room Arquivo**	**Plenary Lecture VI** Helena Canhão, NOVA Medical School, Universidade Nova de Lisboa (UNL) **Chair:** Manuela Gomes, 3B's Research Group, University of Minho, Portugal
17:00 - 18:00	**Awards & Closing Ceremony**

SCIENTIFIC and SPECIAL SYMPOSIA

Current research update in Korean Orthopaedic Research Society (KORS)

Chairs:

Jin Woo Lee, Department of Orthopaedic Surgery, Yonsei University College of Medicine, Seoul, Korea

Ji-Hoon Bae, Department of Orthopaedic Surgery, Korea University Guro Hospital, Seoul, Korea

Since 1995, the Korean Orthopaedic Research Society (KORS) has promoted and advanced basic research related to the musculoskeletal system. Current research is focused on various areas including stem cell research, musculoskeletal disease and treatment, biomaterials and tissue engineering, fracture healing and biology for bone/cartilage/tendon. In this symposium, we will firstly discuss the results of study on enhancing osteogenic differentiation of adipose-derived stromal/stem cells as a keynote lecture. Second, we will focus on sclerostin-mediated impaired osteogenesis by fibroblast-like synoviocytes in the particle-induced osteolysis model. Third, we will discuss possible roles of antioxidants in rotator cuff tendinopathy. Lastly, we will then discuss role of polaprezinc in fracture healing by differentiations of osteoblast and osteoclast.

Shape modelling for orthopaedic clinical research

Chairs:

Audenaert Emmanuel, University of Ghent

Jonas Grammens, University of Antwerp

Kate Duquesne, University of Ghent

The mini symposium entitled "Shape modeling for orthopaedic clinical research" aims to present recent developments in the field of computational anatomy, specifically statistical shape and kinematics modeling, and how these techniques can be applied in clinical practice, specifically for diagnosing and assessing risk for hip, knee, and ankle joint diseases. These techniques, which use advanced 3D imaging and artificial intelligence, can provide a deeper understanding of population-level anatomy by describing morphological variation in a unique way and uncovering new patterns of

diagnostic and prognostic value. Contributions to the symposium will focus on innovative methods, validation, and applications of statistical shape analysis in solving clinical problems.

ON/EORS Collaborative Orthoregeneration Symposium: Most promising strategies for the regeneration of your joints: make your own choice

Chairs:
Jérome Guicheux, Nantes Université
Manuela Gomes, 3B's Research Group, University of Minho

Speakers:
Marianna Tryfonidou, Utrech University
Ivan Martin, University of Basel, Switzerland
Elizabeth Rosado Balmayor, RWTH Aachen University, Germany

Additively manufactured Orthopaedic implants: current and future solutions

Chairs:
Holger Jahr, RWTH Aachen University, Germany
Fatma Nur Depboylu, Hacettepe University, Turkey

Treating large bone defects is still a clinical challenge without perfect solution, mainly due to the unavailability of suitable bone implants. Additively manufactured (AM) porous metals provide unparalleled opportunities to realize the challenging requirements for bone-mimetic implants. This session will give you the latest insights on instruments and materials currently being used for 3D printed customized medical devices for total knee arthroplasties from an industrial point of view. The symposium will cover traditional metallic implant materials, with new coatings, and yet experimental absorbable metal implants. In particular, general corrosion behavior of absorbable metals and the impact of the test environment on their corrosion behavior will be addressed. We will further discuss the impact of topological design of future 3D printed metallic implants and associated technological challenges thereof. Direct printing of porous absorbable metal implants for the treatment of large bone defects will be presented as a potential future solution to provide initial mechanical support in load-bearing anatomical regions, facilitating osseointegration, and ultimately eliminating the risk of implant-associated osteitis after their job is done.

TERMIS-EU/EORS Symposium

Chairs:

Catherine Le Visage, Nantes Université, INSERM, France

The Tissue Engineering and Regenerative Medicine (TERM) community has long been interested in orthopedics, in which bones, joints, tendons, and other skeletal tissues are challenging to treat. The ability to design or generate adequate biomaterials that can support and guide cells during tissue healing and remodeling processes is crucial to the success of regenerative medicine approaches. The keynote lecture and invited speakers will highlight some of the most recent investigations into these biomaterials' mechanical properties, biocompatibility, and bioactivity, focusing on bone and tendon healing performance. The ability of composite biomaterials, hydrogels, and 3D-printed scaffolds to direct cell fate and promote tissue regeneration will also be discussed.

EVs in Orthopaedics

Chairs:

Manuel Gomez-Florit, Health Research Institute of the Balearic Islands
Andreas Traweger, Paracelsus Medical University

The orthopaedic field has recently seen a surge of interest in research regarding extracellular vesicles (EVs). EVs are small vesicles released from cells that have the potential to mediate intercellular communication, influence cellular behavior, and deliver proteins and genetic material to their target cells. This novel research area has the potential to revolutionize orthopaedic care and provide novel strategies to treat a variety of musculoskeletal diseases. This symposium will provide a comprehensive overview of the current state of research in the field of EVs in orthopaedics. Topics will include the biology and biochemistry of EVs, their potential use in diagnostics and therapeutic delivery, and their potential use in regenerative medicine. We will also consider the translational implications of using EVs in orthopaedic care. The symposium will feature presentations from leading experts in the field, with a particular focus on the potential use of EVs as therapeutics for different musculoskeletal tissues. Presentations will address the latest breakthroughs in EV-related research and their implications for the field of orthopaedics. The symposia will also provide an opportunity for networking among the participants and for the exchange of ideas and information.

Understanding mesenchymal stem cell-mediated bone regeneration from clinical and preclinical data

Chairs:

Kamal Mustafa, University of Bergen, Norway

Mohammed A. Yassin, University of Bergen, Norway

Mesenchymal stem cells (MSC) are used to enhance healing and regeneration after disease or injury, thereby overcoming the limited regenerative capacity of native tissues. MSC contribute to tissue repair and regeneration either via direct differentiation into specific cell types or via paracrine signaling by secretion of trophic factors. MSC have the additional benefit that avoid recognition by the host immune system, due to the low expression of major histocompatibility complexes I and II, making use of autologous as well as allogeneic MSC for therapeutic applications. Although cell-based tissue engineering strategies have demonstrated promising potential for alveolar bone regeneration in preliminary studies, reconstruction of larger bone deficiencies remains a clinical challenge. Major contributing factors to this "gap" in translation are considered, a) few controlled clinical trials, b) the lack of adequate and timely vascularization of implanted constructs, c) the use of xenogeneic supplements for ex vivo amplification of cells, potentially compromise their regenerative efficacy and introduce the risk for xenogeneic disease transmission, and d) the two-dimensional (2-D) culture protocols of cells in monolayers, that not adequately reflect the natural 3-D in vivo environment.
This symposium will discuss the potential of a) In patients, reconstruction of alveolar bone by MSC and biomaterials, b) extracellular vesicles: more closely reflect the natural in vivo microenvironment, as strategies for clinical scale tissue engineering, c) the importance to understand the source of mesenchymal stem cells for bone regenerative applications, d) the effect of micro-pores in 3D-printing scaffolds on MSC, and e) Triazine-Trione based-composite as a novel biomaterials.

Nanostructured thin films for orthopedic implants

Chairs:

Gabriela Graziani, Rizzoli Orthopaedic Institute, Bologna, Italy

Julietta V. Rau, Italian National Research Council, Institute of the Structure of Matter, Rome, Italy

Nanostructured coatings offer new perspectives for orthopedic implants, to address several unmet needs. Nanostructured coatings, indeed, permit to functionalize the biointerface of biomedical devices, by conferring them additional properties. At the same time, they exhibit superior properties compared to traditional (micrometric)

films, such as tailored thickness and surface morphology, finely tuned ion release, improved adhesion to the substrate and suitable surface texture, favoring cells adhesion, proliferation and differentiation.
In particular, metal-based implant devices, in combination with bioactive ceramics, can address such an important issue as infection, fighting against the development of resistant bacterial strains and promoting osseointegration, at one same time. More recently, anti-tumor efficacy of some metal-doped calcium phosphates has also been shown.
By exploiting the improved physical, chemical and biological properties, that some established materials (i.e. calcium phosphates, silver etc.) have at the nano-scale, the prevention and treatment of diseases and surgical conditions can be improved, as well as the durability and success rate of bone implants.
In this symposium, we will discuss the clinical needs and the unmet challenges that materials shall face, the applications that can be addressed, and the new findings in the fields. To provide a complete overview of the topic, we will merge clinical and materials science perspectives, and we will also address industrial applicability and requirements for the scale up.

Novel insights into osteoarthritis and cartilage regeneration

Chairs:
Feng-Sheng Wang, Chang Gung University College of Medicine, Kaohsiung, Taiwan
Holger Jahr, RWTH Aachen University, Germany

Articular cartilage is a relatively hypoxic and uniquely loadbearing tissue with a specialized extracellular matrix. Several biomechanical and physicochemical stimuli are known to influence chondrocyte metabolism. Once damaged, however, articular cartilage possesses only a limited regenerative capacity. This symposium combines pre-clinical and clinical aspects related to cartilage degeneration and regeneration. Strategies to preserve a proper chondrocyte phenotype during *in vitro* manipulation for cell-based cartilage regeneration and the impact of an adequate microenvironment will be discussed. Furthermore, the impact of biophysical and nutritional factors in osteoarthritis will be addressed. Specifically, novel insights into the role of hormones, like irisin, and the role of the epigenetic landscape based on histone modifiers will be elucidated. Last not least, our current understanding of the gut- joint axis will be addressed and the role of our microbiome, probiotics or

metabolites, in skeletal homeostasis but also their potential to alter the course of osteoarthritis are discussed.

Equal Representation Committee of the European Orthopaedic Research Society: Special Symposium

Chairs:
Elizabeth R. Balmayor, RWTH Aachen University Hospital, Aachen, Germany
Federica Francesca Masieri, University of Suffolk, UK

Speaker:
José Micard Teixeira, Author, Mentor & Coach

Title of the talk: There is no such thing as luck. There are only choices.
José Micard Teixeira was born in Aveiro - Portugal, in 1961. He graduated in International Relations from the University of Minho - Braga and was a trainee at the Economic and Social Committee of the European Communities. He then joined SONAE (one of the biggest Portuguese multinationals) where he held general management positions in several companies. At the age of 40, he decides to change his life and direction and chooses to help people find their way in life. He did various training courses in personal development and ended up being internationally certified as a Life Coach by the ICC-UK, International Coaching Community. Currently, he gives Life Coaching consultations and lectures on a wide variety of topics of the human condition. He has written seven books of motivational texts and is preparing the launch of his new book for later this year. He is an advocate of freedom and truth as a means for each person to live their own life.

Soft tissue joint disease: towards a cellular & molecular basis of disease

Chairs:
Andreas Traweger, Paracelsus Medical University; Institute of Tendon and Bone Regeneration
Stephanie Dakin, University of Oxford

Knowledge of how the joint functions as an integrated unit in health and disease requires an understanding of the stromal cells populating the joint mesenchyme, including fibroblasts, tissue- resident macrophages and endothelial cells. Knowledge of the physiological and pathological mechanisms that involve joint mesenchymal

stromal cells and the coordinated interplay between tissue resident cells and the ECM has begun to cast new light on why tissue inflammation persists. Cells of mesenchymal origin sustain inflammation in the synovial membrane and tendons by various mechanisms, and the important contribution of newly discovered fibroblast subtypes and their associated crosstalk with endothelial cells, tissue-resident macrophages, leukocytes, and the interaction with the ECM is beginning to emerge. Understanding of these mechanisms should help to shape the future therapeutic landscape for diseases affecting tendons and ligaments, emphasising the requirement for new strategies to address the pathogenic stroma and associated cellular and cell matrix crosstalk.
This session focuses on understanding the cellular and molecular basis underpinning resolution of inflammatory fibrotic joint disease affecting the shoulder joint and presents recent advances in tendon biology providing insights into the mechanisms underlying tendinopathic disease progression.

Spine regeneration: novel translational considerations

Chairs:
Makarand Risburd, Thomas Jefferson University, Philadelphia, USA
Holger Jahr, RWTH Aachen University, Germany

Degeneration of the intervertebral disk (IVD), and subsequent low back pain, is an almost inevitable cause of disability in our increasingly elderly population. Underlaying biological mechanisms of IVD degeneration are complex and current therapeutic strategies often symptomatic. In contrast, animal models provide valuable insights into the intrinsic regeneration potential of the IVD and help elucidating major molecular mechanisms triggering, or contributing to, IVD degeneration. This symposium will start recapitulating anatomical features and the special composition and the cellular microenvironment of the IVD prior to providing latest insights from animal models. The translational clinical potential of stem cell therapies will be discussed and the benefits of modern diagnostics and artificial intelligence (AI) elaborated. Finally, selected promising novel conceptional regenerative approaches will be proposed.

Often forgotten yet so relevant in bone repair: local immune factors, blood vessels, and nerves

Chairs:

Elizabeth R. Balmayor, RWTH Aachen University Hospital, Aachen, Germany
Martijn van Griensven, MERLN-Institute for Technology- Inspired Regenerative Medicine, Maastricht University. The Netherlands

Bone tissue is a specialized, highly complex connective tissue composed of organic and inorganic parts. The organic fraction includes specialized bone cells such as osteoblasts, osteoclasts, and osteocytes. It has been recently suggested that there is a complex communication between bone cells and other organs, indicating the dynamic nature of bone tissue. This organ crosstalk plays an important role during bone repair. For example, it is well-acknowledged that bone healing is controlled by the immune system. Upon bone trauma, immune cells (i.e., platelets, neutrophils, and macrophages) are recruited to the site of injury. These cells secrete multiple factors; inflammatory and others, that are crucial for the recruitment and activation of other cells. These other cells include mesenchymal progenitor cells, which aid to resolve the inflammation at the site and will undergo chondrogenic differentiation initiating the callus formation phase. With this, a new extracellular matrix is deposited that will evolve into a neo, fully functional bone tissue. Immune cells also secrete angiogenic factors such as vascular endothelial growth factor (VEGF). VEGF promotes vessel invasion and cell recruitment. This process is crucial in the replacement of the soft, cartilaginous callus by a bony, mineralized callus. In addition, new blood vessels bring oxygen and nutrients to the regenerating callus and serve as a route for inflammatory, cartilage, and bone precursor cells to reach the injury site. Besides being vascularized, bone is also a highly innervated tissue. Different types of nerves have been recently identified in the bone. In particular, the function of peripheral nerves in bone healing is under much investigation. It has been elucidated that upon bone trauma, nerve activation and regeneration simultaneously occur. For this, important neuropeptides (e.g., NGF, BDNF, CGRP, SP, NPY, and Sema3A) are upregulated that contribute to bone regeneration. These neuropeptides are differentially distributed during all phases of bone healing with blood vessel and nerve regeneration. In addition, relevant cells in bone healing, such as osteoblasts, osteoclasts, macrophages, mesenchymal progenitor cells, and chondrocytes are well known targets of specific neuropeptides during bone regeneration. Despite its relevance, the interaction of bone with other organ systems is often disregarded while developing strategies for bone repair. With this symposium, we look forward to an outstanding discussion on the participation of

the immune system, blood vessels and nerves in bone healing. Cell- and organ crosstalk, its relevance and roles for bone healing will be discussed. The symposium will include four outstanding speakers. An introductory talk will be firstly given to touch upon all the relevant organ systems for bone development and healing. Thereafter, the symposium will continue with specialized speakers for all three organ systems proposed here.

Applications of Weightbearing CT Imaging in the Musculoskeletal System

Chairs:

Claudio Belvedere, Instituto Ortopedico Rizzoli, Bologna, Italy
Arne Burssens, University Hospital of Ghent, Belgium

Osteotomies in the musculoskeletal system are joint preserving procedures to correct the alignment of the patient. In the lower limb, most of the pre-operative planning is performed on full leg weightbearing radiographs. However, these images contain a 2-dimensional projection of a 3-dimensional deformity, lack a clear visualization of the joint surface and are prone to rotational errors during patient positioning. Weightbearing CT imaging has demonstrated to overcome these shortcomings during the first applications of this device at level of the foot and ankle. Recent advances allow to scan the entire lower limb and novel applications at the level of the knee and hip are on the rise. Here, we will demonstrated the current techniques and 3-dimensional measurements used in supra- and inframalleolar osteotomies around the ankle. Several of these techniques will be transposed to other parts in the lower limb to spark future studies in this field.

External stimuli in Orthopaedic Research and Regeneration

Chairs:

Ana I. Gonçalves, 3B's Research Group, University of Minho
Manuela E. Gomes, 3B's Research Group, University of Minho

The use of biomechanical strategies is expanding in tissue engineering and regenerative medicine applications. Given the recognition of the importance of biomechanical cues for mechanotransduction events, biomechano-responsive materials have emerged as promising platforms to realize biomedical functions. Moreover, and in combination with cells, these mechanostimulation platforms hold

promise for repairing multiple tissues, influencing cell migration, controlling stem cells activation and differentiation. Concomitantly, the delivery of functional stimuli in vivo also constitutes an important challenge in the field.
In this symposium, we will explore the breadth of research using external stimuli in the regeneration of many musculoskeletal tissues and cell niches in the body.

Perspectives for future innovation in tendon repair (ITN P4FIT)

Chairs:
Valentina Russo, University of Teramo, Italy
Giovanna Della Porta, University of Salerno, Italy

The main objective of P4 FIT is to build up an innovative training and research environment in the cross-disciplinary domain of Predictive, Preventive, Personalized and Participatory (P4) tendon R&D. Indeed, tendons display a poor capacity for repair. This limited capacity has resulted in ~30% of musculoskeletal referrals being from damaged tendons which translates into an annual socioeconomic burden in excess of €150 Bn for the USA and EU alone.
In compliance with the "One Health" concept, P4 FIT looks to the Perspectives For Future Innovation in Tendon repair exploiting the technological advances in nanomedicine and tissue engineering under the close control of the end users, human and veterinary orthopaedics. P4 FIT booster innovation-driving training and research leadership is grounded in excellence inside a world-renowned international networking seeking to develop research projects in which "biology drives "technology" by finding solutions taking advantage of "computational" tools, for promoting advancement in P4 tendon therapy and diagnosis.
In this context, the proposed P4 FIT symposium will present and discuss progress and challenges in Regenerative Medicine and Tissue Engineering applied to tendon therapy and diagnosis and how to develop integrated biomedical solutions into clinical applications within this field which still remains a healthcare challenge. This symposium will span multidisciplinary interests including biomaterials, stem cell biology, 3D culture models, differentiation, and *in vivo* models.

ATiO Foundation Symposium: Pushing Advanced Therapy Development in Orthopaedics

Chairs:

Tobias Winkler, Charité – Berlin BIH: Berlin Institute of Health
Andrew Williamson, Heraeus Medical

The field of advanced therapies is more exciting and promising than ever – therapies that are based on human genes, tissues or cells offering revolutionary opportunities for the treatment of disease and injury. We see continuous advancement in research concerning new therapy options in all different medical disciplines and an increase of regulatory approvals for new medical products in that field. However, the path to patient and market is a difficult one and isolated stake holder know how often prevents product development. To overcome this obvious need, the Alliance for Advanced Therapies in Orthopaedics was founded in 2021. In this symposium we will talk about the ATiO Alliance, business models in advanced therapy development and projects within the ecosystem of the ATiO.

Regenerative approaches for acute articular cartilage injury

Chairs:

Sylvia Nürnberger, Medical University of Vienna
Martin Stoddart, AO Research Davos, Switzerland

Acute injury to articular cartilage is still a clinical challenge. Cells, materials and biologics offer potential new treatments. This symposium aims to highlight new developments in traumatic articular injury and repair.

Translationally-targeted preclinical models in orthopedics and musculoskeletal regeneration

Chairs:

Esther Wehrle, AO Research Institute Davos and Institute for Biomechanics, ETH Zurich
Martin Stoddart, AO Research Davos, Switzerland

Optimizing therapies for orthopedic applications and musculoskeletal regeneration requires a detailed knowledge of the underlying mechanisms. Well-defined preclinical models are needed to tackle these current clinical needs in orthopedics and musculoskeletal regeneration.

The symposium will focus on novel and translationally-targeted approaches in preclinical models considering the 3Rs of animal welfare.
The talks will cover advanced intravital imaging, clinically relevant mouse models and ex vivo alternatives as well as recent omics-based study approaches to advance musculoskeletal research.

Biofabrication in Orthopaedic Research and Regeneration

Chairs:
Rui Domingues, 3B's Research Group, University of Minho
Lorenzo Moroni, MERLN Maastricht University, The Netherlands

Biofabrication technologies have enabled impressive progress in the development of 3D cellular constructs to mimic the complex structural and functional characteristics of musculoskeletal tissues. 3D (bio)printing systems in particular have rapidly transitioned in recent years from emerging scaffold fabrication techniques to forefront technologies allowing the automated biofabrication of tissue analogs with fine cellular patterns. This symposium intends to be a forum of discussion on the latest developments in the field, covering the design and biofabrication strategies being explored to fabricate tissue constructs for orthopedic tissue engineering and in vitro modeling. Topics to be covered include progresses being made on new 3D (bio)printing methods, tissue specific bioinks, design concepts to recreated cellular patterns, extracellular matrix architecture and biomechanics of native tissues, as well as the functional assessment of biofabricated constructs. While covering these exiting progresses, this symposium aims to contribute for discussing the clinical translation potential of 3D bioprinted tissues and hopefully, help to guide the development of the next generation of orthopedic implants.

Upcoming stars in Orthopaedics

Chair: Dimitrios Zeugolis, UCD, Ireland

Speakers:
Sabine van Rijt, Maastricht University
Fiona Freeman, University College Dublin
Berta Cillero-Pastor, Maastricht University
Raquel Goncalves, University of Porto
Rui Domingues, 3B's Research Group, University of Minho
Martijn Riool, University of Amsterdam, The Netherlands

NetwOArK: Themes of COST action 21110 – Building a new European Society for Osteoarthritis

Chairs:
Feza Korkusuz, Hacettepe University Medical Faculty
Denitsa Docheva, Orthopaedic Hospital König-Ludwig-Haus, University of Würzburg

Osteoarthritis (OA) is one of the single most common causes of pain and physical disability in older adults with an estimated 10% to 15% of persons aged over 60 having some degree of OA, which is likely to increase due to increase in life expectancy throughout the world. Despite the growing OA epidemic and major socio-economic impact, there is a lack of disease-modifying therapies that can bring symptomatic relief and preserve joint function by preventing cartilage- and joint degeneration, thus delaying OA progression. Furthermore, research specifically aimed at OA management in Europe is scattered and not strategically coordinated. The main aim of EU COST action (netwOArk) is to set up the European Society for Osteoarthritis (ESOA) with an emphasis on holistic approach involving three major groups, 1) patients, 2) clinicians and 3) researchers from academia and industry. The COST actions area aims to increase understanding and develop scientific breakthroughs in primary prevention, diagnostics, treatment, interaction (comorbidities) and care management for the disease with a specific emphasis on patient-driven research. This symposia will introduce some of the topics within the COST action, explaining the importance of 1) the clinical basis and current diagnostics for OA, 2) stratifying patients based on a specific OA phenotypes and endotypes and 3) how translational models both ex vivo and animal models can be used to for development of novel treatments (cellular, biomaterials and pharmacological) for the disease.

Cancer in Orthopaedics - How far are we from understanding and treating cancer in musculoskeletal tissues?

Chair: Márcia Rodrigues, 3B's Research Group, University of Minho, Portugal

Advances in diagnosis and treatment have contributed to an increased life expectancy of cancer patients. The incidence of disseminating disease is also increasing along with the increasing life expectancy but improved quality of life remains a challenge. The debilitating pain, loss of tissue functions, and disability are major contributors to a

reduced quality of life together with the adverse effects from traditional management techniques. Such personal and socio-economic impact demands for diagnosis with improved accuracy and speed as well as innovative therapies offering new hopes and solutions for personalized management and combinatorial therapies to treat bone and soft tissue tumors, and prevent metastatic bone disease.

Recent developments in molecular targets and prognosis models, bioinformatics, bioimaging with high-sensitive and remotely actuated navigation systems, and precision prostheses have insight into promising new possibilities to refine cancer screening, assist genetic profiling and classification of tumors, accelerate drug discovery, and meliorate cancer surveillance. In addition, AI technologies promise to leverage all these dimensions to a new level of information networks anticipating better health outcomes.

In this context, the symposium aims to reunite, debate and disseminate the state-of-the-art knowledge driving the advancements of musculoskeletal oncology to innovate and improve the treatment and care of patients.

ISSLS Translational Symposium on Low Back Pain Research

Chairs:

Stefan Dudli, University of Zurich, Switzerland

Gianluca Vadalà, Università Campus Bio-Medico di Roma, Italy

Chronic low back pain (CLBP) represents a significant global burden with multifactorial origin. Research at multiple levels from the labs to the clinics is required to elucidate mechanisms of disease and degeneration and to design effective and sustaining therapies. In this symposium, the International Society for the Study of the Lumbar Spine (ISSLS) partners up with EORS to deliver a cutting-edge session on CLBP. This symposium highlights recent advancements on preclinical models and clinical tools to assess and monitor intervertebral disc disorders that are frequently associated with low back symptoms.

In its 50 years of existence, the International Society for the Study of the Lumbar Spine (ISSLS) has substantially advanced the understanding and treatment of low back pain. Critical success factors of ISSLS are the commingling of basic, translational, and clinical CLBP researchers across all relevant CLBP disciplines. In this symposium, established and raising ISSLS stars from basic, translational, and clinical fields present their advances in CLBP research.

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Ji-Yun Ko, Eugene Lee, Songhee Lee, Gun-Il Im (Seoul, South Korea)

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S. Harris (London, UK), J. Cobb, K. Logishetty

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Functionality that increases with cognitive exercise in systemic sclerosis patients is partly related to skeletal muscle strength: An isokinetic pilot study
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