

OActive

OActive



CONFERENCE

**FROM MODELLING TO**  
**CLINICAL** predictive  
and interventional  
tools to treat Osteoarthritis

**23**  
**APRIL**  
**2021**



This research project has received funding from the European Community's H2020 Programme, under grant agreement Nr. 777159.

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AXIA INNOVATION



## INVITATION

Osteoarthritis (OA) is a degenerative disease of the joints and the most common form of arthritis that causes pain and mobility limitation and, thus, reduces independence and overall quality of life. Osteoarthritis is a complex disease in which biochemical and biomechanical factors are involved and occurs mostly in the weight-bearing joints of the lower limbs, such as the hip and in particular the knee.

This conference will provide new insights, towards the adoption of multi-scale holistic analysis, where patient-specific information from various levels, including molecular (e.g. biochemical/inflammatory biomarkers), cell, tissue, and whole body, will be integrated and combined with information from environmental, behavioural and social risk factors to generate robust predictors for new personalised interventions for delaying the onset and/or slowing down the progression of OA.

Join our discussions on how a combination of mechanistic computational models, simulations, and big data analytics can target patient-specific OA prediction and interventions. Overcoming the limitation of the current treatment interventions, Augmented Reality (AR) empowered interventions allow patients to experience the treatment as more enjoyable, resulting in greater motivation, engagement, and training adherence.

The medical care industry, research & education communities, stakeholders, and other relevant initiatives in the field of Osteoarthritis prevention, will gather together aiming to improve healthcare by transforming and accelerating the OA diagnosis and prediction based on a more comprehensive and holistic understanding of disease pathophysiology, dynamics, and patient outcomes.

This conference is held in the framework of the EU-funded OActive project: “Advanced personalised, multi-scale computer models preventing OsteoArthritis”, and will be attended by the EC Project Officer.



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## AGENDA

### PLENARY SESSION

*Chairs : **Saila Rinne**, OActive Project Officer, Head of Policy Sector, DG CONNECT, Unit eHealth Well-Being and Ageing, European Commission*

***Prof Kyriacos Felekkis**, OActive project coordinator, Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus*

09:00-09:10

#### **Opening speech**

***Saila Rinne**, OActive Project Officer, Head of Policy Sector, DG CONNECT, Unit eHealth Well-Being and Ageing, European Commission*

09:10-09:20

#### **OActive Project Vision**

***Prof Kyriacos Felekkis**, OActive project coordinator, Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus*

09:20-09:30

#### **Ethics related activities**

***Mahault Piéchaud Boura**, Legal Consultant, Timelex, Belgium*



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### SESSION I : OSTEOARTHRITIS BIOMARKERS EVALUATION IN VIVO

*Chairs : Prof Christoforos Giannaki, Assistant Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus*

*Dr Ramon Messeguer, Head of the Drug development Area Health and Biomedicine Department, Leitat Technological Center, Spain*

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|-------------|---|
| 09:30-09:45 | <b>The oxymoron of shoulder arthropathy: Are biomarkers the key to optimal therapies?</b><br><i>Dr. Emmanouel Antonogiannakis, Orthopaedic Surgeon, Director, 3rd Orthopaedics Dpt., Hygeia Hospital, Greece</i>  |
| 09:45-10:00 | <b>Impact of environmental and socioeconomic factors on pain and function in knee OA</b><br><i>Dr Thijs Swinnen, Postdoc researcher Research Group for Musculoskeletal Rehabilitation, KU Leuven, Belgium</i>   |
| 10:00-10:15 | <b>OA-related exosomal and microbiome biomarkers</b><br><i>Dr Ramon Messeguer, Head of the Drug development Area Health and Biomedicine Department, Leitat Technological Center, Spain</i>  |
| 10:15-10:30 | <b>Inflammation and degradation biomarkers in OA patients</b><br><i>Dr Christos Papaneophytou, Assistant Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus</i>   |
| 10:30-10:45 | <b>Impact of the clinical evaluation and the OActive database</b><br><i>Dr Christos Papaneophytou, Assistant Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus</i><br><i>Mr Efthymis Stathakis, Senior Data Scientist, CETRI, Cyprus</i> |

**10:45-11:00**

**Short break**



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## AGENDA

### SESSION II: IN VITRO MODELS

*Chairs: **Prof Kyriacos Felekis**, OActive project coordinator, Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus*

***Dr Ioanna Katsavou**, Chemical Engineer, Dissemination Manager at Axia Innovation, Germany*

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| 11:00-11:20 | <b>Mechanically induced MSC chondrogenesis: Using movement to drive biological responses</b><br><i><b>Prof Martin Stoddart</b>, PhD, FRSB, Program Leader – Regenerative Orthopaedics, Principal Scientist, AO Research Institute Davos (ARI)   AO Foundation, Switzerland</i> |
| 11:20-11:35 | <b>QREM CYTOKINE: A lab-in-a-box technology to treat osteoarthritis</b><br><i><b>Núria Noguera Ferrer</b>, Co-founder and CTO of Tecnologia Regenerativa QREM, Spain</i>   |
| 11:35-11:50 | <b>Biomarkers: The manufacturing and regulatory aspect</b><br><i><b>Dr Dimitrios Karathanasis</b>, BScHons, PhD, MBA/ Biochemist-Cellular Engineer, Scientific Director, Allegene Pharmalabs Hellas, Greece</i>  |
| 11:50-12:05 | <b>Tissue engineering and osteoarthritis models</b><br><i><b>Dr Roberto di Gesu</b>, Post doc researcher, Ri.MED Foundation, Italy</i>   |
| 12:05-12:20 | <b>Impact of in vitro musculoskeletal models</b><br><i><b>Prof Riccardo Gottardi</b>, Principal Investigator, Ri.MED Foundation, Italy</i>   |

**12:20-13.00**

**Lunch break**



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## AGENDA

### SESSION III: IN SILICO MODELS

*Chairs: Prof Bill Baltzopoulos, Biomechanics, Liverpool John Moores University, UK*

*Prof Konstantinos Moustakas, Associate Professor in the Electrical and Computer Engineering Department, University of Patras, Greece*

13:00-13:20

#### **Musculoskeletal Biomechanics modelling**

*Dr David Britzman, Research Associate in Biomechanics, Liverpool John Moores University, UK*  
*Dr Dimitris Tsaopoulos, Researcher on computational modeling and biomechanics, CERTH, Greece*  
*Prof Konstantinos Moustakas, Associate Professor in the Electrical and Computer Engineering Department, University of Patras, Greece*

13:20-13:35

#### **Musculoskeletal models and joint loading: a quest towards dynamic consistency**

*Dario Cazzola, Senior Lecturer (Associate Professor) in Biomechanics, Department for Health, University of Bath, UK*

13:35-13:50

#### **Deep learning-based Cardiac Magnetic Resonance Image Analysis for Improved Guidance of Repaired Tetralogy of Fallot Arrhythmia Interventions**

*Dr Archontis Giannakidis, Assistant Professor in Data Science, School of Science and Technology, Nottingham Trent University, UK*

13:50-14:05

#### **Impact of the in silico musculoskeletal models**

*Prof Bill Baltzopoulos, Biomechanics, Liverpool John Moores University, UK*  
*Prof Paulo Lisboa Professor in Applied Mathematics, Liverpool John Moores University, UK*



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### SESSION IV: ICT-BASED PERSONALIZED MODELING AND INTERVENTIONS

*Chairs: Dr Dimitris Tsaopoulos, Researcher on computational modeling and biomechanics, CERTH, Greece*

*Dr Ioanna Katsavou, Chemical Engineer, Dissemination Manager at Axia Innovation, Germany*

- 14:05-14:20      **Real-time Musculoskeletal Kinematics and Dynamics Analysis Using Marker- and IMU-Based Solutions in Rehabilitation**  
*Dr Dimitar Stanev, Postdoctoral researcher, École Polytechnique Fédérale de Lausanne, Switzerland*
- 14:20-14:35      **Automatic generation of personalized skeletal models of the lower limb using the open source STAPLE toolbox**  
*Luca Modenese, Research Fellow, Imperial College London, UK*
- 14:35-14:55      **Impact of augmented reality (AR) interventions in Osteoarthritis**  
*Prof Konstantinos Moustakas, Associate Professor in the Electrical and Computer Engineering Department, University of Patras, Greece*

14:55-15:10      **Short break**



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## AGENDA

### SESSION V: RELEVANT H2020 INITIATIVES

*Chairs: Ioanna Barouni, Innovation Manager CETRI, Cyprus*

*Prof Kyriacos Felekis, OActive project coordinator, Professor in the Department of Life and Health Sciences, University of Nicosia, Cyprus*

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| 15:10-15:25 | <b>Cluster project I : METAJOINT</b><br><i>Invited speaker TBA (project coordinator)</i>  |
| 15:25-15:40 | <b>AutoCRAT: for automated manufacturing of novel, next generation regenerative therapies for osteoarthritis</b><br><i>Prof Mary Murphy, Professor in Regenerative Medicine, Regenerative Medicine Institute (REMEDI), National University of Ireland Galway, Ireland</i>         |
| 15:40-15:55 | <b>ArthritisHeal: Lipid biology in the rheumatic diseases, the ArthritisHeal consortium</b><br><i>Dr Martin Giera, Head Metabolomics group, Leiden University Medical Center, Netherlands</i>   |
| 15:55-16:10 | <b>uKNEEversal: towards a mechanically active fully human osteoarthritic (OA) joint on chip model to screen the efficacy of anti-OA drugs and medical devices</b><br><i>Paola Occhetta, MSCA-IF Postdoctoral fellow at Politecnico di Milano and CEO of BiomimX S.r.l., Italy</i> |
| 16:10-16:25 | <b>Nanocomposite hydrogels and ultrasound to treat OA: the ADAMAIORA paradigm</b><br><i>Dr Lorenzo Vannozzi, Technologist, Scuola Superiore Sant'Anna, Italy</i>  |

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| 16:25-16:45 | <b>CLOSING REMARKS AND EVALUATION</b><br><i>Prof Kyriacos Felekis, OActive project coordinator</i><br><i>Dr Ioanna Katsavou, Dissemination Manager, Axia Innovation</i> |
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| 16:45 | <b>END OF CONFERENCE</b> |
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## PRESENTERS



**Saila Rinne**

Head of Policy Sector, DG CONNECT,  
UniteHealth Well-Being and Ageing,  
European Commission



**Prof Kyriacos Felekis**

OActive project coordinator,  
Professor in the Department of Life  
and Health Sciences, University  
of Nicosia, Cyprus



**Prof Bill Baltzopoulos**

Professor of Biomechanics  
Liverpool John Moores University, UK



**Prof Christoforos Giannaki**

Assistant Professor in the Department  
of Life and Health Sciences, University  
of Nicosia, Cyprus



**Prof Konstantinos Moustakas**

Associate Professor in the Electrical  
and Computer Engineering Department,  
University of Patras, Greece



**Dr Dimitris Tsaopoulos**

Researcher on computational modeling  
and biomechanics, CERTH, Greece



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## PRESENTERS



**Prof Riccardo Gottardi**

Principal Investigator,  
Ri.MED foundation, Italy  
Assistant Professor of Pediatrics  
and of Bioengineering, University  
of Pennsylvania, USA



**Dr Thijs Swinnen**

Senior Physical Therapist Division  
of Rheumatology, University  
Hospitals Leuven,  
Postdoc researcher Research Group for  
Musculoskeletal Rehabilitation,  
KU Leuven, Belgium



**Dr Christos Papanephytous**

Assistant Professor in the  
Department of Life and  
Health Sciences,  
University of Nicosia, Cyprus



**Dr Ramon Messeguer**

Head of the Drug development Area  
Health and Biomedicine Department,  
Leitat Technological Center, Spain



**Nùria Noguera Ferrer**

Co-founder and CTO of Tecnologia  
Regenerativa QREM, Spain



**Prof Martin Stoddart, PhD, FRSB**

Program Leader – Regenerative  
Orthopaedics, Principal Scientist  
AO Research Institute Davos (ARI) |  
AO Foundation, Switzerland



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## PRESENTERS



**Prof Paulo Lisboa**

Professor in Industrial Mathematics,  
LJMU, United Kingdom Liverpool John  
Moore's University, UK



**Dr Roberto di Gesu**

Post doc researcher,  
Ri.MED Foundation, Italy



**Mahault Piéchaud Boura**

Legal consultant,  
Timelex, Belgium



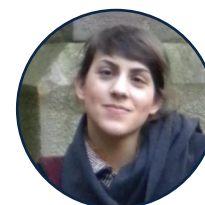
**Dr David Britzman**

Research Associate in  
Biomechanics,  
Liverpool John Moore's  
University, UK



**Dr Ioanna Katsavou**

Chemical Engineer,  
Dissemination Manager at  
Axia Innovation, Germany



**Ioanna Barouni**

Innovation Manager  
CETRI, Cyprus



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## PRESENTERS



**Dr Emmanouel Antonogiannakis**  
Orthopaedic Surgeon, Director,  
3rd Orthopaedics Dpt.,  
Hygeia Hospital, Greece



**Dr Dimitrios Karathanasis**  
BScHons, PhD, MBA/ Biochemist-  
Cellular Engineer, Scientific Director,  
Allegene Pharmalabs Hellas, Greece



**Efthymis Stathakis**  
Senior Data Scientist, CETRI, Cyprus



**Dr Archontis Giannakidis**  
Assistant Professor in Data Science,  
School of Science and Technology,  
Nottingham Trent University, UK



**Dario Cazzola**  
Senior Lecturer (Associate Professor)  
in Biomechanics, Department for  
Health, University of Bath, UK



**Dr Dimitar Stanev**  
Postdoctoral researcher,  
École Polytechnique Fédérale  
de Lausanne, Switzerland



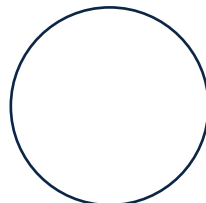
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## PRESENTERS



**Luca Modenese**  
Research Fellow,  
Imperial College London, UK



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**Dr Lorenzo Vannozzi**  
Technologist, Scuola Superiore  
Sant'Anna, Italy



**Professor Mary Murphy**  
Professor in Regenerative Medicine,  
Regenerative Medicine Institute (RE-  
MEDI), National University of  
Ireland Galway, Ireland



**Dr Martin Giera**  
Head of Metabolomics group,  
Leiden University Medical Center,  
Netherlands



**Paola Occhetta**  
MSCA-IF Postdoctoral fellow  
at Politecnico di Milano  
and CEO of BiomimX S.r.l., Italy



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## GENERAL INFORMATION

**MEETING DATES:** Friday 23rd of April 2021

**OFFICIAL LANGUAGE:** English



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