OActive
NEWSLETTER

Advanced Personalised, Multi-Scale Computer Models Preventing Osteoarthritis

Issue 5: April 2021

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Join us at:

OActiveProject

Axia Innovation

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1. Workshop on Personalised Predictive Modeling

AXIA Innovation organised a workshop dedicated to the "Personalised Predictive Models" via zoom, on 26th of March. The workshop included presentations of the main OActive technologies, as well as a discussion on the exploitation strategy for OActive results. Presenters from the OActive consortium came from the following organisations:

University of Nicosia, CETRI, Liverpool John Moores University and University of Patras. Additionally, similar EU funded projects **(SILICOFCM, CarBon, PRECISE4Q, BackUp, InSilc and EUSTANDS4PM)** presented their work in the area of personalised or predictive medicine.

It was our honour to have in the panel of presenters Mr Tobias Wiesenthal, Head Of eHealth, Well-Being and Ageing Sector, of the European Commission, who gave a welcome speech to our workshop.

The agenda of the workshop can be found below. Registration was performed through the OActive website.

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This is our workshop Agenda

Take a look at the interesting presentation from the OActive consortium and our invited speakers.

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OACTIVE WORKSHOP

DATE: 26 MARCH 2021

CLICK HERE to register online

PERSONALISED PREDICTIVE MODELS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No. 777159.

Join us at: Organised by: AxiaInnovation ©

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AGENDA

Time	Session
10:00-10:05 CET	**Welcome** Tobias Wiesenthal, Head Of Sector, European Commission DG CNECT.H.3 — eHealth, Well-Being and Ageing
10:05-10:15 CET	**Introduction and Exploitation strategy of the OActive project** Prof. Kyriacos Felekkis, OActive Project coordinator, UNIC, Cyprus Ioanna Barouni, Innovation Manager, CETRI, Cyprus
10:15-10:35 CET	**Main outcomes of the OActive project** Prof. Bill Baltzopoulos, Professor of Biomechanics, LJMU, United Kingdom Dr. Giorgos Giarmatzis, Sports scientist / Biomechanist, University of Patras Prof Paulo Lisboa, Professor in applied mathematics, LJMU, United Kingdom
10:35-10:45 CET	**SILICOFCM: Computational platform for In Silico clinical trials of familial cardiomyopathies** Prof. Nenad Filipovic, Head of Center for Bioengineering , BioIRC, Serbia
10:45-10:55 CET	**PRECISE4Q: Precision-medicine for stroke using hybrid, multi-level, and multi-timescale modelling** Prof. Gunnar Cedersund, Senior Lecturer, Linköping University, Sweden
10:55-11:05 CET	**EU-STANDS4PM: A European standardization framework for data integration and data-driven in silico models for personalised medicine** Dr. Marc Kirschner, Scientific Officer, Forschungszentrum Jülich GmbH, Germany
11:05-11:15 CET	**Back-UP: Risk stratification and personalised prediction models for Back and Neck Pain** Prof. Jonathan Hill, Senior Lecturer in Physiotherapy, Keele University, United Kingdom
11:15-11:25 CET	**InSilc: In silico trials for advancing the design and development of stents; Where we stand, Challenges and Opportunities** Georgia Karanasiou, Technical Manager, FORTH, Greece
11.25-11:35 CET	**CarBon: A Marie-Sklodowska Curie training network combining in silico, in vitro and in vivo approaches to study Cartilage and Bone biology and engineering** Prof. Liesbet Geris, Professor in Biomechanics and Computational Tissue Engineering, University of Liège & KU Leuven-Belgium
11.35-12:00 CET	**Closing discussions** Prof. Kyriacos Felekkis, OActive Project coordinator, UNIC, Cyprus Dr. Ioanna Katsavou, Project Manager, Axia Innovation, Germany

Join us at:

For More Information: info@oactive.eu

CLUSTER PROJECTS:

Overall, 115 registrations were recorded with around 75 attending the live session, showing their interest in field of personalised interventions improving healthcare.

The video reconding of the workshop is available on **YouTube** and the dissemination materila can be found in the **dedicated section of the OActive website.**

THE OACTIVE PROJECT ORGANISED THE CONFERENCE
FROM MODELLING TO CLINICAL PREDICTIVE
AND INTERVENTIONAL TOOLS TO TREAT OSTEOARTHRITIS

This conference provides 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.

The medical care industry, research & education communities, stakeholders, and other relevant initiatives in the field of Osteoarthritis prevention, have gathered 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.

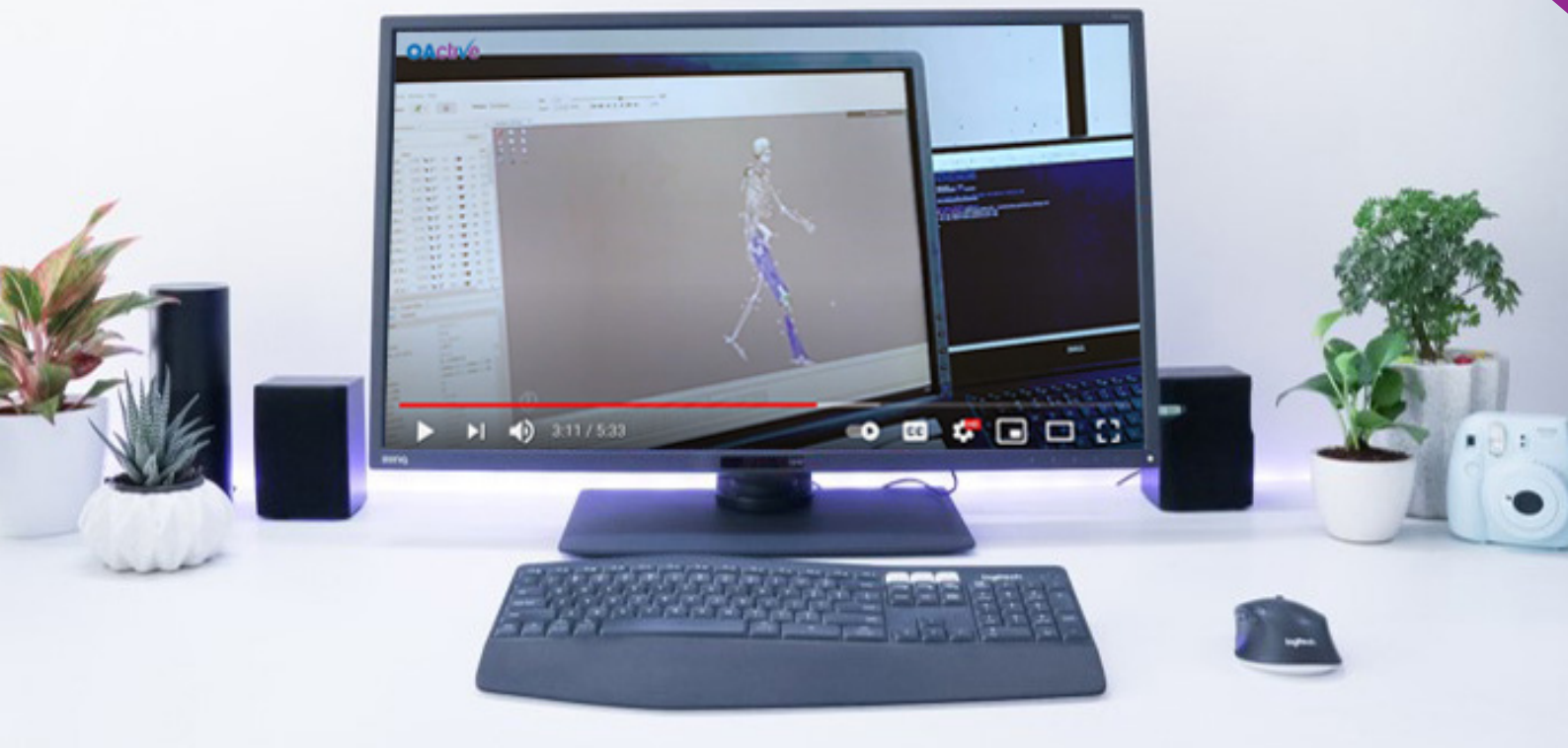Registration was available **at this link.**

The conference agenda can be found **HERE**, along with the presenters details.

The event was organised by **Axia Innovation** with the support of **MD Congress**.

The video recording is available in this **LINK**

AXIA Innovation, responsible for the Dissemination, Communication and Training activities of the project, has released the final OActive video.

The video highlights the impact the project's activities can have on patients that suffer from pain-related, chronic diseases, and in particular knee osteoarthritis, and how personalised interventions can pave the way towards early diagnosis and prognosis of the disease.

The focus groups were mainly scientists in the field of biomarkers, tissue engineering and musculoskeletal and predictive modelling and augmented reality interventions, as well as doctors, healthcare providers and other relative fields.

The video can be found on YouTube

DISSEMINATION ACTIVITIES

University of Patras presented the **OActive Project** in the online, interactive, and informative EUandU conference, organisaed by the **European Commission** Delegation in Greece. **https://www.euandu.eu**

On January 18, 2021, during the event innovative ideas that started from the research laboratory and became market successes, have been presented, with the aim to support and encourage young people to bring their ideas to market.

University of Nicosia attended the 1st Research & Development and Innovation in Healthcare Conference on February 2nd, 2021.

The **OActive Project** coordinator is shared the project's main outcomes so far during his interesting oral presentation on "Using AI and Big Data to Transform Healthcare: A real case of a Horizon 2020 project".

DISSEMINATION PLANNING

The OActive consortium has already planned some dissemination activities for the next period including the following events:

1. Congress of SVMEFR	7-8 May 2021	http://congresosvmefr.es	HULAFE
2. VIRTUAL ISPRM 2021 CONGRESS	12-15 June 2021	https://www.virtualisprm2021.com	HULAFE
3. ESPRM CONGRESS 2021	Still unknown	-	HULAFE
4. 29th Annual Meeting of the European Orthopaedic Research Society (EORS)	15-17 September 2021	https://eors2021.org	Ri.MED

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The Data Management Plan (DMP) has been developed by Axia Innovation in the context of Deliverable 10.3. The purpose is to define the DMP for the OActive project, containing the main elements of data management policy and outlines the processes for identifying data generating processes, compiling the associated metadata, selecting data repositories, and ensuring data preservation after the completion of the project. The goals of the DMP are listed below:

01
- Enhance research and development in the EU by providing industrial or academic researchers with open access to data.

02
- Support the data management life cycle for all data that will be collected, processed or generated by the project.

03
- Provide an analysis of the main elements of the data management policy, which will be used by the applicants with regard to all the datasets which will be generated by the Project.

04
- Provide detail and guarantee about the preservation of the data collected during the Project, as well as any results derived from the associated research.

05
- Provide detail on how the OActive consortium plans to address the ethical issues related to data, which will be collected during the Project timeframe.

06
- Increase cooperation and synergies between research entities in Europe and beyond.

07
- Help to avoid unnecessary replication of work conducted in research projects funded by the EC.

THE DMP CONTAINS THE FOLLOWING INFORMATION:

- Description of FAIR data and open access in EU projects
- Description of processes for data management in OActive
- Description of datasets generated during the OActive project, explaining the processes used to collect or create them.
- Copyright and IPR issues.
- Compliance with GDPR

- Ethical issues related to data storage, persons authorised to see/use them and how long they are kept; managing ethical concerns that include the anonymisation of data; processes used to obtain the consent requested to allow data sharing and reuse.
- Metadata collection, handling and storage
- Data storage in Open access repositories

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- **REAL-TIME PREDICTION OF JOINT FORCES BY MOTION CAPTURE AND MACHINE LEARNING**

Authors: Georgios Giarmatzis, Evangelia I. Zacharaki, and Konstantinos Moustakas
Partner: Sensors
Journal: University of Patras
DOI: 10.3390/s20236933

- **NEURAL NETWORK BASED PREDICTION OF KNEE CONTACT FORCES FOR DIFFERENT GAIT SPEEDS**

Authors: Georgios Giarmatzis, Evangelia I. Zacharaki, and Konstantinos Moustakas
Proceedings: 2020 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)
Partner: University of Patras
Journal: Osteoarthritis and Cartilage Open
DOI: 10.1109/BIBM49941.2020.9313190

- **ARE PSYCHOSOCIAL FACTORS DETERMINING IN PAIN AND SOCIAL PARTICIPATION OF PATIENTS WITH EARLY OSTEOARTHRITIS? A CROSS-SECTIONAL STUDY.**

Authors: Alabajos-Cea, A. Herrero-Manley, L. Suso-Martí, L. Alonso-Pérez-Barquero, J. Viosca-Herrero E.
Partner: HULAFE
Journal: International Journal of Environmental Research and Public Health
DOI: https://www.mdpi.com/1660-4601/18/9/4575

- **ACCEPTED PUBLICATION
A HIGH-THROUGHPUT MECHANICAL ACTIVATOR FOR CARTILAGE ENGINEERING ENABLES RAPID SCREENING OF IN VITRO RESPONSE OF TISSUE MODELS TO PHYSIOLOGICAL AND SUPRA-PHYSIOLOGICAL LOADS**

Authors: Gottardi R. Capuana E., Marino D., Di Gesù R., La Carrubba V., Brucato V., Rocky S.T.
Partner: Ri.MED
Journal: Cells, Tissue, Organs 2021

The OActive exploitation strategy is split into two paths:

• The first path is the joint exploitation where we seek to define a longer-term vision for the OActive Integrated System which partners can shape as they see fit.

• For the second path, the individual exploitation we seek to enable each partner to take their project results and exploit them for their own ends.

For the Joint Exploitation, we employed certain business tools and methodologies: such as Market analysis, Market positioning, PESTEL analysis, etc. The idea was that we had to investigate the drivers and the challenges in OActive's macro-environment, the OActive's inherent strengths and weaknesses and overall, the parameters of how and when to position OActive in the market for maximum success.

First of all, we placed OActive in the Personalized Medicine Market which is of course expected to grow significantly in the upcoming years. We looked for OA personalized medicine solutions already in the market and these are mostly artificial Intelligence supported solutions in the field of musculoskeletal (MSK) radiology. OActive's scope is a lot broader than that and therefore, it is safe to state that currently there is no direct competition in the market. Regarding the OActive's target markets, these are -primarily- medical Service providers such as hospitals and clinics, and also, technology providers such as biotechnology companies, diagnostic test producers, bio banks, etc.

OActive's position and opportunity lies at the intersection of the Competition's Weaknesses, the Customer Needs and OActive's key strengths. The customer needs are today largely unmet and as regards current treatment options for OA, they are palliative and reactive, rather than coordinated, proactive and preventive. OActive could promote targeted therapy and thus reduce trial-and-error prescribing, adverse drug reactions and high-risk invasive surgeries. It could also increase patient adherence to treatment and help control the overall cost of OA treatment for the society and the patients.

We also conducted a PESTEL analysis which revealed the global trends that could have an impact on the future exploitation of the OActive Integrated System. Indicatively, a major social trend is the aging population. In Europe we have declining fertility rates combined with increasing life-expectancy. Meaning that solutions such as the OActive that help in preventing and better managing chronic diseases will inevitably be of high demand in the future. However, we also have an emerging legal trend that relates to Cybersecurity in digital healthcare. The healthcare industry remains a prime target for malicious cyber groups looking to cause discord and make unethical gains. There is a lot of room for developing cyber defense policies and capabilities for all Big data empowered solutions such as the OActive to be considered by the general public as trustworthy & safe to use.

For the Individual Exploitation, all project partners identified their results and decided on how to protect and exploit them -either commercially or non-commercially. Finally, they engaged in the conduction of some preliminary analyses in the same way we did for the OActive Integrated System. Here are some of the commercial and non-commercial exploitation routes that the OActive partners wish to engage with after the project ends: Novel AR supported gait retraining for other joint diseases, such as: stroke, traumatic brain injury, spinal cord injury, etc., Portable devices for gait analysis, New diagnostic tools (biosensors) for other bone and cartilage diseases, Expanded portfolios with new services for Rehabilitation Centers & Hospitals, of course several Publications, Agreed collaborations among partners to jointly participate in other research projects on chronic diseases, Further research into the causes of the disease, and the subsequent design of potential therapeutics and New knowledge on the regulatory and ethical challenges in relation to cross border scientific processing of health care data.

The OActive consortium is broadly disseminating the OActive goals and progress in order to increase social awareness, to steer SMEs and other stakeholder engagement, to attract additional future funding and to increase the project's commercial exploitability. To this end, all project partners are actively contributing to the creation of a structured and critical OActive community which comprises associations and other EU funded projects.

In more detail, we have reached out to more than 15 EU funded projects with whom OActive shares several common research goals, with the aim to engage in common dissemination and communication activities and sharing lessons learnt. We have also identified and reached out to more than 40 associations and social parties, such as Hospitals, Clinics, Rehabilitation Centers, Research Centers, NGOs and International & European Organizations. Some of the relevant associations are provided below.

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13 PARTNERS

7 COUNTRIES

3 YEARS

5M. FUNDING

Project Title:
Advanced personalised,
multi-scale computer models
preventing osteoarthritis
SC1-PM-17-2017 – Personalised
computer models and in-silico
systems for well-being
Type of action: Research and
Innovation action (RIA)

UNIVERSITY *of* NICOSIA

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

LIVERPOOL JOHN MOORES UNIVERSITY

UNIVERSITY OF PATRAS
ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ

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Instituto de Investigación Sanitaria La Fe