Deliverable D6.4 – Report on the Industrial Engagement Open Day Workshops

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Topic	**DT-NMBP-40-2020** **Creating an open marketplace for industrial data (RIA)**
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Acronym	**DOME 4.0**
Title	**Digital Open Marketplace Ecosystem 4.0**
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V0.7	30/10/2024	Mónica Spreadbury	Input information
V1.0	31/10/2024	Mónica Spreadbury & Dr Bojan Boskovic	Final input and internal review

Publishable Summary

During the DOME 4.0 project, two Industrial Engagement Open Days were organised with the aim to identify gaps and barriers that the industry has in the field of data handling and data management practices, and use them for the input of three Hackathons. The first two of DOME 4.0 two-day Hackathons followed the Industrial Engagement Open Days, both in Bologna and in Leuven. The Open Days provided an important input to increase the scalability of the DOME 4.0 ecosystem and focus on further development aimed at solving industrial problems and proposing new solutions.

Executive Summary

The Deliverable D6.4 Report on the Industrial Engagement Open Day Workshops includes information on preparation and delivery of the 2 workshops at month 26 and month 35.

The DOME-4.0 Industrial Engagement Open Days have been prepared and delivered by CNT, in Bologna, in January 2023 and in Leuven, in October 2023. The aim was to actively engage industrial partners and established networks within and outside of the consortium in supporting further development of proposed solutions by providing ideas, guidance, technical recommendations and exploitation optimal strategies to ensure future compatibility with data management handling and practices within different organisations.

The DOME 4.0 partners, CMCL, Intrasoft, UNIBO were involved in the planning and organisation of the 1st Open Day, which was held at Bi-Rex, in Bologna, Italy, and for the 2nd Industry Open Day, DOME 4.0 partners Siemens, CMCL, Intrasoft were involved in the planning and organization of the event, which was held in Siemens, in Leuven, Belgium.

The Industrial Engagement Open Days aimed to identify gaps and barriers, that the industry has in the field of data handling and data management practices and use them as input for the Hackathons. The first two DOME 4.0 two-day Hackathons in Bologna and Leuven, followed the Industrial Engagement Open Days. The aim was to provide input and setting for development of a pathway to increase the scalability of the DOME 4.0 ecosystem and focus on development aimed at solving industrial problems and proposing new solutions via demonstration.

In order to provide a comfortable atmosphere for open and unrestricted discussions, there were no recordings during the two workshops. These has enabled open discussions, industrial feedback, and exchange of ideas, supporting project partners in further development. The main conclusions were the importance of data security, quality and integrity for the industrial participants at the workshop. While some industrial workshop participants are interested in being data providers on the market, it is clear that industrial companies are very much interested into being data end-users.

For the development of data market, direct feedback from industry is necessary, and further engagement is recommended.

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1. Introduction

The Industrial Engagement Open Days activity was led by Cambridge Nanomaterials Technology Ltd (CNT), and two Industrial Engagement Open Days were organised (M26 -M35). This deliverable gives an overview on both of these events.

The 1st Industrial Engagement Open Day Workshop took place on the 17th January and was co-organised in partnership with the SimDOME Project as a hybrid event. 65 individuals registered to participate (34 in person and 31 online), from whom 75% belong to industry. Participants came from organisations such as: Airbus, ESRF, HaDEA, UKRI, Goldbeck Consulting, Fraunhofer, NETCOMPANY-INTRASOFT, SINTEF, UCL, AIM, Astreo, CellDynamics, DataRiver Srl, Energy Group, NIREOS, UMICORE, Rekeep, C Quadra , Caboto, Var Group, Yiotis, Youbiquo, Politecnico di Torino, University of Bologna, MEP, National Technical University of Athens, and Nextema, among others. The DOME 4.0 partners, CMCL, Intrasoft, University of Bologna, were involved in the planning and organisation of the event which was held at BI-REX, in Bologna, Italy and led by Cambridge Nanomaterials Technology Ltd (CNT).

The 2nd Industrial Engagement Open Day was organised as a hybrid event on 10th October 2023 in Leuven, Brussels, hosted by DOME 4.0 partner Siemens Digital Industries Software, at their premises. At this Open Day, 44 people registered to participate (16 in person and 28 online). 77% of the participants belong to industry. Registered participants came from leading organizations and institutions such as: Airbus, Siemens Digital Industries Software, BOSCH, Ansys Inc., NIREOS SRL, Keysight Technologies, Datariver, SINTEF, Novartis Pharma (CH), UKRI, Fraunhofer IWM, EPFL, ESRF, BI-REX, The Innovation Loop, University of Cambridge, UCL, among others.

These events gave an opportunity to learn about standard data handling and data management practices in industrial organisations and understand how to develop compatibility between proposed data management solutions with already existing data management practices in the industry as well as the novel Business Models. The aim was to actively engage industrial partners and established corporate networks within and outside of the consortium in supporting further development of proposed solutions by providing ideas, guidance, technical recommendations, and exploitation optimal strategies to ensure future compatibility with data management handling and practices within different organisations.

Dr Bojan Boskovic from CNT, was responsible for moderation and coordination of both Open Days, chairing the presentations, discussions, and facilitating interactions between external participants and project partners.

2. Industrial Engagement Open Day Workshop I - Overview

The first Industrial Engagement Open Day (IEOD) Workshop took place as a hybrid meeting at Bi-Rex (Bologna, Italy), on the 17 January 2023. This event was followed by the Hackathon, held on the 18-19 January 2023.

The organization of the IEOD was led by CNT, in collaboration with CMCL, Intrasoft and UNIBO. Regular teleconferences meetings of the core organization team were held prior to the event, to discuss the content of the event, logistics, speakers, and any other organisational aspects as well as the Hackathon that followed the event.

Speakers for the event came from leading industrial organisations such as: Bosch Center for Artificial Intelligence (BCAI), Siemens PLM Software (SISW) and Umicore. A total of 74 people registered to participate on the IEOD, with the majority attending in person. An exhibition was organized for the in-person participants by the hosts, BI-REX National Competence Center - Big Data Research and Innovation Excellence. The exhibitors were: Caboto, Nextema, Cell Dynamics, Nireos, Data River, Astreo, and Energy Group. Participants came from organisations such as: Airbus, ESRF, HaDEA, UKRI, Goldbeck Consulting, Fraunhofer, NETCOMPANY-INTRASOFT, SINTEF, UCL, AIM, Astreo, CellDynamics, DataRiver Srl, Energy Group, NIREOS, UMICORE, Rekeep, C Quadra , Caboto, Var Group, Yiotis, Youbiquo, Politecnico di Torino, University of Bologna, MEP, National Technical University of Athens, and Nextema, among others.

Figure 1 Logos of participating organisations

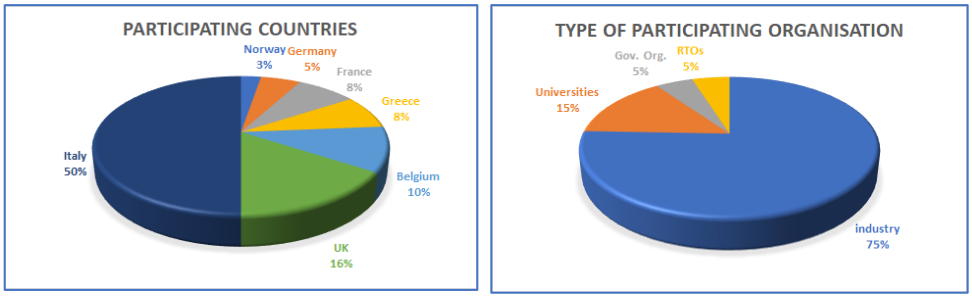


Figure 2 Participating countries & type of participating organisations

A preliminary agenda was prepared and possible speakers were approached to invite them to participate at this event. CNT prepared an online registration form, which has accessible from the project website (dome40.eu). The form included the registration for the IEOD on 17 January and the Hackathon event held on the 18 – 19 January 2023.

The information requested in the online registration form was:

- Email
- Name, last name
- Organisation
- Job Title
- Organisation website
- Events attending
    - Industrial Engagement Open Day – 17 January 2023
    - Hackathon – 18-19 January 2023
    - Both events (17-18-19 January 2023)
- Attending:
    - In person
    - Online
- If attending in person, please mention any dietary or access restriction
- Privacy Policy Notice

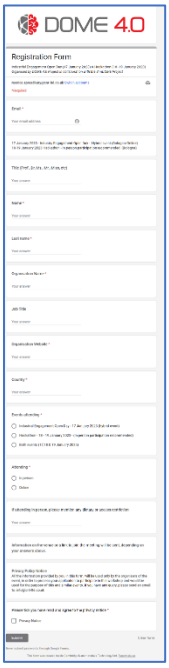


Figure 3 Registration form

CNT prepared a banner to promote the for promotional purposes. Additional promotional material was prepared by Infrasoft. The prepared material was distributer to partners and used for promotion of both events on the project website and social media (LinkedIn and Twitter).

Figure 4 Banner to promote the event

Figure 5 Promotional materal for the events

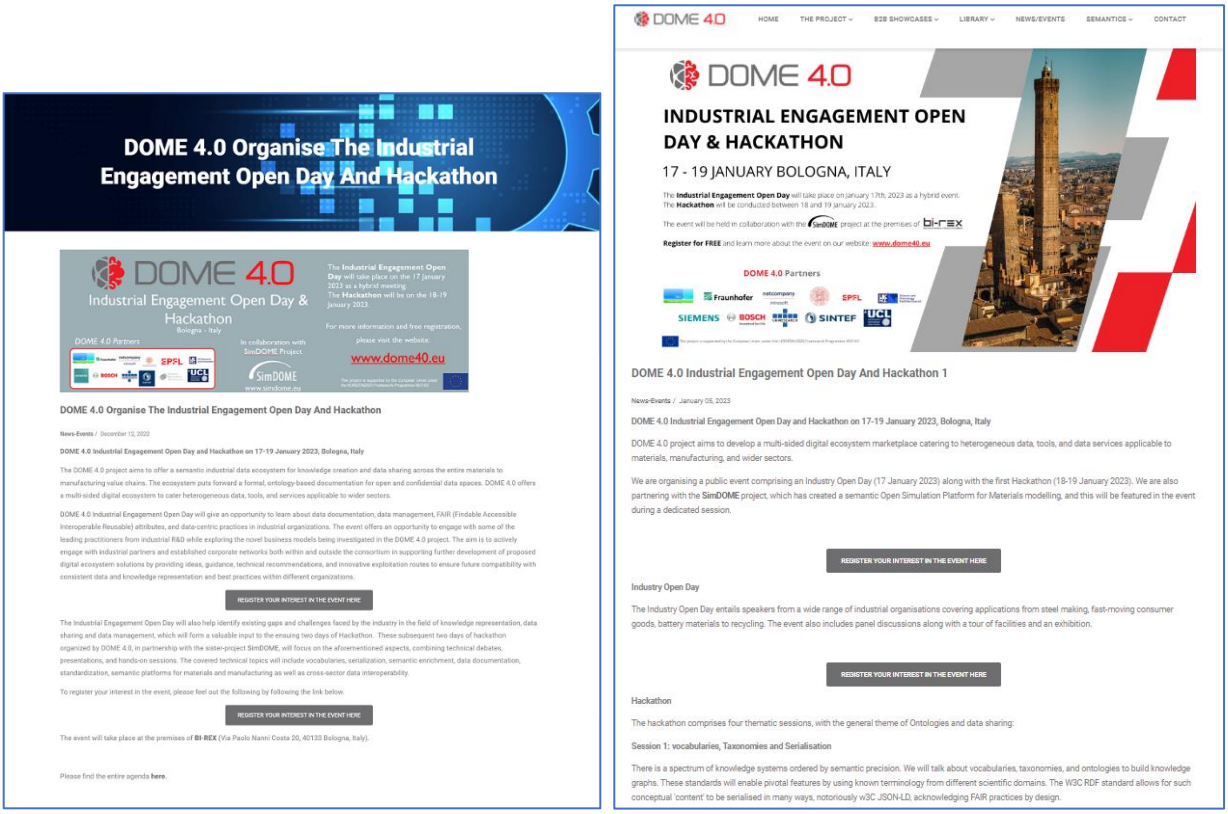


Figure 6 Screenshots of the project website

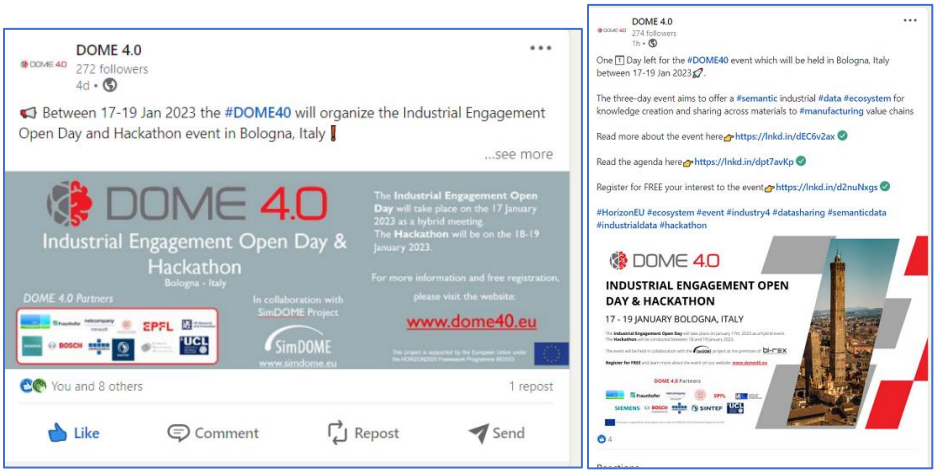


Figure 7 Samples of promotion of the events on LinkedIn

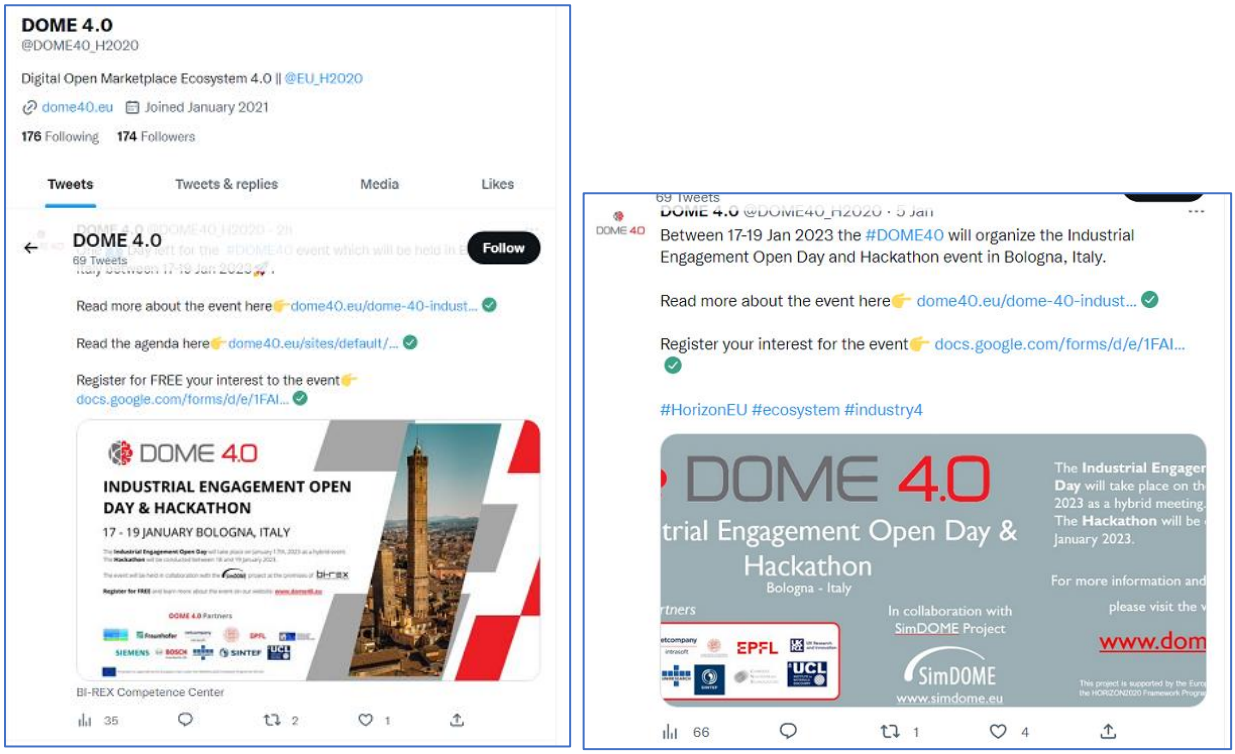
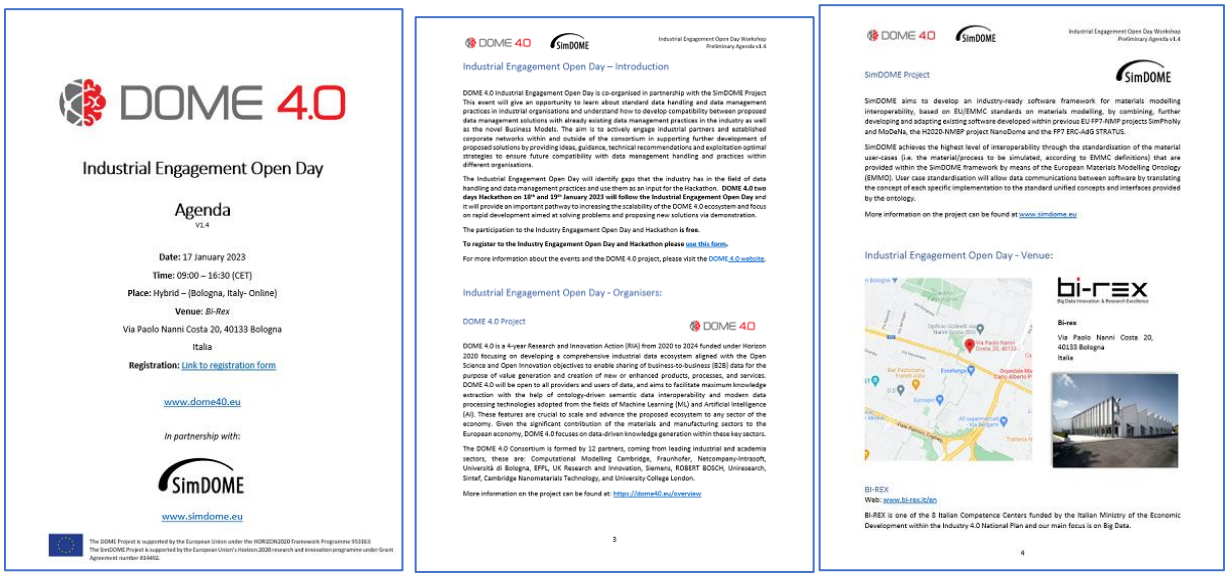


Figure 8 Sample of promotion of the event via Twitter posts

In preparation for the event, CNT undertook extensive mapping of industrial stakeholders. To engage the targeted stakeholders, CNT implemented a widespread email campaign and sent individual email invitations to the identified industrial stakeholders and potentially interested CNT personal contacts

A document with the agenda, information on the venue and profiles of all speakers was prepared by CNT and circulated to all registered delegates of the IEOD. This document was also available for download from the project website.



DOME 4.0 SimDOME Industrial Engagement Open Day Workshop Preliminary Agenda v1.4

Our public-private Consortium, born in 2018, has its headquarter in Bologna (Italy) and gathers in partnership 60 players among Universities, Research Centers and Companies of excellence in order to assist businesses, in particular SMEs, through a varied series of services: from consultancy to technology assessment, from design to validation of innovative solutions, from orientation to training, up to the Pilot Plant.

Our Consortium is configured as a highly specialized Competence Center, constituted according to the modalities established by Italian Ministry of Economic Development in conjunction with Italian Ministry of Economy and Finance.

Industrial Engagement Open Day – Agenda

09:00 *Venue Open to Participants (online participants to join)*

09:15 Welcome to the Industrial Engagement Open Day
DOME 4.0, SimDOME and Bi-Rex Team

09:30 **Danilo Mascolo,** Head of Innovation and Business Development, BI-Rex, Italy
Title: A Competence Centre for Industry 4.0

10:00 **Amit Bhave,** CEO & Co-Founder, CMCL Innovations, UK
Title: DOME 4.0 – an overview and update on the data sharing ecosystem and B2B showcases

10:30 **Samir Sid,** Process Simulation Scientist, Unicore, Belgium
Title: How SimDOME helps support battery material development

11:00 *Coffee break*

11:15 **Evgeny Kharlamov,** Senior Expert, Bosch Center for Artificial Intelligence (BCAI), Germany
Title: Smart Manufacturing

11:45 **Fabrizio Preda,** CEO, NIREOS, Italy
Amit Bhave, CEO & Co-Founder, CMCL Innovations, UK
Title: Open Simulation Platform use cases from NIREOS and CMCL

12:15 **Ennio Capria,** Deputy Head of Business Development, European Synchrotron (ESRF), France
Title: Large Scale Research Infrastructures: extending your characterisation toolbox with cutting edge unique methodologies has never been so easy

12:45 Tour of Bi-Rex facilities

13:00 *Lunch & Exhibition*

14:30 **Laszlo Farkas,** Siemens PLM Software- (SISW). Italy
Title: Digital Thread Approach to Materials

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DOME 4.0 SimDOME Industrial Engagement Open Day Workshop Preliminary Agenda v1.4

15:00 Round table discussion
Moderator: **Bojan Boskovic,** CEO, Cambridge Nanomaterials Technology Ltd, UK

15:45 Conclusion

16:00 *Networking and Wrap-up*

Note it is planned that all presentations would be followed by Q&A discussion. The organisers reserve the right to change the programme or speakers should circumstances require.

Industrial Engagement Open Day – Speakers

Dr Amit Bhave
CEO & Co-Founder
CMCL Innovations
Sheraton House
Castle Park, Castle Street
Cambridge, CB3 0AX,
United Kingdom

Dr Amit Bhave is the CEO and co-founder of CMCL Innovations, an award-winning company offering digital engineering solutions to the automotive, chemicals/materials, and energy industries. His main responsibilities include software and services business development, and for over a decade, he has also been responsible for fostering R&D partnerships with industry and research organisations worldwide.

Amit is the Coordinator for DOME 4.0 and has led numerous projects in areas ranging from low-emission vehicles, nanomaterials production, and carbon-negative energy processes.

He is a Chemical Engineer by profession (PhD, University of Cambridge) and trained in technology enterprise management (London Business School). He is also an Associate at Hughes Hall, and has over 40 peer-reviewed technical publications.

Danilo Mascolo
Head of Innovation and Business Development
Bi-Rex
Bologna,
Emilia-Romagna,
Italy

Danilo Mascolo has over 22 years of experience in leading innovation and business inside Multinational Companies, Industry Associations, SMEs, the UE and Regional\National Government, developing processes, offerings and tools, to produce maximum value to all stakeholders. He started his career as independent consultant in 2000 developing a pioneering diagnostic tool for ICs, for University Federico II after graduation in Electronic Engineering and Information Theory (summa cum laudae). Over the years, he has supported >1.000 companies in consolidated and digitalized value

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Figure 9 Sample pages of the agenda

2.1 Industrial Engagement Open Day Workshop I - Agenda

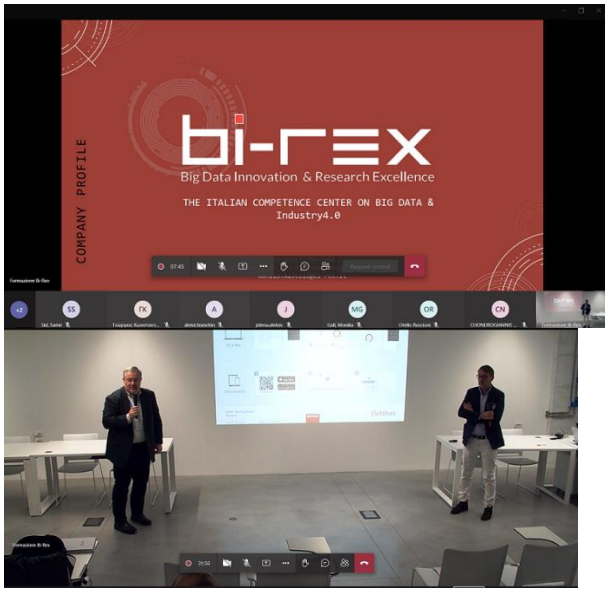
09:00 *Venue Open to Participants (online participants to join)*

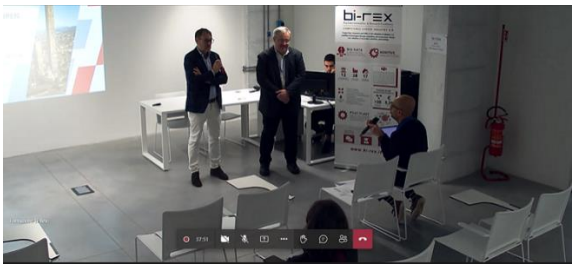
09:15 Welcome to the Industrial Engagement Open Day

DOME 4.0, SimDOME and Bi-Rex Team

09:30 **Danilo Mascolo,** Head of Innovation and Business Development, BI-Rex, Italy

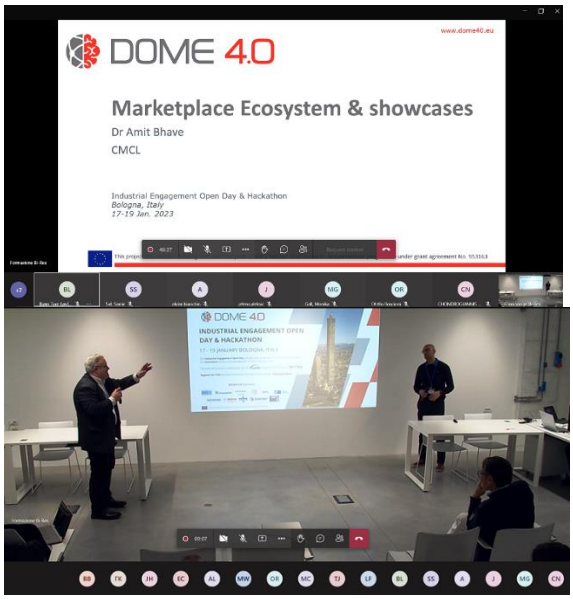
Title: A Competence Centre for Industry 4.0





10:00 **Amit Bhave,** CEO & Co-Founder, CMCL Innovations, UK

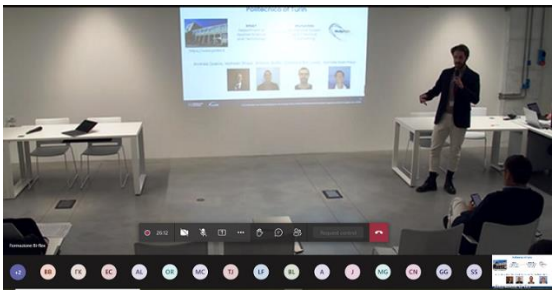
Title: DOME 4.0 – an overview and update on the data sharing ecosystem and B2B showcases

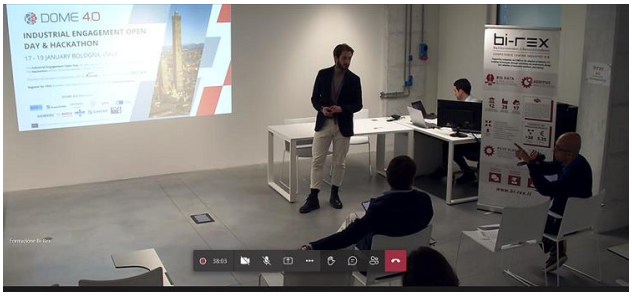


10:30 **Samir Sid,** Process Simulation Scientist, Umicore, Belgium

Andrea Querio, Researcher, Politecnico di Torino, Italy

Title: How SimDOME helps support battery material development

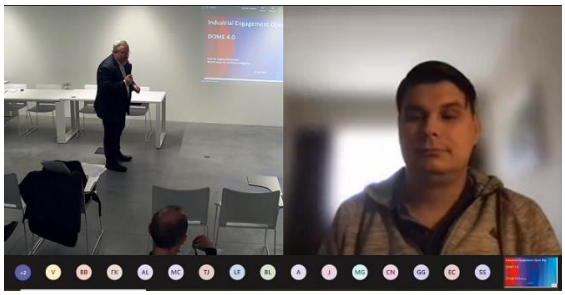




11:00 *Coffee break*

11:15 **Evgeny Kharlamov,** Senior Expert, Bosch Center for Artificial Intelligence (BCAI), Germany

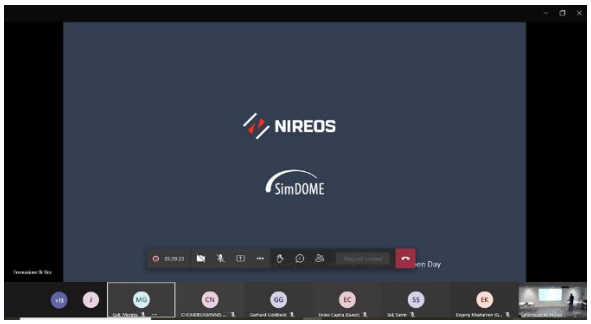
Title: Smart Manufacturing

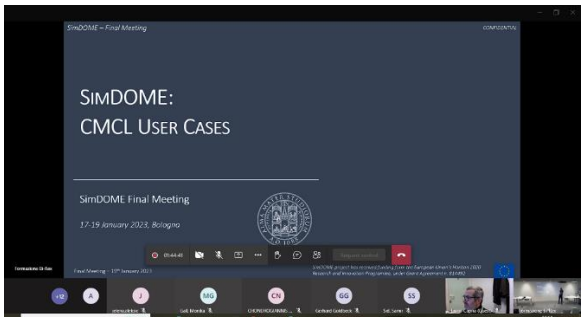


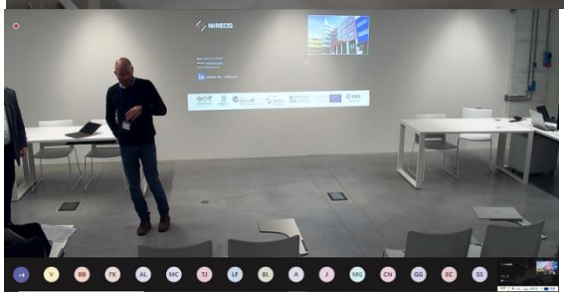
11:45 **Fabrizio Preda,** CEO, NIREOS, Italy

Amit Bhave, CEO & Co-Founder, CMCL Innovations, UK

Title: Open Simulation Platform use cases from NIREOS and CMCL

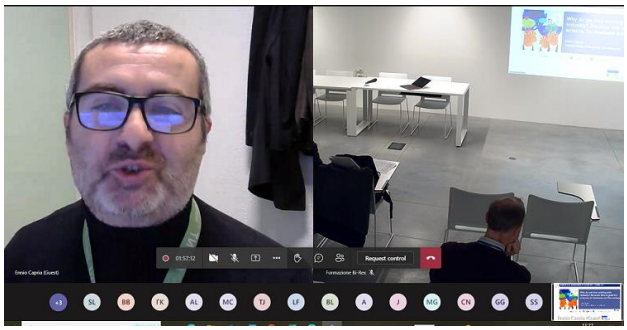


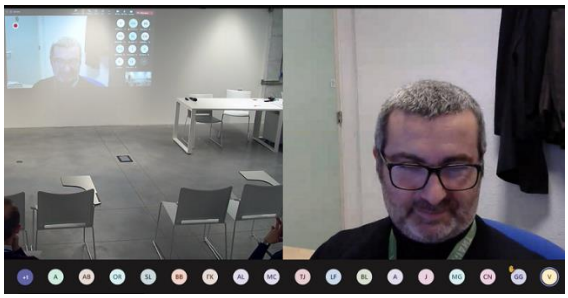




12:15 Ennio Capria, Deputy Head of Business Development, European Synchrotron (ESRF), France

Title: Large Scale Research Infrastructures: extending your 16haracterization toolbox with cutting edge unique methodologies



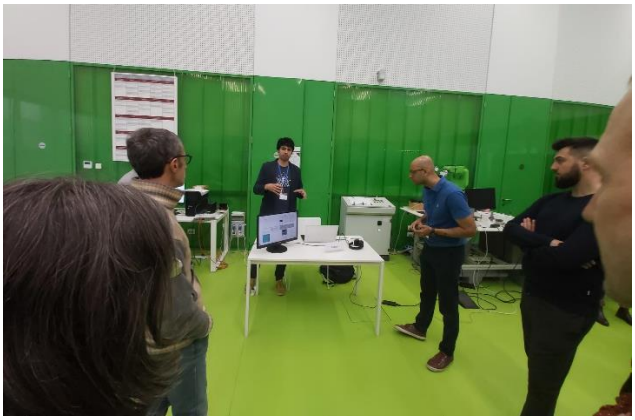


12:45 Tour of Bi-Rex facilities

13:00 *Lunch & Exhibition by the following SMEs/Start-ups*

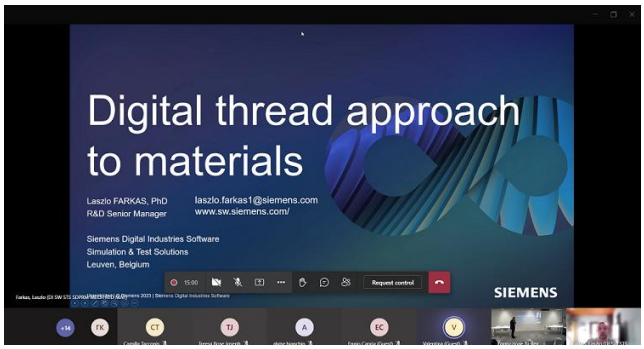
- Energy Group (www.energygroup.it)
- Data River: (www.datariver.it)

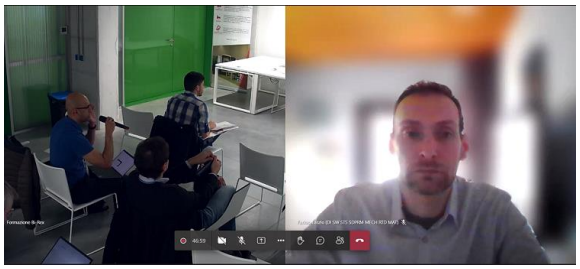
- Nextema: (www.nextema.com)
- Caboto
- Astreo: (www.astreotech.com)
- Nireos: (www.nireos.com)



14:30 **Laszlo Farkas,** Siemens PLM Software- (SISW). Belgium

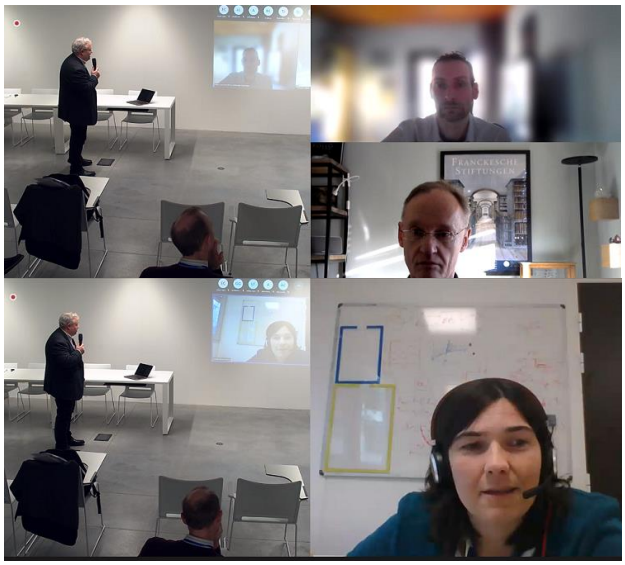
Title: Digital Thread Approach to Materials

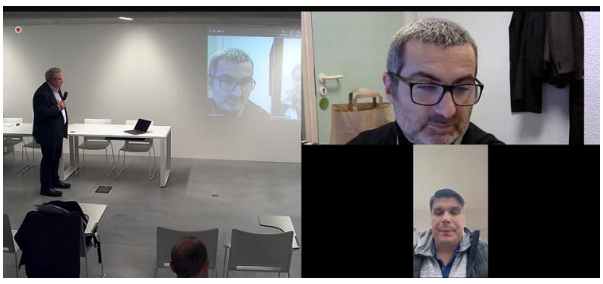




15:00 Round table discussion

Moderator: **Bojan Boskovic,** CEO, Cambridge Nanomaterials Technology Ltd, UK





15:45 Conclusion

16:00 *Networking and Wrap-up*

2.2 Industrial Engagement Open Day Workshop I – Speakers

Dr Amit Bhave
CEO & Co-Founder
CMCL Innovations
Sheraton House
Castle Park, Castle Street
Cambridge, CB3 0AX,
United Kingdom

Dr Amit Bhave is the CEO and co-founder of CMCL Innovations, an award-winning company offering digital engineering solutions to the automotive, chemicals/materials, and energy industries. His main responsibilities include software and services business development, and for over a decade, he has also been responsible for fostering R&D partnerships with industry and research organisations worldwide.

Amit is the Coordinator for DOME 4.0 and has led numerous projects in areas ranging from low-emission vehicles, nanomaterials production, and carbon-negative energy processes.

He is a Chemical Engineer by profession (PhD, University of Cambridge) and trained in technology enterprise management (London Business School). He is also an Associate at Hughes Hall, and has over 40 peer-reviewed technical publications.

Ing Danilo Mascolo, MBA
Head of Innovation and Business Development
Bi-Rex - *National Competence Centre on Big Data and Applied-AI for Manufacturing*
Bologna, Emilia-Romagna,
Italy

Ing Danilo Mascolo, MBA started his career as researcher in the University Federico II, where he graduated summa cum laude in Electronic Engineering and Information Theory. In June 2002, He joint STMicroelectronics as R&D Manager and PM of emerging technologies with application in Flexible

Electronics, Energy Harvesting, Si-Optics, Embedded Computing & AI. As principal investigator, He drove Molecular and Carbon-based Electronics in US, UE and Singapore, where he contributed to start operations of a new R&D Centre. In July 2009, he moved in Confindustria Emilia-Romagna, the Federation of Industry Associations as CIO deploying innovation and strategic management counselling services to the Associate Companies Network. Today He is the head of Innovation and business development in BI-REX the national competence center on Big Data and Applied-AI for Manufacturing. During his activities, he wrote several papers and chapters to books, filled 65 patents and PCT and was listed top-10 inventors on nanotech 2006-2009 in EPO.

Dr Samir Sid
Process Simulation Scientist
Umicore
Group Research & Development Watertorenstraat 33
B-2250 Olen,
Belgium

Dr Samir Sid is an aerospace engineer and a scientist passionate by fluid dynamics and computational sciences in the broader sense. After graduating from the University of Liège in 2012, he conducted a PhD thesis on the fundamental dynamics of turbulent flows in the Multi-Physics & Turbulent Flows Computation (MTFC) research group led by Prof. Terrapon (ULiege). A few years later, he joined Umicore, a global company leader in clean mobility materials and recycling, where he is currently in charge of a portfolio of research projects dedicated to process and product development. As R&D Scientist, he leverages his expertise in fluid dynamics and computational physics to coordinate the development of dedicated simulation models in order to provide key insights into various production processes to operational teams.

Andrea Querio
Researcher
Politecnico di Torino
Italy

Andrea Querio, is a Researcher at the Department of Applied Science and Technology, of the Politecnico di Torino.

Dr Evgeny Kharlamov
Senior Expert
Bosch Center for Artificial Intelligence (BCAI)
Renningen, Baden-Württemberg,
Germany

Dr Evgeny Kharlamov is a Senior Expert in "AI methods for Semantic Digital Twins and Knowledge Graphs" at the Bosch Center for Artificial Intelligence and an Associate Professor at the University of Oslo. He was previously a Senior Research Fellow at the University of Oxford, a visiting researcher at the University of Edinburgh, and a researcher at the University of Bolzano and INRIA Saclay.

Evgeny does AI-centered research that aims at sustainable, circular, and smart manufacturing / Industry 4.0 and centered around topics of standardised, intelligent and data-driven production value-chain empowered with digital twins and IoT. His research in particular accounts for Semantic Technologies, ontologies, knowledge graphs for symbolic representation and reasoning over manufacturing knowledge, for machine learning for processing of production data, and for their combinations in Neural-Symbolic AI methods. Evgeny's work led to 150+ publications including top tier venues such as NeurIPS, JIM, TODS, PVLDB, SIGMOD, IJCAI, AAAI, CIKM, and ISWC. His citation count at Google Scholar is about 3K. He won several prestigious awards including the best research and industrial applications papers at ESWC'20, ISWC'17, best demo at ISWC'15, and he is ranked as 18th among "AI 2000 Knowledge Engineering Most Influential Scholars" by AMiner.

Evgeny raised or participated in raising of about 3M EUR of research funding. He was in charge of several industrial collaborations of the University of Oxford and was in charge of or participated in several EU projects at the University of Oxford and Bosch (FP7, H2020) and of EPSRC and Royal Society projects at the University of Oxford.

Fabrizio Preda
CEO
NIREOS
Milan, Lombardy,
Italy

Fabrizio Preda is the CEO & Founder of NIREOS. He has a degree from the Politecnico di Milano, in Master of Science - MS - Engineering Physics. He founded NIREOS in 2018.

Dr Ennio Tito Capria
Deputy Head of Business Development
European Synchrotron (ESRF),
France

Dr Ennio Tito Capria is the Deputy Head of Business Development at the ESRF. In his research career he worked on the development of electrochemical nanobiosensors, nanocomposites and optoelectronic devices and particularly their characterisation with synchrotron light. At the ESRF, he is coordinating the participation of the ESRF in various collaborative initiative with industry, in particular on energy storage applications, additive manufacturing methods and nano-sciences. Since 2020 Ennio is Director of the Characterisation programme of the Technological Research Institute Nanoelec.

Dr Laszlo Farkas
Siemens PLM Software (SISW)
Katholieke Universiteit Leuven
Leuven, Flemish Region,
Belgium

Dr Laszlo Farkas is a Senior R&D Manager at Siemens PLM Software for over 7 years. He has worked in Siemens since 2003. He got his PhD degree in Engineering from K.U.Leuven.

Dr Bojan Boskovic
CEO,
Cambridge Nanomaterials Technology
14 Orchard Way
Lower Cambourne
Cambridge CB23 5BN - UK

Dr Bojan Boskovic is the Founder, Managing Director, and Principal Consultant of the company. He has more than 20 years of hands-on experience with carbon nanomaterials and composites from industry and academia in the UK and Europe. Previously, he worked as a R&D Manager at Nanocyl, one of leading carbon nanotube manufacturing companies in Europe. He also worked on carbon nanotube synthesis and applications as a Principal Engineer-Carbon Scientist at Meggitt Aircraft Braking Systems, as a Research Associate at the University of Cambridge, and as a Senior Specialist at Morgan Advanced Materials. During his PhD studies at the University of Surrey he invented low temperature synthesis method for production of carbon nanomaterials that has been used as a foundation patent for the start-up company Surrey Nanosystems. He was a member of the Steering and Review Group for the Mini-IGT in Nanotechnology that advised the UK Government on the first nanotechnology strategy policy document. Dr Boskovic was working as an advisor for the European Commission (EC) on Engineering and Upscaling Clustering and on setting up of the European Pilot Production Network (EPPN) and European Materials Charaterisation Cluster (EMCC). He has experience in exploitation and dissemination management on a number of FP7 and H2020 European projects, including UltraWire, NanoLeap, OYSTER, M3DLoC, Genesis, nTRACK, nanoMECommons, APOLO, Triankle, Carbo4Power, Repair3D, AM4BAT and DOME 4.0. Also, in UK Government InnovateUK funded projects, such as UltraMAT, GRAPHOSITE and HiBarFilm. He is also a leader of two private membership-based consortiums: Nano-Carbon Enhanced Materials (NCEM) and Advanced Materials for Additive Manufacturing (AMAM).

2.3 Industrial Engagement Open Day Workshop I – Venue

2.3.1 BI-REX

Web: www.bi-rex.it/en

BI-REX is one of the 8 Italian Competence Centers funded by the Italian Ministry of the Economic Development within the Industry 4.0 National Plan and our main focus is on Big Data.

Our public-private Consortium, born in 2018, has its headquarter in Bologna (Italy) and gathers in partnership 60 players among Universities, Research Centers and Companies of excellence in order to assist businesses, in particular SMEs, through a varied series of services: from consultancy to technology assessment, from design to validation of innovative solutions, from orientation to training, up to the Pilot Plant.

Our Consortium is configured as a highly specialized Competence Center, constituted according to the modalities established by Italian Ministry of Economic Development in conjunction with Italian Ministry of Economy and Finance.

2.4 Industrial Engagement Open Day Workshop I - Exhibitors

2.4.1 Energy Group

Web: www.energygroup.it

Energy Group was founded in 1995 and it has been helping companies to optimize research, development, design and production processes through advanced digital technologies and use of professional 3D printers. Energy Group provides to its clients highly qualified technical service and a solid experience in additive technologies.

The Energy Group team meets technological needs, solves problems and helps customers in order to reach their goals.

Key points

- One of the most advanced Technological Centers in Europe
- Over 25 years of experience in 3D world
- Certified reseller of Stratasys 3D printers
- Generative design and topological optimization with nTopology.
- Certified reseller of Stratasys, MakerBot and Xact Metal professional 3D printers, with a strong polymer and metal expertise

2.4.2 Data River

Web: www.datariver.it

DataRiver Srl is an innovative SME accredited as an Industrial Research Lab of the High Technology Network of the Emilia-Romagna Region. Founded in 2009 as a Spin-Off of the University of Modena and Reggio Emilia, the company develops innovative software solutions in the fields of Big Data Integration & Analytics, IoT, Industry 4.0, Artificial Intelligence and Machine Learning, Semantic Search. DataRiver's mission is enabling companies to easily understand their data, through a clear and unified view of internal and external information sources. Big Data analysis allows companies to learn from experience and optimize decision-making, production and prediction processes.

2.4.3 Nextema:

Web: www.nextema.com

Nextema S.r.l. is a spinoff of the University of Bologna that brings together 20 years of experience in the field of laser machining, specifically: Laser hardening, Laser cladding, Laser welding and Lithium battery welding.

2.4.4 Astreo

Web: www.astreotech.com

Astreo is an Internet-of-Things (IoT) company providing high-quality solutions to a constantly growing Decentralized Wireless Network community. Connectivity is the key to our Future. It will change our way of thinking and living, as individuals and as a community, improving our lifestyle, our wellness, and addressing future challenges facing us and our planet. Through Connectivity, our life will be simpler. The fridge will inform us when it is empty, a dog collar will tell us where our dog is, lights will switch off when they are not needed. And then, we will have tools to save water, to cut down energy wasting and to reduce air pollution. Connectivity and Smart Things should be available to the community and People, without class and racial distinction. Our goal is to live in a Future without Digital Divide. These values lead us to founding Astreo. All these principles inspire us to build IoT devices and Networks, drive us to improve every day, to investigate and research new and better technologies. For us, for the People, for the Planet. To build a better tomorrow, a Connected Future.

2.4.5 Nireos

Web: www.nireos.com

NIREOS is an innovative high-tech company based in Milan (Italy). NIREOS develops and manufactures high-performance devices for spectroscopy and machine vision. The product portfolio features hyperspectral cameras (in the visible and infrared range, HERA models), multispectral cameras, an ultra-compact interferometer for FT spectroscopy (GEMINI), and an amplified broadband photodetector (SPIDER). The solutions provided by NIREOS are employed in different applications in the scientific and in the industrial field, ranging from spectroscopy labs to the agri-food industry, from cultural heritage to

plastic sorting, from remote sensing to biology, from microscopy to vegetation studies. NIREOS is known as a trusted partner offering high quality products and support.

2.4.6 Caboto

Web: www.caboto.net

AI based autonomous inspection and anomaly detection, on the metaverse

2.5 Industrial Engagement Open Day I – External participating organisations

2.5.1 Airbus

Web: www.airbus.com

Airbus is a global pioneer in the aerospace industry, operating in the commercial aircraft, helicopters, defence and space sectors. Airbus is a leader in designing, manufacturing and delivering aerospace products, services and solutions to customers on a worldwide scale. With around 130,000 employees and as the largest aeronautics and space company in Europe and a worldwide leader, Airbus is at the forefront of the aviation industry. We build the most innovative commercial aircraft and consistently capture about half of all commercial airliner orders. Thanks to our deep understanding of changing market needs, customer focus and technological innovation, we offer products that connect people and places via air and space.

2.5.2 ESRF, the European Synchrotron

Web: www.esrf.fr

The **ESRF, the European Synchrotron,** is an international science facility based in Grenoble, France. Thanks to high-level, innovative engineering and cutting-edge vision, the ESRF is recognised as one of the top research institutions worldwide, welcoming more than 6'500 scientists every year in fields such as biology, medicine, chemistry, earth and environmental sciences, cultural heritage, materials and surface science, and physics. The ESRF is supported by 22 countries and employs 650 staff.

2.5.3 European Health and Digital Executive Agency (HaDEA)

Web: https://hadea.ec.europa.eu/index_en

The European Health and Digital Executive Agency (HaDEA) implements European programmes and initiatives on behalf of the European Commission, by managing projects that are related to health, digital, food, industry and space. HaDEA is tasked with bringing EU funding to innovative projects, businesses and research, to help rebuild a post-COVID-19 Europe, which will be healthier, more digital, resilient and better prepared for current and future challenges. Our job is to make sure that EU funding reaches the right people, is properly spent, has a concrete impact on the ground, and makes a meaningful difference to the lives of EU citizens.

2.5.4 Artificial Intelligence Monitoring

Web: www.aimonitoring.net

AIM is an innovative startup that intends to offer a service to SMEs in the manufacturing sector. Our goal is to minimize the damage suffered in the company by the downtime of a machine and to better manage the efficiency of the production process. This aim is achieved thanks to our software system for predictive maintenance based on machine learning algorithms. AIM is aimed at companies with a fleet of machines that requires constant maintenance. Companies benefit by predicting interventions and developing targeted solutions; which on the one hand reduce costs and plant downtime, on the other have a positive impact on the quality of company production.

2.5.5 ISTC CNR Laboratory for Applied Ontology (LOA)

Web: www.loa.istc.cnr.it

The **ISTC-CNR Laboratory for Applied Ontology (LOA)** performs basic and applied research on the ontological foundations of conceptual modeling, exploring the role of ontologies and ontology management in different fields, such as: knowledge representation, knowledge engineering, database design, information retrieval, natural language processing, and the semantic web. The group is characterized by a strong interdisciplinary approach that combines Computer Science, Philosophy and Linguistics, and relies on logic as a unifying paradigm. On the application side, special emphasis is given to the use of ontologies for e-government, enterprise and business modeling, product and process modeling, natural language processing, and the Semantic Web.

2.5.6 MBN Nanomaterialia

Web: www.mbn.it/en

Research & development is the center of **MBN Nanomaterialia** activity program aimed to the materials and processes evolution. MBN Nanomaterialia collaborates actively with industrial and academic world, favoring knowledge transferring from laboratory to the market. Our Work Team is constituted by a group of young and dynamic specialists in the technological and scientific fields having competences in materials, chemical and mechanical engineering. Commercial assistance and technical service is managed by qualified technical personnel able to answer to customer needs and to support them in their development activities.

2.5.7 MEP Spa

Web: https://mepsaws.it/en

Leader in the production of sawing machines and systems for metal cutting. **MEP SPA**, a company of the MEPGroup group, is headed by a staff of 110 people who, with passion and tenacity, contribute to establishing it as a leading brand in the production of metal cutting machines and systems. A constantly evolving company that has been able to grow in line with market changes and affirm its name in the main world markets. Located in the Marche region, in the hilly part of the verdant Valcesano 35 km from the sea, MEP has been designing and manufacturing the best sawing machines since 1964, both standard and in special execution, manual, semi-automatic and automatic for metal cutting. Mep operates on a covered area of 13,000 m2, boasts more than 150,000 machines installed worldwide and exports its products to 5 continents.

2.5.8 National Technical University of Athens (NTUA)

Web: http://nanolab.chemeng.ntua.gr/

National Technical University of Athens (NTUA) was founded in 1836 and is the oldest and most prestigious educational institution of Greece in the field of technology. Part of the NTUA School of Chemical Engineering (Department of Materials Science and Engineering) is the Research Unit of Advanced, Composite, Nano Materials & Nanotechnology (R-NanoLab), which was founded in 2007.

R-NanoLab has extensive experience in Designing, Production, and Characterization of Advanced-, Composite-, and Nano-Materials, specializing in the development of nanomaterials and (nano-) composites with tailored properties, and upscaling those processes using pilot lines. Furthermore, R-Nanolab is also involved in advanced materials characterisation including the development of tailored protocols for testing in nanoscale with nanoindentation. Cross-validation of characterization data is performed to adapt the relevant protocols to materials specific test cases, while Machine Learning is also

used to support materials characterization activities and i) establish structure-property relations, ii) support phase recognition, iii) perform failure prognosis, as well as iv) το provide implications for materials design and optimization. R-NanoLab has a strong presence in European Research Activities in Materials Science, through participation in numerous EU and national funded projects.

2.5.9 Rekeep S.p.A.

Web: www.rekeep.com

Rekeep S.p.A. is the head of the main group active in Italy in Integrated Facility Management, i.e. the management and provision of integrated services to public and private customers, aimed at real estate, the territory and in support of healthcare activities. It was born in 2003 from a spin-off of Manutencoop Società Cooperativa, which today has become MSC Società di Partecipazione tra Lavoratori S.p.A., which owns 100% of the Group. From plant management to cleaning, through green maintenance and energy requalification of buildings, up to specialized services for hospitals: Rekeep is able to provide a wide range of auxiliary services to the core business of large private groups, public bodies and health facilities.

2.5.10 YIOTIS S.A.

Web: www.jotis.gr

Innovation is an inseparable part of YIOTIS' Company history. Ioannis and Maria Yiotis' initial goal when they founded the company in 1930 was to offer Greek children innovative, nutritious food made with pure ingredients from crops grown in Greece. Today, the company remains 100% Greek. It has played an integral role in the history and evolution of the Greek diet, and still continues to innovate. The company meets the needs of the whole family, with a rich variety of innovative products that make them the homemaker's "right hand" when it comes to cooking and baking at home. In addition to this, it has been steadily playing its part in strengthening the Greek economy by consistently implementing its investment plans. In 2012, the company invested in acquiring a new warehouse in Mandra, Attica, with a total area of 10,000 sq. m. and capacity for 9,000 pallet stacks. In 2015, YIOTIS S.A. continued its steady investment plan in Greece and completed the construction of its new factory in Agrinio, with a total area of 10,000 sq. m. In 2017 the construction of new company facilities was completed. These 1350 sq. m. facilities house the "Hellenic Research and Innovation Center" (HRIC), which gives the company the ability and the momentum to increase the checks and controls, it carries out on its Food Production. At the same time, the company is dynamically strengthening its presence in foreign markets in all five continents.

2.5.11 Youbiquo

Web: www.youbiquo.eu

Youbiquo is a product company positioned in the B2B market and specialized in the design and production of wearable devices equipped with Augmented Reality and Artificial Intelligence functions. He designed the first AR "Talens" Smart Glasses in 2015 and developed his own binocular evolution called "Holo Industry+" in 2021.

2.5.12 C Quadra

Web: www.c-quadra.it

Born from the expertise gained in the field of strategic consulting of its founding members, **C Quadra** deploys specific analysis and control tools that allow to certify the feasibility, the distinctive value and the probability of success of ideas in the field of innovation also looking for funding and internationalization opportunities. It analyzes and interprets data in order to propose winning, unprecedented and competitive repositioning, activates business strategies able to provide constant and timely responses, analyzes the corporate structural components to understand the quality determinants, or vice versa the defects.

2.5.13 Var Group

Web: www.vargroup.it

Var Group, www.vargroup.it, with a 480 million euros turnover as of 30 April 2021, more than 2700 employees in 23 offices throughout Italy, 8 foreign offices in France, Spain, Germany, Romania, Switzerland, Austria and China, is one of the main partners for innovation in the ICT sector. It supports Italian businesses' competitiveness, offering dedicated solution to major Italian sectors: Manufacturing, Food & Wine, Industrial Mechanics, Automotive, Fashion, Furniture, Retail & Mass Distribution. Var Group constantly renews its offering thanks to continuous research activity and close collaboration with Start-ups and University Centers. Companies have to face increasingly complex challenges and they must be able to count on innovative and specialized solutions. Var Group's offering draws its strength from the deep knowledge of business processes and the integration of several elements. It is the result of the work carried out by several Business Units focusing on projects development in terms of: Business & Industry Solutions, Digital Cloud, Digital Industries, Digital Process Engineering, Customer Experience, Digital Security, Business Technology Solutions, Smart Services, Data Science. Var Group is fully owned by Gruppo Sesa S.p.A., a leading Italian Group in the field of value-added IT solutions for business segment. The parent company Sesa S.p.A. is listed on the STAR segment of the MTA market of the Italian Stock Exchange.

2.5.14 DataRiver Srl

Web: www.datariver.it/en

DataRiver is an Innovative SME,self-certified by AIFA as Contract Research Organization and member of the European Clinical Research Infrastructure Network (ECRIN). DataRiver is accredited as Industrial Research Lab of the High Technology Network of Emilia Romagna Region, member of the steering committee of Clust-ER (Emilia Romagna Region) on "Health and Wellness Industries" and founding member of the BI-REX (Big Data Innovation & Research EXcellence) Industry 4.0. DataRiver is a certified SME by the IMI EHDEN consortium (https://www.ehden.eu/) for the support to healthcare facilities in the process of standardizing health data with respect to the OMOP Common Data Model standard and provide additional services in the EHDEN and OHDSI ecosystem. The company is a member of AICRO (Italian Association of Contract Research Organization). The mission of DataRiver is to allow customers to better understand data through an integrated view of the information sources.The value resulting from the integrated data enables companies to improve decision-making, production and estimation processes,optimizing costs and time effort. DataRiver offers innovative software solutions and consulting services for problems in the fields of IoMT,Big Data Integration & Analytics, Real World Data (RWD)Machine Learning, Artificial Intelligence.

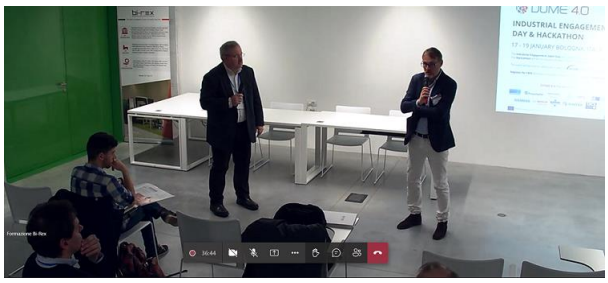
2.5.15 CellDynamics

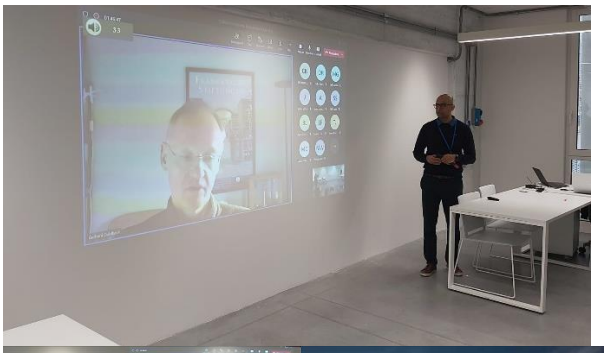
Web: https://celldynamics.it/

Celldynamics aims to set a new standard for in vitro testing in the pharmaceutical and biotechnology sectors with solutions designed for 3D cell models helping decision making through more reliable results. Founded in 2013, CellDynamics is now an italian SME based in Bologna and with two branches in Sicily and Sardinia. Today, our technologies are used by leading universities around the world working with 3D cellular models to increase the reliability of their results reducing experimental errors caused by the intrinsic heterogeneity of 3D cell models.

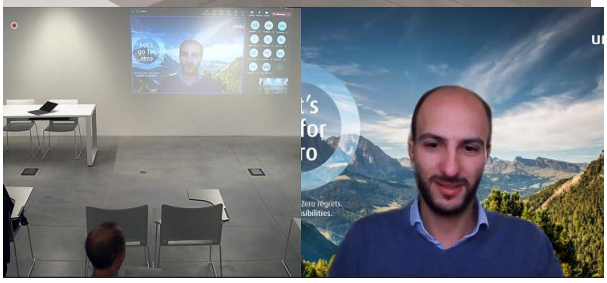
2.6 Industrial Engagement Open Day Workshop I – Annexes

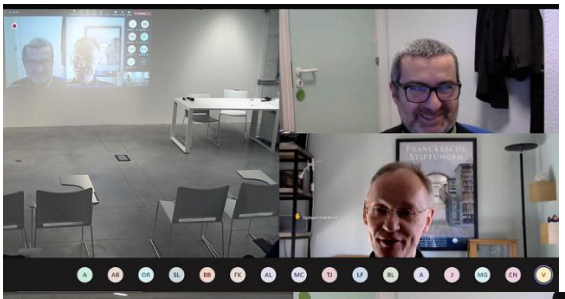
2.6.1 Screenshots and photos of the event

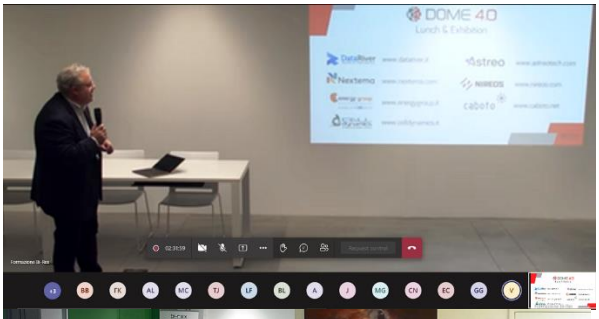


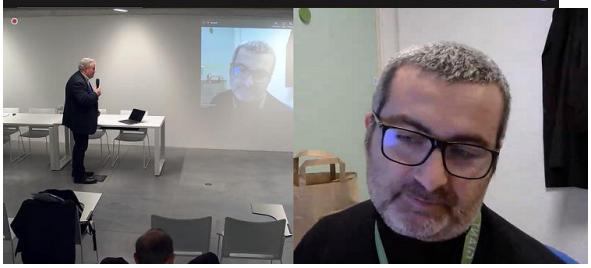


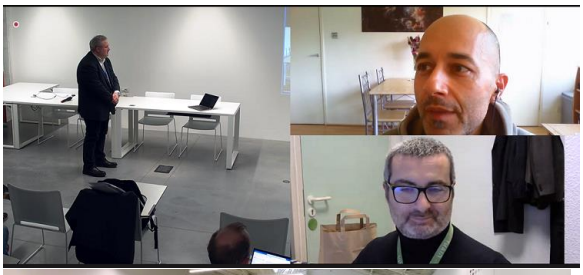
Key Challenges

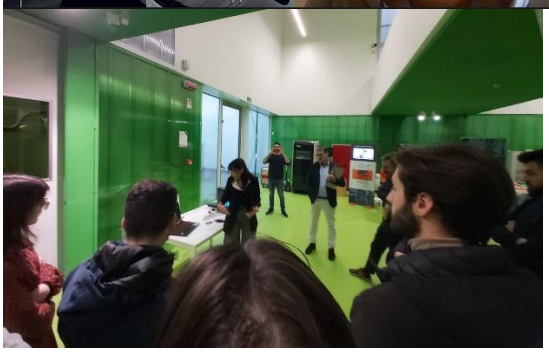




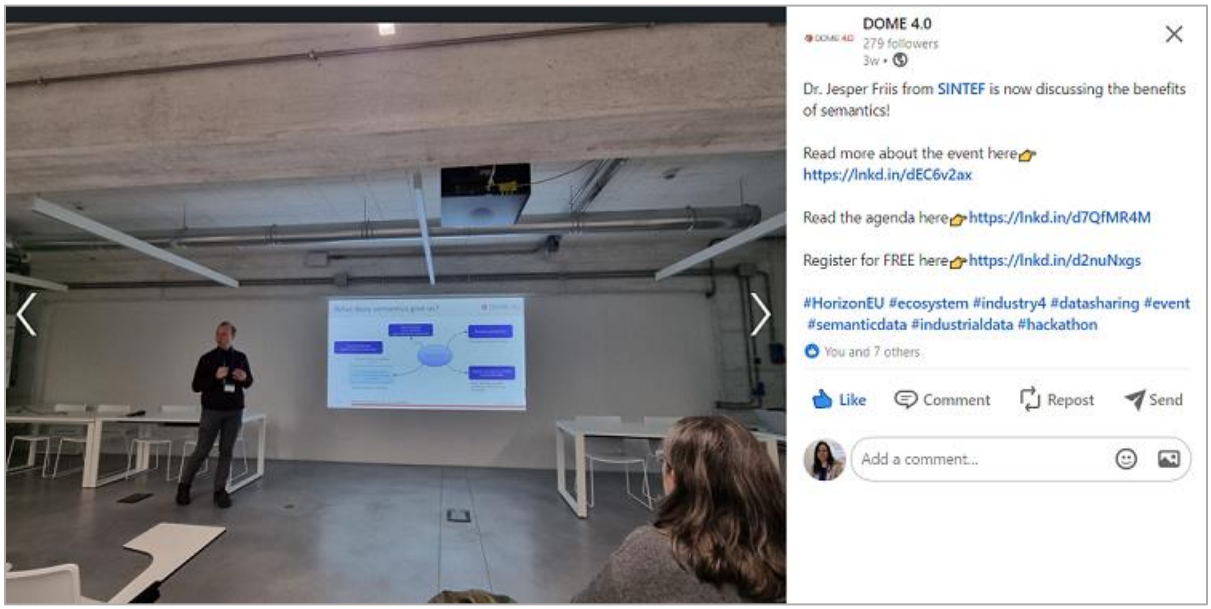

DOME 4.0
Lunch & Exhibition

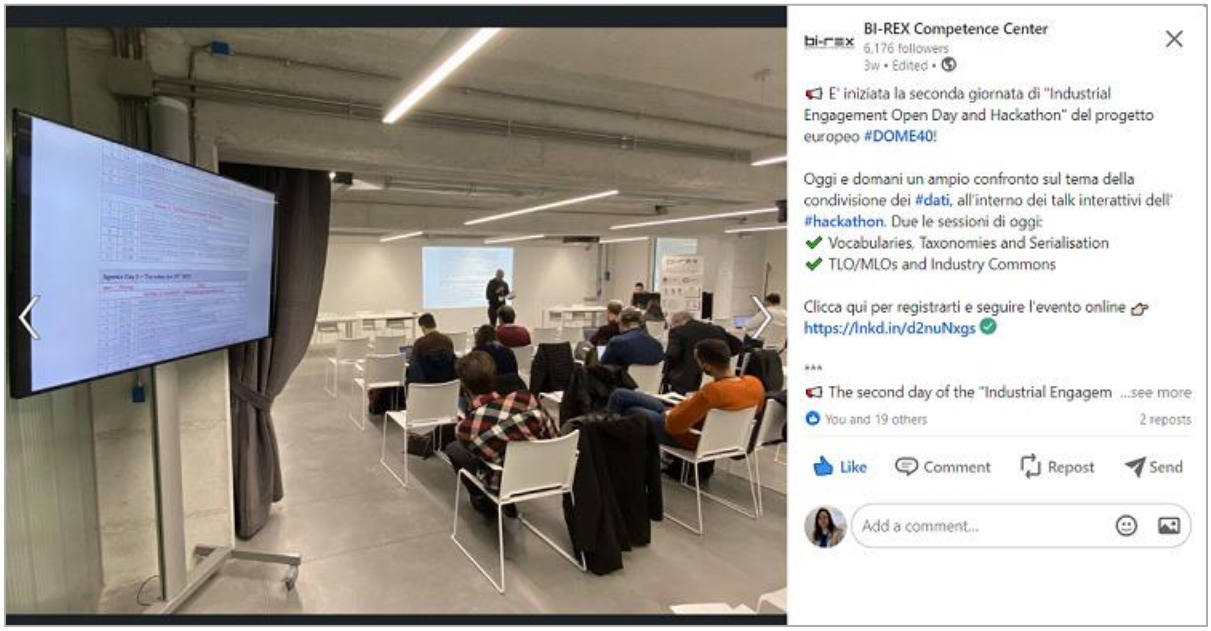




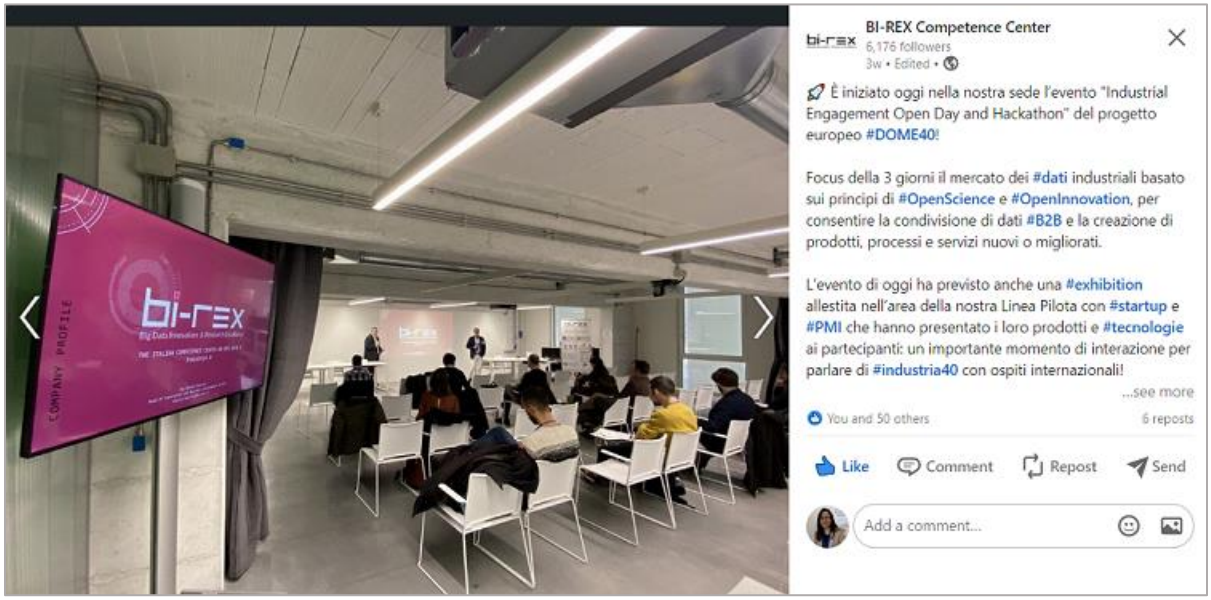


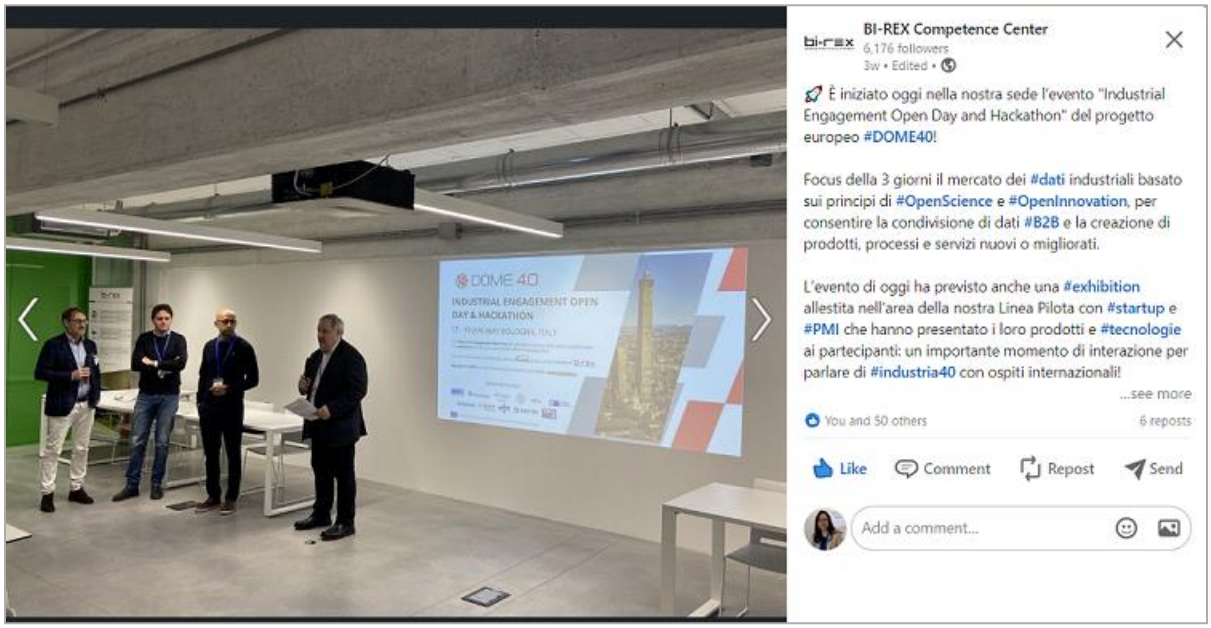
2.6.2 Sample of LinkedIn posts from DOME-4.0 partners and hosts





BI-REX Competence Center
6,176 followers
3w • Edited •
È iniziato oggi nella nostra sede l'evento "Industrial Engagement Open Day and Hackathon" del progetto europeo #DOME40!
Focus della 3 giorni il mercato dei #dati industriali basato sui principi di #OpenScience e #OpenInnovation, per consentire la condivisione di dati #B2B e la creazione di prodotti, processi e servizi nuovi o migliorati.
L'evento di oggi ha previsto anche una #exhibition allestita nell'area della nostra Linea Pilota con #startup e #PMI che hanno presentato i loro prodotti e #tecnologie ai partecipanti: un importante momento di interazione per parlare di #industria40 con ospiti internazionali!
...see more
You and 50 others
6 reposts
Like
Comment
Repost
Send
Add a comment...


BI-REX Competence Center
6,176 followers
3w • Edited •
È iniziato oggi nella nostra sede l'evento "Industrial Engagement Open Day and Hackathon" del progetto europeo #DOME40!
Focus della 3 giorni il mercato dei #dati industriali basato sui principi di #OpenScience e #OpenInnovation, per consentire la condivisione di dati #B2B e la creazione di prodotti, processi e servizi nuovi o migliorati.
L'evento di oggi ha previsto anche una #exhibition allestita nell'area della nostra Linea Pilota con #startup e #PMI che hanno presentato i loro prodotti e #tecnologie ai partecipanti: un importante momento di interazione per parlare di #industria40 con ospiti internazionali!
...see more
You and 50 others
6 reposts
Like
Comment
Repost
Send
Add a comment...


DOME 4.0
INDUSTRIAL ENGAGEMENT OPEN DAY & HACKATHON
BI-REX Competence Center
6,176 followers
3w • Edited •
È iniziato oggi nella nostra sede l'evento "Industrial Engagement Open Day and Hackathon" del progetto europeo #DOME40!
Focus della 3 giorni il mercato dei #dati industriali basato sui principi di #OpenScience e #OpenInnovation, per consentire la condivisione di dati #B2B e la creazione di prodotti, processi e servizi nuovi o migliorati.
L'evento di oggi ha previsto anche una #exhibition allestita nell'area della nostra Linea Pilota con #startup e #PMI che hanno presentato i loro prodotti e #tecnologie ai partecipanti: un importante momento di interazione per parlare di #industria40 con ospiti internazionali!
...see more
You and 50 others
6 reposts
Like
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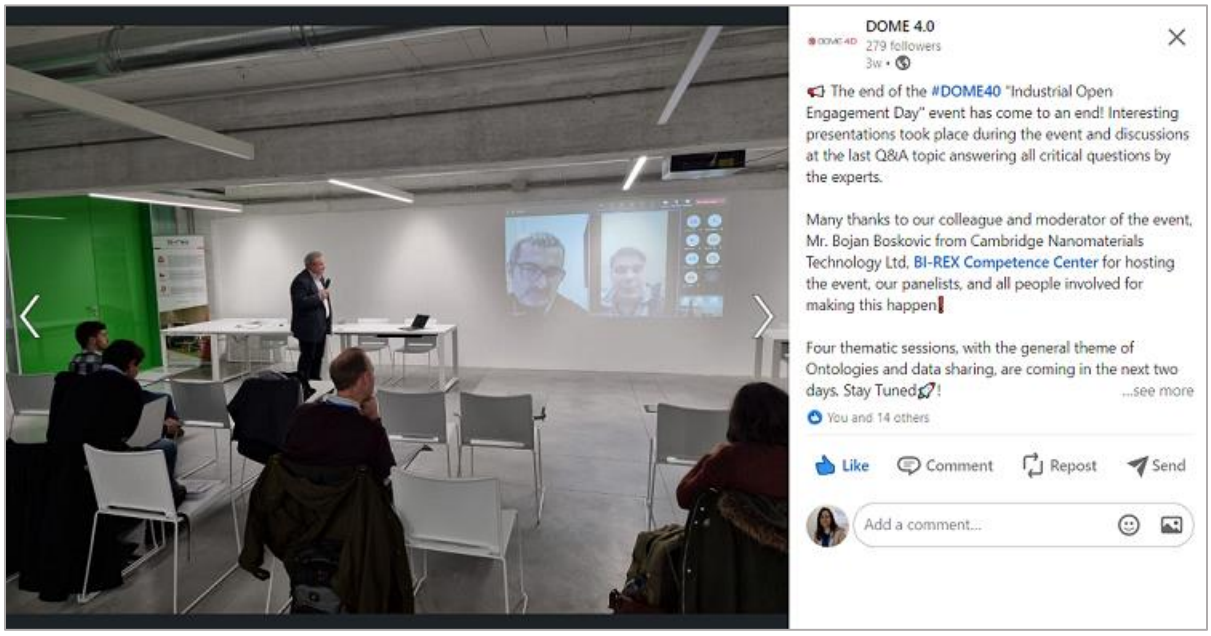
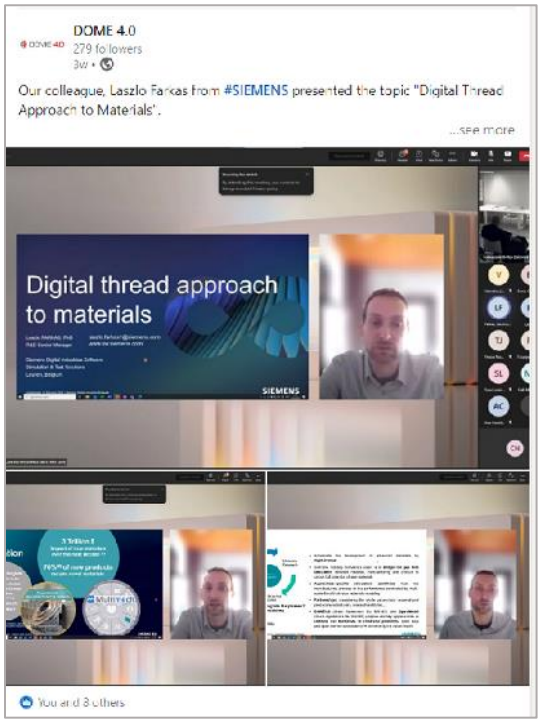
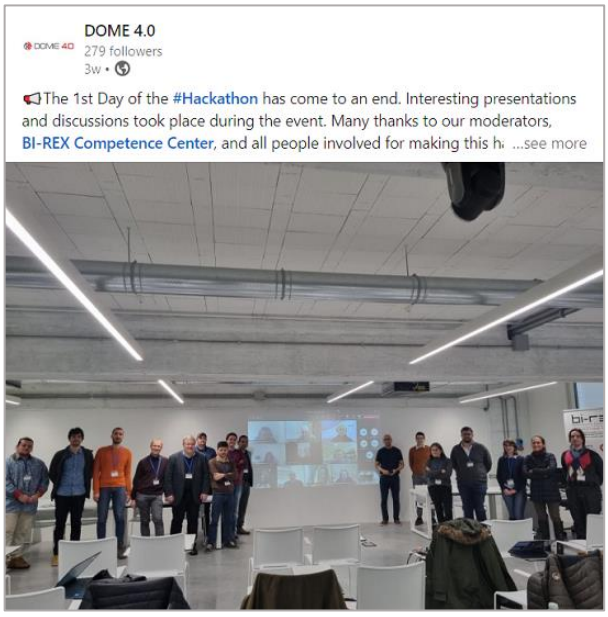

DOME 4.0
279 followers
3w •
The end of the #DOME40 "Industrial Open Engagement Day" event has come to an end! Interesting presentations took place during the event and discussions at the last Q&A topic answering all critical questions by the experts.
Many thanks to our colleague and moderator of the event, Mr. Bojan Boskovic from Cambridge Nanomaterials Technology Ltd, BI-REX Competence Center for hosting the event, our panelists, and all people involved for making this happen!
Four thematic sessions, with the general theme of Ontologies and data sharing, are coming in the next two days. Stay Tuned!
...see more
You and 14 others
Like
Comment
Repost
Send
Add a comment...

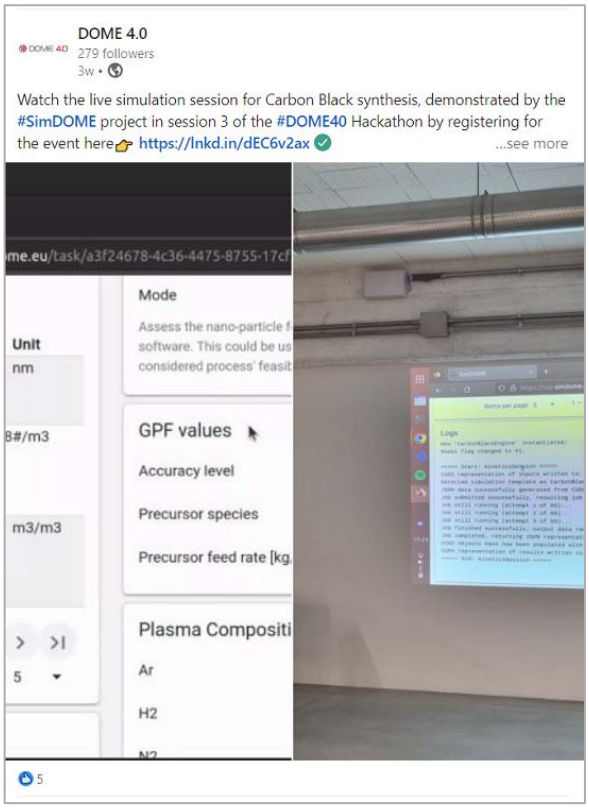

DOME 4.0
279 followers
3w •
Our colleague, Laszlo Farkas from #SIEMENS presented the topic "Digital Thread Approach to Materials'.
...see more
Digital thread approach to materials
SIEMENS
You and 8 others

DOME 4.0
279 followers
3w •
Now Jose Manuel Dominguez from Fraunhofer-Gesellschaft is presenting the #SimDOME architecture at the #DOME40 event!
...see more
SIMPHONY OSP,
SIMDOME GUI
Fraunhofer
IWM

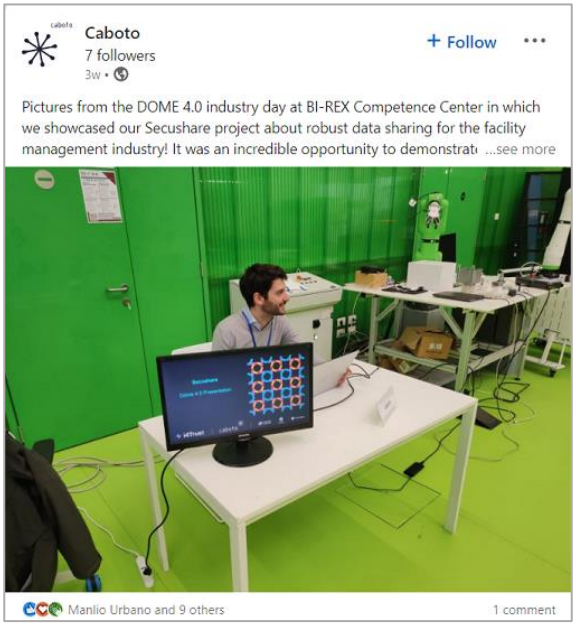
DOME 4.0
279 followers
3w •
Now Emanuele Ghedini the coordinator of the #SimDOME which is a sister project is now presenting the Open Si.ulation Platform!
...see more


DOME 4.0
279 followers
3w •
The 1st Day of the #Hackathon has come to an end. Interesting presentations and discussions took place during the event. Many thanks to our moderators, BI-REX Competence Center, and all people involved for making this h ...see more

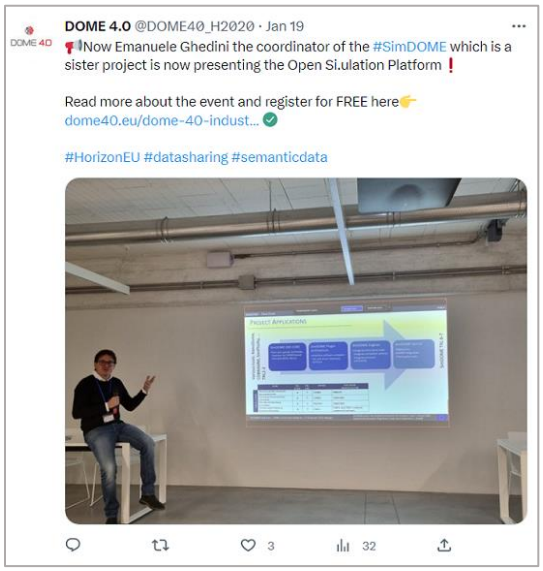
Energy Group - 3D Printing Solutions
2,311 followers
3w • Edited •
+ Follow
Industrial Engagement Open Day and Hackathon: grazie a
BI-REX Competence Center per averci coinvolto!
L'open day del progetto europeo DOME 4.0 si è basato su Open Scien ...see more
See translation
INNOVATION DAYS


DOME 4.0
279 followers
3w •
Watch the live simulation session for Carbon Black synthesis, demonstrated by the
#SimDOME project in session 3 of the #DOME40 Hackathon by registering for
the event here https://lnkd.in/dEC6v2ax ...see more
Mode
Unit
nm
GPF values
Accuracy level
Precursor species
Precursor feed rate [kg
Plasma Compositi
Ar
H2
5

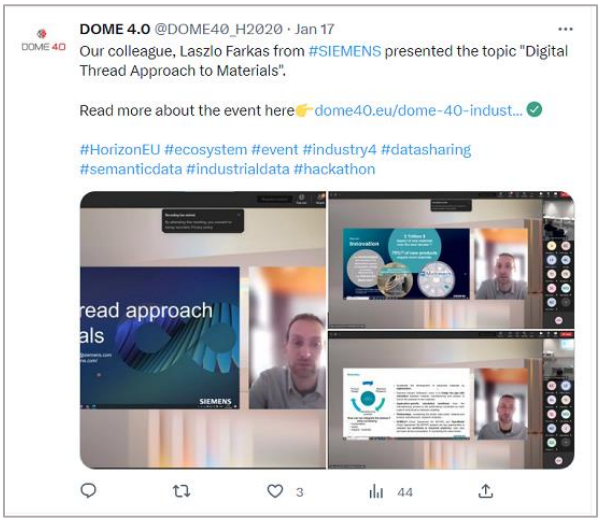
DataRiver
2,078 followers
3w • Edited •
+ Follow
We are ready to present the DataRiver innovative solutions during the DOME 4.0
Industrial Engagement Open Day at BI-REX Competence Center.
...see more
Industrial IoT
datariver.it • 1 min read

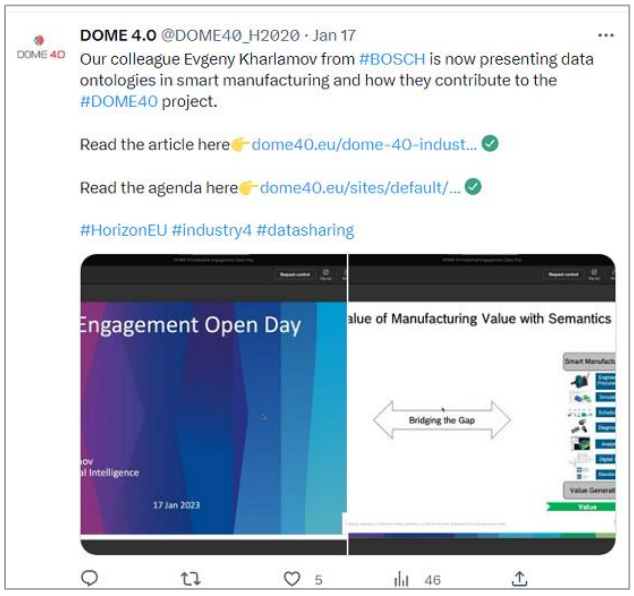

Caboto
7 followers
3w •
+ Follow
Pictures from the DOME 4.0 industry day at BI-REX Competence Center in which
we showcased our Secushare project about robust data sharing for the facility
management industry! It was an incredible opportunity to demonstrat ...see more
Manlio Urbano and 9 others
1 comment

2.6.3 Sample of Twitter posts from DOME-4.0 partners and hosts



DOME 4.0 @DOME40_H2020 · Jan 17
The 1st Day of the #DOME40 event has come to an end with Interesting presentations and discussions. Many thanks to our moderator Bojan Boskovic, @BIREX_CC, and all people involved for making this happen. Interesting sessions are coming in the next two days. Stay Tuned! #HorizonEU
1
5
91


DOME 4.0 @DOME40_H2020 · Jan 17
Our colleague, Laszlo Farkas from #SIEMENS presented the topic "Digital Thread Approach to Materials".
Read more about the event here👉dome40.eu/dome-40-indust...
#HorizonEU #ecosystem #event #industry4 #datasharing #semanticdata #industrialdata #hackathon
3
44


DOME 4.0 @DOME40_H2020 · Jan 17
Our colleague Evgeny Kharlamov from #BOSCH is now presenting data ontologies in smart manufacturing and how they contribute to the #DOME40 project.
Read the article here👉dome40.eu/dome-40-indust...
Read the agenda here👉dome40.eu/sites/default/...
#HorizonEU #industry4 #datasharing
Engagement Open Day
17 Jan 2023
Bridging the Gap
5
46

DOME 4.0 @DOME40_H2020 · Jan 17
Now Samir Sid, researcher from @UmicoreGroup is presenting the #SimDOME project and how the is contributing to support battery material development
Read the article here👉dome40.eu/dome-40-indust...
#HorizonEU #ecosystem #event #industry4 #datasharing #semanticdata
Samir Sid – Scientist at Umic
SimDOME
3
30

3. Industrial Engagement Open Day Workshop 2 - Overview

The **2nd Industrial Engagement Open Day** was organised as a hybrid event on 10th October 2023 in Leuven, Brussels, hosted by DOME 4.0 partner **Siemens Digital Industries Software** at their premises. At this Open Day, 44 people registered (16 in person and 28 online). 77% of the participants belong to industry. Registered participants came from leading organizations and institutions such as: Airbus, Siemens Digital Industries Software, BOSCH, Ansys Inc., NIREOS SRL, Keysight Technologies, Datariver, SINTEF, Novartis Pharma (CH), UKRI, Fraunhofer IWM, EPFL, ESRF, BI-REX, The Innovation Loop, University of Cambridge, UCL, among others

Figure 10 Logos participating organisatons 2nd IEOD

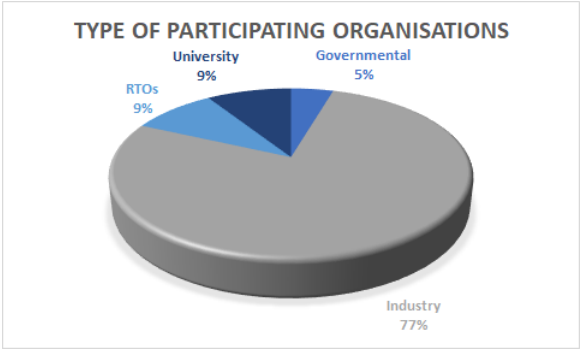


Figure 11 Type of participating organisatons 2nd IEOD

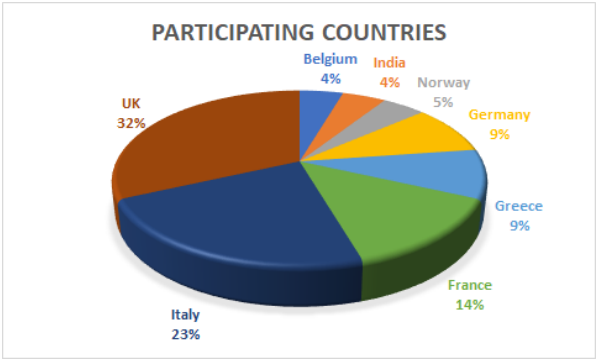


Figure 12 Participating countries - 2nd IEOD

Participants at the 2nd IEOD were welcomed to SIEMENS by their Director of Innovation, Mr Ian McGann, and the Senior Research Manager, Dr Laszlo Farkas. Other speakers of the day came from Keysight Technologies, ESRF, BOSCH, NIREOS, DataRiver, Ansys and CMCL. The meeting was moderated by Dr Bojan Boskovic from Cambridge Nanomaterials Technology (CNT Ltd.), organiser of the event. The panel discussions were moderated by Mr Ian McGann from SIEMENS.

Figure 13 Group photo 2nd IEOD

As part of the post dissemination of this event, SIEMENS SimCenter prepared a video, which has widely disseminated through their media and social platforms. This video has also been published through the DOME 4.0 LinkedIn account.

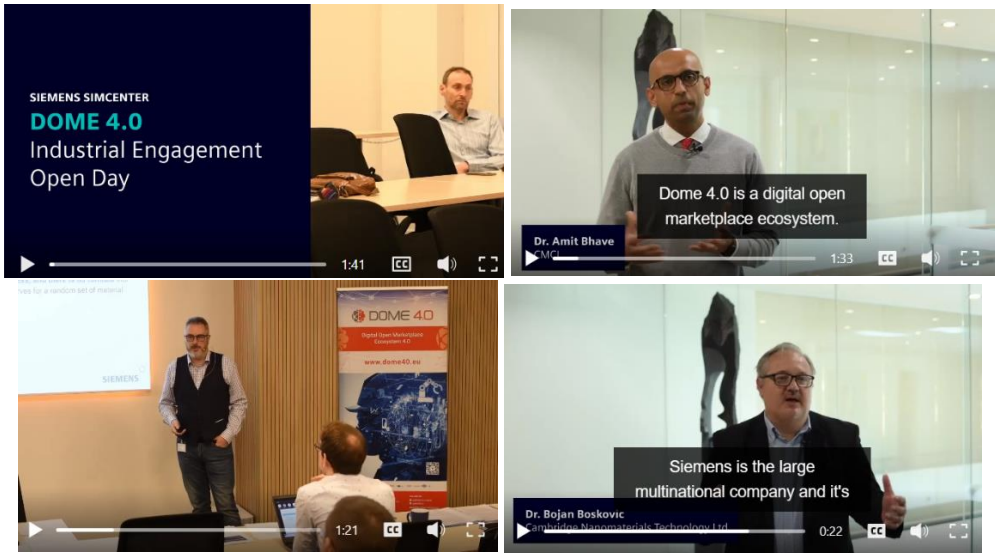


Figure 14 DOME 4.0 Video produced by Siemens

In preparation of the Industrial Engagement events, CNT prepared a preliminary agenda and approached the possible speakers to invite them to participate at this event. CNT prepared an online registration form, which has accessible from the project website (dome40.eu). The form included the registration for the IEOD and the Hackathon event

A travel information document was prepared and sent to everyone who registered to the 2nd Industrial Engagement Workshop. A final agenda which included all links to access the meeting, and the programme for the Hackathon, was sent to those who registered.

Figure 15 Travel information document (2nd Industrial Engagement)

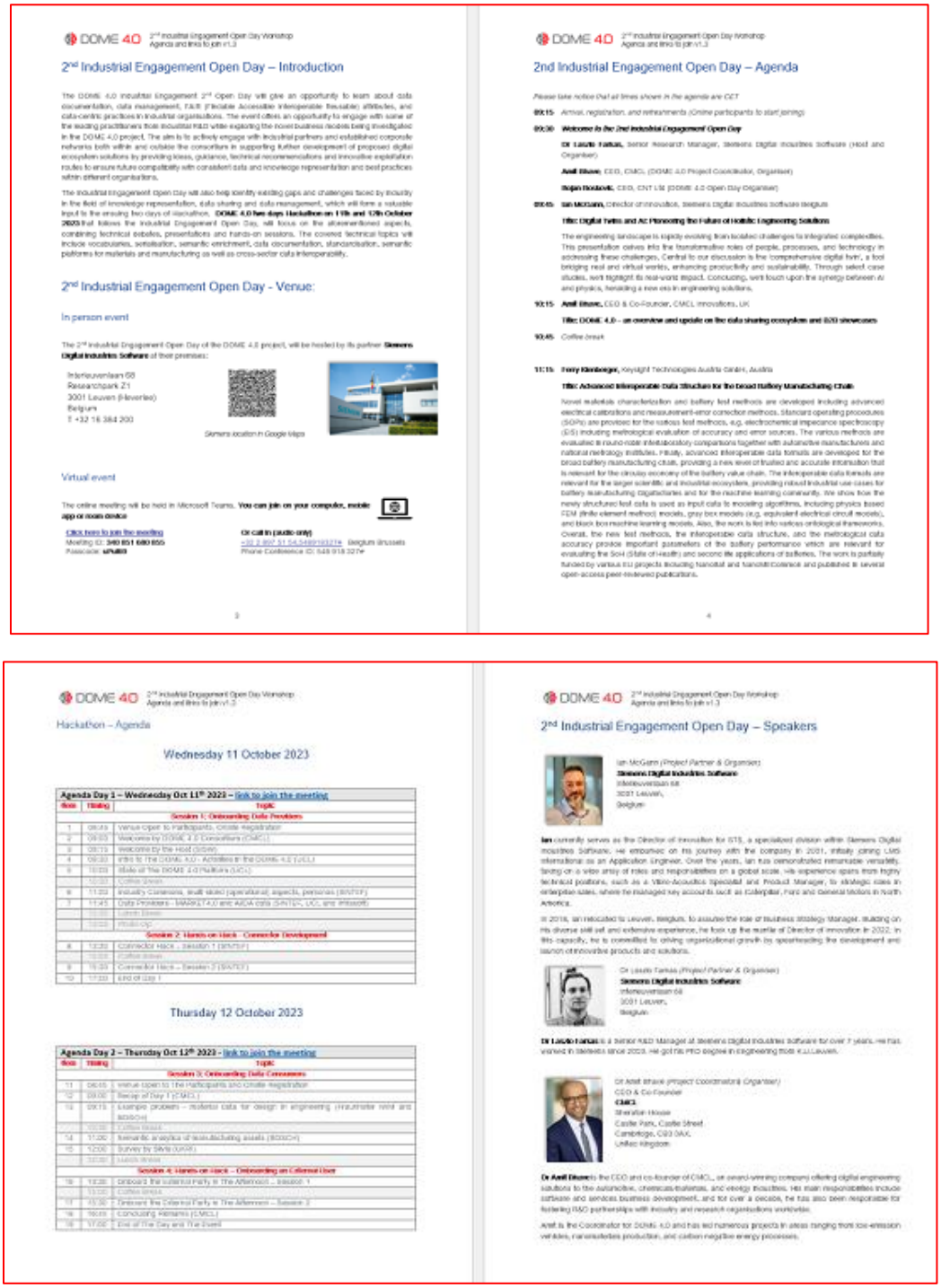


Figure 16 Sample pages of the final agenda (2nd Industrial Engagement)

The 2nd Industrial Engagement and Hackathon were advertised on the project website, on a dedicated page for these events, accessible through the homepage.

Figure 17 Homepage

Figure 18 Industrial Engagement web page

3.1 Industrial Engagement Open Day Workshop 2 - Agenda

09:15 *Arrival, registration, and refreshments (Online participants to start joining)*

09:30 ***Welcome to the 2nd Industrial Engagement Open Day***

Dr Laszlo Farkas, Senior Research Manager, Siemens Digital Industries Software (Host and Organiser)

Amit Bhave, CEO, CMCL (DOME 4.0 Project Coordinator, Organiser)

Bojan Boskovic, CEO, CNT Ltd (DOME 4.0 Open Day Organiser)

09:45 **Ian McGann,** Director of Innovation, Siemens Digital Industries Software Belgium

Title: Digital Twins and AI: Pioneering the Future of Holistic Engineering Solutions

The engineering landscape is rapidly evolving from isolated challenges to integrated complexities. This presentation delves into the transformative roles of people, processes, and technology in addressing these challenges. Central to our discussion is the 'comprehensive digital twin', a tool bridging real and virtual worlds, enhancing productivity and sustainability. Through select case studies, we'll highlight its real-world impact. Concluding, we'll touch upon the synergy between AI and physics, heralding a new era in engineering solutions.

10:15 **Amit Bhave,** CEO & Co-Founder, CMCL Innovations, UK

Title: DOME 4.0 – an overview and update on the data sharing ecosystem and B2B showcases

10:45 *Coffee break*

11:15 **Ferry Kienberger,** Keysight Technologies Austria GmbH, Austria

Title: Advanced Interoperable Data Structure for the broad Battery Manufacturing Chain

Novel materials characterization and battery test methods are developed including advanced electrical calibrations and measurement-error correction methods. Standard operating procedures (SOPs) are provided for the various test methods, e.g. electrochemical impedance spectroscopy (EIS) including metrological evaluation of accuracy and error sources. The various methods are evaluated in round-robin interlaboratory comparisons together with automotive manufacturers and national metrology institutes. Finally, advanced interoperable data formats are developed for the broad battery manufacturing chain, providing a new level of trusted and accurate information that is relevant for the circulay economy of the battery value chain. The interoperable data formats are relevant for the larger scientific and industrial ecosystem, providing robust industrial use cases for battery manufacturing Gigafactories and for the machine learning community. We show how the newly structured test data is used as input data to modeling algorithms, including physics based FEM (finite element method) models, gray box models (e.g. equivalent electrical circuit models), and black box machine learning models. Also,

the work is fed into various ontological frameworks. Overall, the new test methods, the interoperable data structure, and the metrological data accuracy provide important parameters of the battery performance which are relevant for evaluating the SoH (State of Health) and second life applications of batteries. The work is partially funded by various EU projects including NanoBat and NanoMECommon and published in several open-access peer-reviewed publications.

11:45 **Ennio Capria**, European Synchrotron (ESRF), France (online)

Title: Advancing Industrial Research with Fast-Track Services: A Game Changer for Innovation

In recent years, the European Synchrotron Radiation Facility (ESRF) has embarked on a pioneering journey towards the development of fast-track services under the aegis of the EU-funded initiative, Streamline. These innovative services stand poised to revolutionize the landscape of scientific research and industrial applications. This talk presents an overview of these cutting-edge services and their profound implications for various sectors.

The advent of fast-track services at ESRF holds immense promise for the user community by providing affordable and efficient access to high-throughput data acquisition within an expedited timeframe. In the era of Industry 4.0, the ability to acquire statistically significant information from extensive data sets in a cost-effective and time-efficient manner is invaluable. This paradigm shift has the potential to drive transformative changes in the fields of chemistry and pharmaceuticals, particularly in the domain of new compound discovery. Additionally, industries such as catalysis, battery development, and metallurgy stand to benefit significantly from these services, as they enable accelerated research and development cycles. Finally, the massive amount of data collected can be used to feed relevant modelling software to progress with the definition of the digital twins, so important to address the challenges of the coming industry 5.0.

Moreover, the application of fast-track services extends to critical sectors like mining and environmental assessment, where the rapid mapping and evaluation of large-scale data sets can revolutionize decision-making processes. The synergy between synchrotron-based techniques and these services accelerates the pace of data collection, empowering researchers and stakeholders to make informed choices in real-time.

12:15 *Group photo of participants*

12:30 Lunch break

13:30 **Francesco Campagno**, Bosch, Germany

Title: Semantic Digital Twins for Smart Manufacturing

14:00 **Fabrizio Preda**, CEO, NIREOS, Italy (online)

Title: A novel spectroscopy tool for a seamless integration of experiments and simulations

COBRAMM is a versatile framework designed for computational (photo)chemistry simulations. It facilitates the study of ground and excited-state electronic structures, molecular dynamics, and chemical reactions in complex environments, particularly focusing on the interaction between

photo-responsive molecules and light. To bridge the gap between academic research and industrial application, COBRAMM is being integrated into the SimDOME OSP platform. This integration aims to make COBRAMM accessible to third parties, providing industry-ready software solutions and fostering collaboration between academia and industry.

NIREOS, a small and medium-sized enterprise (SME), plays a pivotal role in facilitating the exploitation of COBRAMM's potential for practical applications. NIREOS specializes in developing and commercializing innovative spectroscopic hardware, utilizing patented optical technologies for molecular and solid-state system characterization with high sensitivity. By integrating COBRAMM with NIREOS' experimental tools, a unique synergy is achieved. This integration allows, on the one hand, a straightforward interpretation of experimental data and assignment of the optical signals to molecular properties of direct interest to the industrial end user. On the other hand, comparison with experiments will enable to validate the theoretical model and/or improve it by integrating experimental parameters in the simulations. This innovative approach significantly reduces the barriers for non-expert industrial users to model complex molecular systems, offering a robust and user-friendly platform for simultaneous experimental and computational investigations, a feature currently unmatched by any optical spectroscopy instrument on the market.

14:30 **Mirko Orsini,** CEO, DataRiver, Italy *(online)*

Title: Big Data integration & analytics solutions to create value from company data

During the talk, innovative technologies developed by DataRiver for semantic integration and analysis of Big Data and their application in several success stories for companies from different industries will be presented.

15:00 *Coffee break*

15:30 **Davide Di Stefano,** Ansys, UK

Title: MUSICODE: Open Innovation Platform for Materials Modelling

MUSICODE is an H2020 project with the ambitious goal of developing an Open Innovation Platform to facilitate material design and expedite the manufacturing process and device optimization for Organic Electronics. Within the project Ansys coordinates the development of the Open Innovation Platform itself. This is a modular and flexible framework which combines workflow editors, data and knowledge management, and simulations orchestration tools. In this talk, we will present and discuss the architecture and key components of the platform in its current implementation.

16:00 TBC, International Data Spaces Association (IDSA), Germany

Title: International Data Spaces for Data Sharing and Data Sovereignty

16:30 Interactive Panel discussion

Panel Chairman: **Ian McGann**, Siemens Digital Industries Software

Moderator: **Bojan Boskovic,** Cambridge Nanomaterials Technology Ltd, UK

Panellists: **Amit Bhave,** CMCL Innovations

Ferry Kienberger, Keysight Technologies Austria

Ennio Capria, European Synchrotron (ESRF)

Fabrizio Preda, NIREOS

Mirko Orsini, DataRiver

Davide Di Stefano. Ansys

17:00 Conclusions

17:15 Networking and Wrap-up

3.2 Industrial Engagement Open Day Workshop 2 – Speakers

Ian McGann *(Project Partner & Organiser)*
Siemens Digital Industries Software
Interleuvenlaan 68
3001 Leuven,
Belgium

Ian currently serves as the Director of Innovation for STS, a specialized division within Siemens Digital Industries Software. He embarked on his journey with the company in 2001, initially joining LMS International as an Application Engineer. Over the years, Ian has demonstrated remarkable versatility, taking on a wide array of roles and responsibilities on a global scale. His experience spans from highly technical positions, such as a Vibro-Acoustics Specialist and Product Manager, to strategic roles in enterprise sales, where he managed key accounts such as Caterpillar, Ford and General Motors in North America.

In 2018, Ian relocated to Leuven, Belgium, to assume the role of Business Strategy Manager. Building on his diverse skill set and extensive experience, he took up the mantle of Director of Innovation in 2022. In this capacity, he is committed to driving organizational growth by spearheading the development and launch of innovative products and solutions.

Dr Laszlo Farkas *(Project Partner & Organiser)*
Siemens Digital Industries Software
Interleuvenlaan 68
3001 Leuven,
Belgium

Dr Laszlo Farkas is a Senior R&D Manager at Siemens Digital Industries Software for over 7 years. He has worked in Siemens since 2003. He got his PhD degree in Engineering from K.U.Leuven.

Dr Amit Bhave *(Project Coordinator& Organiser)*
CEO & Co-Founder
CMCL
Sheraton House
Castle Park, Castle Street
Cambridge, CB3 0AX,
United Kingdom

Dr Amit Bhave is the CEO and co-founder of CMCL, an award-winning company offering digital engineering solutions to the automotive, chemicals/materials, and energy industries. His main responsibilities include software and services business development, and for over a decade, he has also been responsible for fostering R&D partnerships with industry and research organisations worldwide.

Amit is the Coordinator for DOME 4.0 and has led numerous projects in areas ranging from low-emission vehicles, nanomaterials production, and carbon-negative energy processes.

He is a Chemical Engineer by profession (PhD, University of Cambridge) and trained in technology enterprise management (London Business School). He is also an Associate at Hughes Hall, and has over 40 peer-reviewed technical publications.

Dr Bojan Boskovic *(Project Partner & Organiser)*
CEO,
Cambridge Nanomaterials Technology
14 Orchard Way
Lower Cambourne
Cambridge CB23 5BN - UK

Dr Bojan Boskovic is the Founder, Managing Director, and Principal Consultant of the company. He has more than 20 years of hands-on experience with carbon nanomaterials and composites from industry and academia in the UK and Europe. Previously, he worked as a R&D Manager at Nanocyl, one of leading carbon nanotube manufacturing companies in Europe. He also worked on carbon nanotube synthesis and applications as a Principal Engineer-Carbon Scientist at Meggitt Aircraft Braking Systems, as a Research Associate at the University of Cambridge, and as a Senior Specialist at Morgan Advanced Materials. During his PhD studies at the University of Surrey he invented low temperature synthesis method for production of carbon nanomaterials that has been used as a foundation patent for the start-up company Surrey Nanosystems. He was a member of the Steering and Review Group for the Mini-IGT in Nanotechnology that advised the UK Government on the first nanotechnology strategy policy document. Dr Boskovic was working as an advisor for the European Commission (EC) on Engineering and Upscaling Clustering and on setting up of the European Pilot Production Network (EPPN) and European Materials Charaterisation Cluster (EMCC). He has experience in exploitation and dissemination management on a number of FP7

and H2020 European projects, including UltraWire, NanoLeap, OYSTER, M3DLoC, Genesis, nTRACK, nanoMECommons, APOLO, Triankle, Carbo4Power, Repair3D, AM4BAT and DOME 4.0. Also, in UK Government InnovateUK funded projects, such as UltraMAT, GRAPHOSITE and HiBArFilm. He is also a leader of two private membership-based consortiums: Nano-Carbon Enhanced Materials (NCEM) and Advanced Materials for Additive Manufacturing (AMAM).

Dr Ferry Kienberger *(External Speaker)*
Keysight Technologies Austria GmbH
Austria

Dr Ferry Kienberger is Keysight Austria Country Manager and Keysight Labs Group leader on battery research since 2015. Prior to this he was Scientist at Agilent Technologies from 2007 to 2015. His university education includes a PhD in Technical Physics and the Habilitation in Nanotechnology, both at JKU Linz. The scientific track record includes 140+ scientific peer reviewed publications (including Nature Publishing Group, AAAS Science, PNAS USA, and IEEE Transactions) with an H-factor 41 and 5000+ citations; he supervised 10 PhD theses. He was coordinator and lead partner in 15+ EU projects for Keysight and Agilent, 7 national projects, 2 international projects, and 3 metrology EU projects. He serves as a vice-chair for the Horizon Europe program and is a former member of the OECD business and industry advisory council.

Dr Ennio Tito Capria *(External Speaker - online)*
Deputy Head of Business Development
European Synchrotron (ESRF),
France

Dr Ennio Tito Capria is the Deputy Head of Business Development at the ESRF. In his research career he worked on the development of electrochemical nanobiosensors, nanocomposites and optoelectronic devices and particularly their characterisation with synchrotron light. At the ESRF, he is coordinating the participation of the ESRF in various collaborative initiative with industry, in particular on energy storage applications, additive manufacturing methods and nano-sciences. Since 2020 Ennio is Director of the Characterisation programme of the Technological Research Institute Nanoelec.

Francesco Compagno *(Project Partner)*
Natural Language Processing and Neurosymbolic AI (CR/AIR3)
Robert Bosch GmbH
Postfach 10 60 50
70049 Stuttgart
GERMANY

Francesco Compagno is a research fellow at Bosch IA and an Industrial Ph.D. candidate at the Italian University of Trento. He is also a member of the Laboratory for Applied Ontology and has several years of experiences working with semantic technologies in both academia and industries.

Fabrizio Preda *(External Speaker - online)*
CEO
NIREOS
Milan, Lombardy,
Italy

Fabrizio Preda is the CEO & Founder of NIREOS. He has a degree from the Politecnico di Milano, in Master of Science - MS - Engineering Physics. He founded NIREOS in 2018.

Dr Mirko Orsini, CEO *(External Speaker - online)*
President, CEO
DataRiver
Milan, Lombardy,
Italy

Mirko Orsini, PhD is CEO of the innovative SME DataRiver, specialized in Big Data integration and analysis in industrial and clinical settings. He has coordinated several industrial research projects in Big Data and Industrial IoT for companies in the ceramic, logistics, biomedical and pharmaceutical sectors, and is DataRiver's representative in the European Big Data Value Association (BDVA), in the Competence Center Industry 4.0 BI-REX and in the Clust-ER Innovate of the Emilia Romagna Region.

Dr Davide Di Stefano *(External Speaker)*
Ansys UK
97 Jubilee Avenue,
Milton Park, Abingdon,
England, OX14 4RW

Dr Davide Di Stefano is a Senior R&D Project Manager at Ansys. He focuses on research projects related to Integrated Computational Materials Engineering (ICME) and material Informatics. Davide holds a PhD in physics and has extensive experience in computational material science and atomistic and mesoscale materials modelling and informatics, having worked on applications across various industries.

3.3 Industrial Engagement Open Day 2 – External participating organisations

3.3.1 Airbus

Web: www.airbus.com

Airbus is a global pioneer in the aerospace industry, operating in the commercial aircraft, helicopters, defence and space sectors. Airbus is a leader in designing, manufacturing and delivering aerospace products, services and solutions to customers on a worldwide scale. With around 130,000 employees and as the largest aeronautics and space company in Europe and a worldwide leader, Airbus is at the forefront of the aviation industry. We build the most innovative commercial aircraft and consistently capture about half of all commercial airliner orders. Thanks to our deep understanding of changing market needs, customer focus and technological innovation, we offer products that connect people and places via air and space.

3.3.2 European Synchrotron Radiation Facility – ESRF

Web: https://www.esrf.eu/

The ESRF is the world's most intense X-ray source and a centre of excellence for fundamental and innovation-driven research in condensed and living matter science. Located in Grenoble, France, the ESRF owes its success to the international cooperation of 22 partner nations, of which 13 are Members and 9 are Associates

3.3.3 NIREOS

Web: www.nireos.com

NIREOS is an innovative high-tech company based in Milan (Italy). NIREOS develops and manufactures high-performance devices for spectroscopy and machine vision. The product portfolio features hyperspectral cameras (in the visible and infrared range, HERA models), multispectral cameras, an ultra-compact interferometer for FT spectroscopy (GEMINI), and an amplified broadband photodetector (SPIDER). The solutions provided by NIREOS are employed in different applications in the scientific and in the industrial field, ranging from spectroscopy labs to the agri-food industry, from cultural heritage to plastic sorting, from remote sensing to biology, from microscopy to vegetation studies. NIREOS is known as a trusted partner offering high quality products and support.

3.3.4 DataRiver Srl

Web: www.datariver.it/en/

DataRiver Srl is an innovative SME accredited as an Industrial Research and Technology Transfer Laboratory of the Emilia Romagna Region, it is an Associate Member of the European Big Data Value Association (http://bdva.eu/associate-members) and one of the founding members of the Competence Center Industry 4.0 BI-REX (Big Data Innovation & Research Excellence) (https://bi-rex.it/en/).

DataRiver's mission is to enable companies to easily understand their data, optimizing production, decision-making and forecasting processes, developing innovative software solutions in the fields of Big Data Integration & Analytics, IoT, Industry 4.0, Artificial Intelligence and Machine Learning.

The company provides consultancy, design and development of web and mobile platforms for Business Analytics and semantic integration of heterogeneous data in distributed information sources, the creation of software applications for the collection, processing and display of data through dashboards with location intelligence functions, to provide the user with the best understanding and interpretation of the information collected, advanced interaction with users, data analysis through Artificial Intelligence and Machine Learning techniques.

With an experience of more than 15 years in Big Data Integration and Artificial Intelligence industrial research projects, DataRiver has activated collaborations with public administrations and major companies in the Ceramic, Mechanical, Logistics, Energy and Sustainability, Facility Management and Global Services, Biomedical and Pharmaceutical sectors.

3.3.5 Keysight Technologies GMBH

Web: https://www.keysight.com/zz/en/home.html

Keysight Technologies (Keysight) is the world's premier electronic measurement company with 13.500+ employees which generated revenues of $4.2B in fiscal year 2020. Keysight delivers advanced design and validation solutions that help accelerate innovation to connect and secure the world. Keysight's dedication to speed and precision extends to software-driven insights and analytics that bring tomorrow's technology products to market faster across the development lifecycle, in design simulation, prototype validation, automated software testing, manufacturing analysis, and network performance optimization and visibility in enterprise, service provider and cloud environments. Our customers span the worldwide communications and industrial ecosystems, aerospace and defense, automotive, energy, semiconductor and general electronics. Keysight offers a portfolio of different electronic measurement equipment, calibration devices, software packages, and data analytics, including high speed oscilloscopes and performance network analysers (PNA) that are in many aspects leading the edge on performance, speed, and sensitivity in the broad frequency spectrum. Recently, Keysight extended the automotive and battery division by adding automotive battery test systems on top of power supplies and source measurement units SMUs. Keysight aims to lead software and hardware development in energy storage and battery quality test via combined hardware and software algorithms for battery quality control, products and services to gigafactories. Hereby, Keysight is working on the development of impedance calibration and

high-throughput measurements, as well as the battery self-discharge methodology that improves cell production efficiency significantly.

3.3.6 Ansys Ltd,

Web: www.ansys.com/products/materials

Ansys Inc. Materials Business Unit has a core business for design and development of software products related to materials information management, data, and tools (eco-design, restricted substances, critical materials assessment, materials selection and substitution), several of which integrate with CAD/CAE/PLM. Granta contributes to networks and standardization bodies and supports a number of industry standard commercial databases for materials such as metals, composites, polymers, and medical devices. Granta also produces and maintains several leading data products including Materials Universe (a database of over 4,000 commercially available engineering materials including technical, ecological and cost attributes for each material and its associated processes) and the Product Risk database which incorporates one of the leading resources on restricted substances as well as critical and conflict minerals risks and data needed for streamlined life cycle analysis. Granta supports numerous collaborative projects by providing a centralized materials information management system for the project to enable the pooling and consolidation of project knowledge which would otherwise be dispersed amongst the partners, this approach enables standardization and capitalizes on the value in the project by avoiding duplication of effort and maximizing results visibility to partners and external stakeholders. Granta also has reach to over 1000 educational institutes world-wide via its education software, GRANTA EduPack, which translates materials research into data, information and teaching resources. The recent acquisition by ANSYS Inc. means that our materials and process data, software tools, and learning resources can reach an even greater audience for higher impact of collaborative project outcomes.

3.3.7 National Technical University of Athens (NTUA)

Web: http://nanolab.chemeng.ntua.gr/

National Technical University of Athens (NTUA) was founded in 1836 and is the oldest and most prestigious educational institution of Greece in the field of technology. Part of the NTUA School of Chemical Engineering (Department of Materials Science and Engineering) is the Research Unit of Advanced, Composite, Nano Materials & Nanotechnology (R-NanoLab), which was founded in 2007.

R-NanoLab has extensive experience in Designing, Production, and Characterization of Advanced-, Composite-, and Nano-Materials, specializing in the development of nanomaterials and (nano-) composites with tailored properties, and upscaling those processes using pilot lines. Furthermore, R-Nanolab is also involved in advanced materials characterisation including the development of tailored protocols for testing in nanoscale with nanoindentation. Cross-validation of characterization data is performed to adapt the relevant protocols to materials specific test cases, while Machine Learning is also used to support materials characterization activities and i) establish structure-property relations, ii)

support phase recognition, iii) perform failure prognosis, as well as iv) το provide implications for materials design and optimization. R-NanoLab has a strong presence in European Research Activities in Materials Science, through participation in numerous EU and national funded projects.

3.3.8 MBN Nanomaterialia

Web: www.mbn.it/en

Research & development is the center of **MBN Nanomaterialia** activity program aimed to the materials and processes evolution. MBN Nanomaterialia collaborates actively with industrial and academic world, favoring knowledge transferring from laboratory to the market. Our Work Team is constituted by a group of young and dynamic specialists in the technological and scientific fields having competences in materials, chemical and mechanical engineering. Commercial assistance and technical service is managed by qualified technical personnel able to answer to customer needs and to support them in their development activities.

3.3.9 BI-REX

Web: www.bi-rex.it/en

BI-REX is one of the 8 Italian Competence Centers funded by the Italian Ministry of the Economic Development within the Industry 4.0 National Plan and our main focus is on Big Data.

Our public-private Consortium, born in 2018, has its headquarter in Bologna (Italy) and gathers in partnership 60 players among Universities, Research Centers and Companies of excellence in order to assist businesses, in particular SMEs, through a varied series of services: from consultancy to technology assessment, from design to validation of innovative solutions, from orientation to training, up to the Pilot Plant.

Our Consortium is configured as a highly specialized Competence Center, constituted according to the modalities established by Italian Ministry of Economic Development in conjunction with Italian Ministry of Economy and Finance.

3.3.10 Novartis Pharma (CH)

Web: www.novartis.com

Novartis is reimagining medicine to improve and extend people's lives. As a leading global medicines company, we use innovative science and digital technologies to create transformative treatments in areas of great medical need. In our quest to find new medicines, we consistently rank among the world's top companies investing in research and development. Novartis products reach nearly 1 billion people globally

and we are finding innovative ways to expand access to our latest treatments. About 125 000 people of more than 140 nationalities work at Novartis around the world.

3.3.11 VECV

Web: www.vecv.in

VE Commercial Vehicles Limited (VECV) is a joint venture between the Volvo Group and Eicher Motors Limited. In operation since July 2008, VECV is multi-brand, multi-division company comprising of a complete range of Eicher Trucks and Buses, Volvo Buses, exclusive distribution of Volvo Trucks in India, engine manufacturing and export hub for Volvo Group, non-automotive engines and Eicher component business. VECV is also constantly introducing innovative technologies & services, through 9 manufacturing facilities spread across India, supported by a strong dealership network of over 800+ outlets. The company is exporting to over 34 countries and is being recognized as an industry leader in driving modernization in commercial transportation in India and the developing world.

3.3.12 International Data Spaces Association (IDSA)

Web: https://internationaldataspaces.org/

The **International Data Spaces Association (IDSA)** is a coalition of more than 140 member companies from 28 countries that share the vision of a world where all companies self-determine data usage rules and realize the full value of their data in secure, trusted, equal partnerships. And we are making that vision a reality.

Our goal is nothing less than a global standard for sovereign data spaces and interfaces, as well as fostering the related technologies and business models that will drive the data economy of the future across industries.

3.3.13 The Innovation Loop

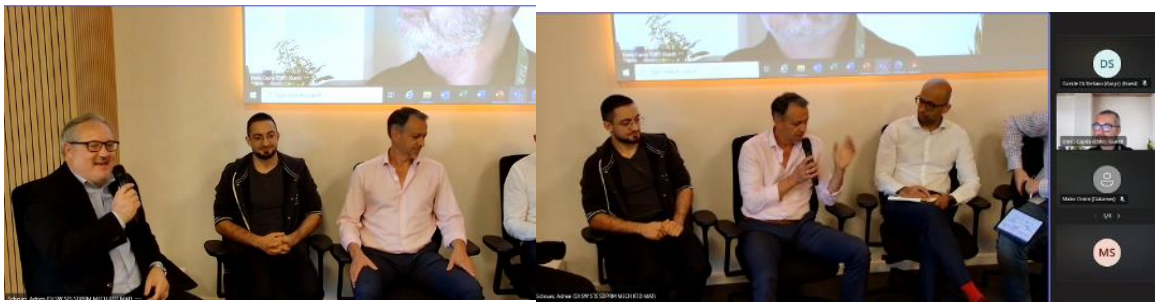
Web: www.theinnovationloop.eu/

The Innovation Loop ***is the first AI-platform for the design and financing of innovation projects***! We are committed to ensuring that innovative projects develop their full potential. Innoloop is here to help you change the world with your innovation.

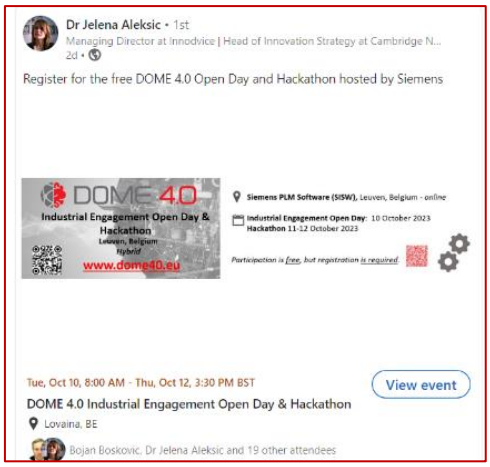
3.4 Industrial Engagement Open Day Workshop 2 – Annexes

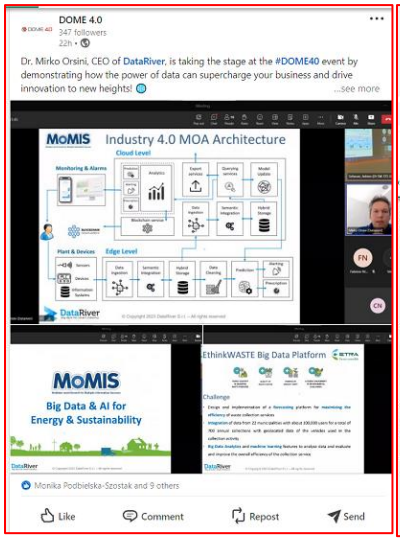
3.4.1 Screenshots and photos of the event

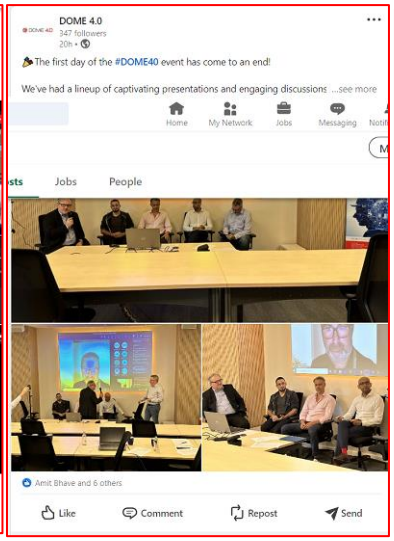
Interactive Panel discussion

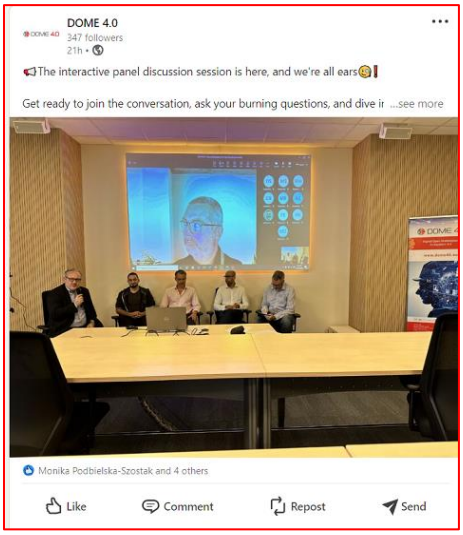


3.4.2 Samples of Social Media posts from DOME-4.0 partners related to the 2nd Industrial Engagement Workshop









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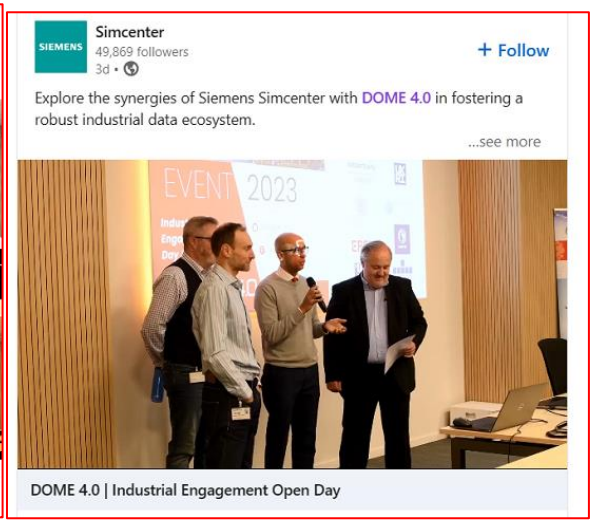
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4. Conclusions / Next steps

The DOME 4.0 project had two Industrial Engagement Open Days, one in Bologna and another Leuven. These Open Days aimed to facilitate the understanding and learning about standard data handling and data management practices. They have opened the doors to discussions on how to develop compatibility between proposed data management solutions in the project with already existing data management practices in the industry.

The Industrial Engagement Open Days facilitated the engagement of industrial partners and established corporate networks both within and outside of the consortium, by providing confidential and comfortable space to discuss and express their views and ideas.

Direct feedback from industry is necessary for the development of data market, and further engagement with industry is recommended.

5. Lessons learnt

Based on the discussions during the two Industrial Engagement Open Days, has been identified that the main focus for industrial participants was data security, quality and integrity.

Some industrial workshop participants are interested in being data providers on the market; however, it is clear that industrial companies are very much interested into being data end-users.

Industrial engagement and direct feedback are necessary on development of data market. Further, constant and direct engagement with industry is recommended.

6. Deviations from Annex 1

No deviations from Annex 1 of the GA.

7. Acknowledgement

The author(s) would like to thank the partners in the project for their organizational support with the 1st IEOD (UNIBO, CMCL & INTRA) and the 2nd IEOD (SISW, CMCL & INTRA)

Project partners:

#	Type	Partner	Partner full name
1	**SME**	**CMCL**	**Computational Modelling Cambridge Limited**
2	Research	FHG	Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung E.V.
3	**Research**	**INTRA**	**Intrasoft International SA**
4	**University**	**UNIBO**	**Alma Mater Studiorum – Universita di Bologna**
5	University	EPFL	Ecole Polytechnique Federale de Lausanne
6	Research	UKRI	United Kingdom Research and Innovation
7	**Large Industry**	**SISW**	**Siemens Industry Software NV**
8	Large Industry	BOSCH	Robert Bosch GmbH
9	SME	UNR	Uniresearch B.V.
10	Research	SINTEF	SINTEF AS
11	SME	CNT	Cambridge Nanomaterials Technology LTD
12	University	UCL	University College London

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8. Table of Abbreviations

Abbreviation	Explanation
IEOD	Industrial Engagement Open Day
CNT	Cambridge Nanomaterials Technology Ltd.
SISW	Siemens PLM Software-
UNIBO	Alma Mater Studiorum – Universita di Bologna
CMCL	Computational Modelling Cambridge Limited