



Open characterisation and modelling environment to drive innovation in advanced nano-architected and bio-inspired hard/soft interfaces

OYSTER Open Day 2019 Workshop

Preliminary agenda v2.2

Date: 28th November 2019

Venue: CDMA Building
A Mondrian
Rue du Champ de Mars 21
1050 - Ixelles / Elsene,
Brussels

www.oyster-project.eu



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Oyster Open Day 2019

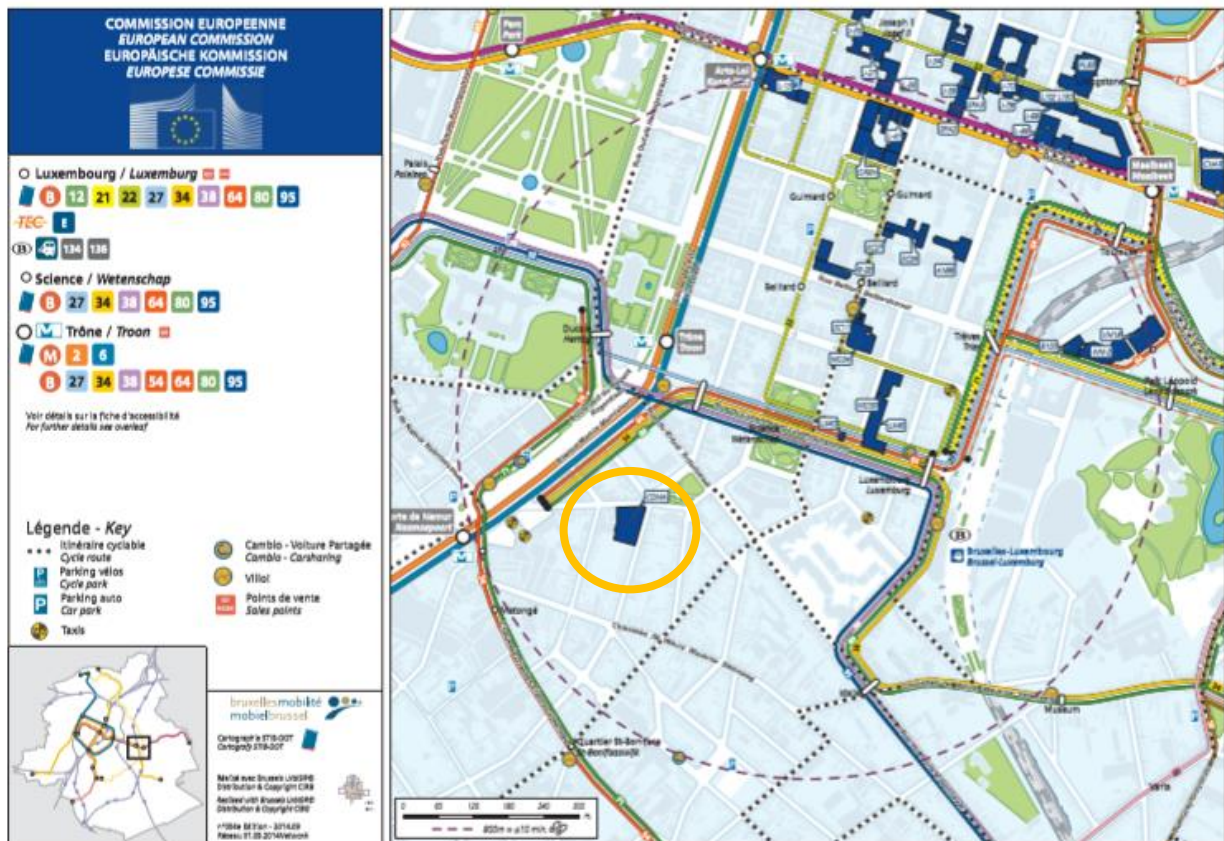
The **Oyster Open Day 2019 Workshop** is being held at the European Commission at:

CDMA Building, room-1 SDR1.

A Mondrian
Rue du Champ de Mars 21
1050 - Ixelles / Elsene,
Brussels



Please see below the information provided by the European Commission regarding transport to their offices. The venues have been marked in **black** (M24) and **orange** (Open Day) on the map, for your convenience.



Agenda OYSTER Project Open Day

Oyster Project Overview:

OYSTER Open characterisation and modelling environment to drive innovation in advanced nano-architected and bio-inspired hard/soft interfaces

- **OYSTER** uses contact mechanics to bridge adhesion data at multiple length scales and link interfacial adhesion to physicochemical properties.
- **OYSTER** brings Europe's first-class laboratories and SMEs to take existing nanoscale characterisation technologies towards widespread utilisation in process optimisation and model validation.
- **OYSTER** achieves this by sharing metadata in an Open Innovation Environment (OIE), where new paradigms of multi-scale contact mechanics are validated on selected application oriented reference materials through continuous interaction with the European Materials Characterisation Council (EMCC).

08:45 *Arrival and registration*

09:00 **Welcome and Oyster Open Day Introduction**

Bojan Boskovic, Managing Director, Cambridge Nanomaterials Technology Ltd (CNT)
Oyster Project Open Day 2019 Organiser

09:10 **Welcome and Characterisation Project Landscape**

Yanaris Ortega-García, Policy and Project Monitor Officer, Materials for Tomorrow,
European Commission

09:30 **Overview of the Oyster Project**

Marco Sebastiani, Project Coordinator, University "Roma Tre", Italy

Title: OYSTER - Open characterisation and modelling environment to drive innovation in advanced nano-architected and bio-inspired hard/soft interfaces

A failure to quantitatively control adhesion costs billions of euros each year in failed components, suboptimal product performance and life-threatening infections. Nano-enabled, bio-inspired products offer practical solutions to overcome adhesion and friction problems in these application areas. Current tools and methodologies, however, have so far failed to produce any standardised interpretation of adhesion data linking nanoscale adhesion to the macroscopic data. The OYSTER project (<http://www.oyster-project.eu/>), which is formed by 15 members in 9 European countries from industry, research and academia and is funded by the European Union under the H2020 programme, uses contact mechanics to bridge adhesion data at multiple length scales and link interfacial adhesion to physicochemical properties. OYSTER brings Europe's first-class laboratories and SMEs to take existing nanoscale characterisation technologies towards widespread utilisation in process optimisation and model validation. OYSTER aims at achieving this by sharing metadata in an Open Innovation Environment, where new paradigms of multi-scale contact mechanics are validated on selected application-oriented reference materials through continuous interaction with the European Materials Characterisation Council (EMCC, <http://www.characterisation.eu/>). From an experimental point of view, OYSTER generates wider agreement over adhesion measurement protocols by multimodal Atomic Force Microscopy and high-speed nanoindentation. Focusing on the modelling work, different atomistic simulation protocols to compute the surface free energy of solid surface materials are compared. Precisely, by simulating a standard nano-indentation experimental measurement, and by studying the wetting properties at solid-liquid interfaces,

the work of adhesion and consequentially the surface free energy of the considered solid surfaces can be computed. The experimental and modelling characterisation of nano-patterned wear resistant surfaces and chemically/topologically functionalised soft contact lenses will show case nano-enabled products for significant market impact. In this way, OYSTER implements the triangle of modelling, characterisation and manufacturing to the wider context of industrial exploitation, specially through small and medium enterprises, stakeholders' networks such as EMCC, European Materials Modelling Councils (EMMC, <https://emmc.info/>) and European Pilot Project Network (EPPN, <https://www.eppnetwork.com/>), and international standard organisations.

09:50 Raphaël Guillemet, Thales, France

Nanostructured surfaces with both antireflective and superhydrophobic properties.

Thales Research and Technology has developed on the last ten years a strong background in the design and fabrication of nanostructured optical surfaces to synthesize various optical functions (antireflection, filtering, phase masking, angular scanning,...) on different substrates (fused silica, silicon,...). The anti-rain and even anti-mist behaviour of these nano-patterned surfaces has been already demonstrated. The presentation will focus on the different materials that can be processed at Thales, depending on the wavelength and the applications addressed, and on the observed superhydrophobic properties.

10:10 Marius Specht, Fraunhofer IWM, Germany

Title: Direct Laser Writing for Surface Structuring

10:30 *Coffee break*

10:50 Charles Clifford, National Physical Laboratory, UK

Title: From Collaborative Research to International Standards

International ISO standards can support legislation and regulation in nanotechnologies. In this presentation an overview of some of NPL's activities towards developing ISO standards in nanotechnologies will be outlined including those from the Oyster project. These include standards in terminology and measurement and characterisation as well as pre-normative interlaboratory studies under VAMAS. Case studies will be presented on i) graphene and related two dimensional materials, ii) surface chemistry and shell thickness of core-shell nanoparticles, iii) adhesion/surface free energy iv) nano-particle number concentration, (v) nanoparticle dispersion and vi) nanotechnologies in general.

11:10 Elias P. Koumoulos, IRES, Belgium

Title: DMP shifting from just a prerequisite in funded projects to a useful tool

11:30 David Cant, National Physical Laboratory, UK

Title: Surface Chemical Analysis of Nanostructured Materials

Nanomaterials of all types are a topic of great interest for a broad variety of applications in modern technology. These can range from such disparate fields as catalysis, where nanoparticles and nanostructured surfaces may be engineered for greater catalytic efficiency; photovoltaics and other optoelectronics, where effects such as band-gap tuneability and energy quantisation can lead to novel optoelectronic devices; through to medicine and biotechnology, where nanostructures may be used for highly-sensitive biosensors, or functionalised

nanoparticles are used for targeted drug delivery. For all nanomaterials, surface properties are of vital importance. The high surface-area-to-volume ratio that is inherent to nanoscale objects results in materials with behaviours that are almost entirely governed by the interactions of their surface. Surface chemical analysis techniques, such as x-ray photoelectron spectroscopy (XPS) are therefore of great use when characterising nanomaterials. However, such analysis is not always simple to perform and interpret, and the presence of nanoscale topography can complicate things further. The development of tools and methodologies for accurate, reproducible surface chemical analysis of nanostructured materials, and the advancement of standards within this area, are therefore crucial for the creation of novel technologies which efficiently utilise the benefits of nanomaterials.

11:50 Pietro Asinari, Politecnico Di Tonino, Italy

Title: Designing Low-Free-Energy Surfaces.

Low-free-energy surfaces have attracted an intense academic interest over the last decade. A reduction of the surface free energy (SFE), in fact, has found to enhance the self-cleaning, hydrophobic, and non-fouling properties which are highly desirable in several industrial applications. However, tuning the surface chemistry and topography to achieve tailored low-free-energy surfaces has been found extremely challenging. In this work we couple Molecular Dynamics simulations and contact angle experiments to suggest a standard framework for the surface free energy characterization. Specifically, the study case proposed in this contest allows to quantitatively distinguish the contribution of Perfluoro Decyl Acrylate (PFDA) coating, and hence the role of the surface chemistry, in the reduction of the surface free energy of a bare silicon sample. In addition simulations on PLGA coating are also shown. Beyond the specific case study, our results emphasize that the synergistic tuning of surface chemistry and texture is able to unveil the optimal pathway for designing low-free-energy surfaces.

12:10 Christian Bippes, NANOSURF, Switzerland

Title: ANA - A new system for automated AFM-based nanomechanical analysis

Studying the mechanical properties of specimens at the nanometer scale is of high interest in many research areas. In polymer sciences, for example, characterization of the Young's modulus distribution of polymer blends and the domain distribution are often of interest, as these contribute to the material properties. For polymeric surface coatings apart from the elastic modulus, also adhesive properties play a crucial role depending on the application. In life sciences, disease states might be associated with changes in the elastic properties of single cells but also tissues.

All these applications have in common that typically a large number of force-distance curves is required, either to gain a sufficient resolution or to simply have proper statistics from different areas for in depths analysis. Recording these force-distance curves manually is tedious and time-consuming. Thus, automated measurements on multiple areas of large or multiple samples along with an online analysis would facilitate recording of such data. With the ANA software, Nanosurf designed a software that is capable of automating such measurements in a easy-to-use manner, so that also non-expert users can obtain sufficient data for analysis. Moreover, the automation significantly reduces the time spent by the user in front of the system while recording data.

12:40 Discussion – EMCC role and related activities in Clustering Characterisation Projects and Supporting Collaboration

Discussion facilitated by: Bojan Boskovic

13:00 Lunch

14:00 Claude Becker, Molecular Plasma Group (Funcoats), Luxembourg

Title: Superhydrophobic surfaces achieved by soft atmospheric plasma polymerization: towards tunable wettability

Plasma polymer thin films are of great interest in surface engineering in a wide range of applications. However, all available technologies to achieve such surface modification are suffering from a lack of control in the plasma deposition conditions or are not adapted to industrial requirements in terms of cost and production yield. MPG (Molecular Plasma Group) company has developed an innovative deposition atmospheric plasma method, which can answer to all industrial criteria and could entirely fulfil their requirements. By using soft atmospheric plasma deposition conditions and by adapting these conditions to the use of suitable precursors [1], it appears possible not only to get a high retention of monomer functionalities but a polymerization close to conventional methods. Molecular investigation revealed the presence of polymeric moieties and the mechanism of plasma polymerization has been mainly based on the polymerization by activation of monomers specific chemical groups. This innovative plasma deposition technology affords not only to achieve high superhydrophobic surfaces (high contact angle values) but also to obtain a high control in the wetting regime (from Wenzel to Cassie-Baxter state) on any kinds of substrates. With Molecular Plasma technology, based on soft plasma polymerization method, we are able to control the wetting properties on a wide range of substrates, to immobilize numerous bio-molecules such as anti-bodies, DNA, proteins, peptides, etc. onto any substrate whilst keeping full bio-functionality. We can ensure perfect adhesion on the most inert substrates (Teflon, Carbon Fibre, Polyolefins, Titanium, ...) as well as on the most sensitive substrates (Natural Fibres, Cellulose, Ultra-thin Films, ...). And because we are able to use a wide range of chemistry, many more surface functionalities are possible such as UV Barrier performances, temperature-controlled and reversible bonding, Gas-sensing capabilities, Fire retardant capabilities.

14:20 Ehtsham-Ul Haq, University of Limerick, Ireland

Title: Contact Angle Measurements Challenges

Metrology, the science and act of measuring, is required not only from a technological confidence point of view but is also a market requirement and would become a legal and financial requirement for the products that would be sold in the market. Nanoscale metrology enabling quantitative determination of physical properties is key to engineer surfaces with control over chemical, mechanical, electrical, morphological and other functional properties. Recent advances in the laboratory-based characterization tools is key enabler in the growth of several industries, e.g. microelectronics, microsystem engineering, energy, photonics, tribology, tissue engineering and biomedical devices. Despite that, the contact mechanics related problems in nanoengineered materials with complex shape and geometries still hugely impact the products and their applications in industry. The current tools and methodologies have so far failed to produce any standardised interpretation of adhesion data linking nanoscale adhesion to the macroscopic data. The goal here to develop a standardised measurement protocol for atomic force microscopy (AFM) and contact angle for quantitative analysis of adhesion/surface free energy (SFE) and determine its viability as an approach and to assess whether models developed on reference surfaces such as mica and graphite could be extended to soft/hard surfaces. The approach is quite comprehensive on the subjects of contact angle and AFM, the enormity of these topics precludes a single source solution to the questions at hand. Contact angle measures average contact angle over a macroscopic scale using carefully selected test liquids. Even when the choice of liquids is appropriate, the calculated SFE of a solid is not an exact value. It rather depends on the liquids chosen for contact angle testing and theory chosen for data analysis. Therefore, it is improper to compare SFE values of two samples that are not determined with the same method. Similarly, atomic force spectroscopy can reliably measure nanoscale forces on the sample. However, the measured forces are then converted into work of adhesion and SFE using several contact mechanics models. The calculated SFE is highly dependent upon the mathematical models used to convert pull-off

force into SFE, contact radius between the probe and the sample as well SFE of the probe. Contact radius is dependent upon probe geometry while probe SFE is dependent upon probe chemistry which is difficult to characterize between probes, therefore quantitatively AFM data could have variations for different probes. Here, we present preliminary results on an alternative approach that compares pull-off forces with contact angle on standard samples to develop a calibration curve for each probe and then use specific calibration curve of the probe to calculate adhesion/SFE of the test samples. The methodology will be further extended to the acquisition [force-volume (FV) maps of 256×256 points, or more] and development analytical approaches to obtain consistent quantitative nanomechanical results from the raw data with analysis of individual force curves that can have very different shapes to get a complete picture at a nanoscale.

14:40 Marius Specht, Fraunhofer IWM, Germany

Title: Direct Laser Writing for Surface Structuring

15:00 *Coffee break*

15:20 Gerhard Goldbeck, Goldbeck Consulting Ltd, UK

Title: Towards standardisation of data documentation in the physical sciences: the European Materials & Modelling Ontology (EMMO) and its application in the Oyster project

The talk will introduce the key concepts underlying EMMO, in particular to outline its firm basis in physical sciences, for example the way in which a material property is linked both to the material itself, the measurement process that has been used and the natural laws and equations that are used in the derivation of the property value. Nanoindentation will be discussed as an example case.

15:40 Valeriia Kudriavtceva, Nanoforce Technology Limited, UK

Title: Biocompatible coating enabling drug eluting on demand

The combination of an efficient encapsulation method of small water-soluble substances with a stimuli-responsive release remains a challenging task. Targeted drug delivery systems (DDS) based on bioresorbable polymer materials for micro-package of bioactive agents have been developed. The proposed microchamber arrays system is a film of micron thickness with release-on-demand properties and multipurpose application including drug delivery from contact lenses, intraocular lenses and other implants. The method of fabrication is based on soft-lithography technique and allows obtaining microchamber arrays with an individual cargo capacity in the range of several picograms. The loaded substances could be released through polymer degradation and diffusion or external stimuli.

16:00 Eduard Piqueras – EURECAT Technology Centre - *Guest speaker*

Title: FormPlanet – Sheet metal forming testing hub

FormPlanet is one of European Union's Open Innovation Test Beds (OITBs) for characterization, aiming at increasing the productivity of the sheet metal forming industries through novel experimental and modelling methodologies to assure zero-defects production and optimize sheet material development, production and performance. FormPlanet develops unique testing methodologies for more accurate characterization and modelling for high strength sheet materials, processability and quality parts problems in the sheet manufacturing sector.

16:20 Ennio Tito CAPRIA, European Synchrotron (ESRF), France – *Guest speaker*

Title: Teesmat – Introduction and Overview of Activities

16:40 Welchy Leite Cavalcanti, Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Germany – **Guest speaker**

Title: Introduction to the VIMMP Project - VIRTUAL MATERIALS MARKETPLACE

VIMMP is a user-friendly digital marketplace that provides effective use of materials modelling by a wide range of stakeholders facilitating an accelerated speed of development and market deployment of new materials. VIMMP is a true “two sided” marketplace that promotes exchange between providers and consumers of products and services. The target is to promote easy access to state-of-the-art Software Simulation Tools for novel product developments. A remarkable component of VIMMP is the translation router for connecting users to experts called translators. With the guidance of the translators VIMMP will facilitate the translation of a scientific problem into modelling workflows ready for simulation using a range of software tools and VIMMP components. Among the main achievements of VIMMP at the current stage are the VIMMP ontologies, the development of translation router ontology driven, collection of stakeholders feedback for the business plan, data storage architecture of VIMMP including search and metadata ingest. This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 760907.

17:00 Ferry Kienberger, Keysight Labs, Austria – **Guest speaker**

Title: Introduction to MMAMA Project and Keysight activities

The MMAMA project objectives are focused in the triangle of manufacturing, modelling, and characterization to enhance the quality and control of nanomaterial based products. In particular, we focus on thin films, multi-layers, and heterogeneous materials of organic PV structures for solar technologies and composite structures for energy applications (electrode of batteries). The characterization technologies we use are microwave imaging methods operating at the nano-scale for lab characterization and macro-scale for in-line applications. Thereby, microwave (1-20 GHz) to mm-wave (30+ GHz) nondestructive testing and evaluation methods are established to determine electrical properties. There are six goals we pursue: 1. Development of Scanning Microwave Microscopy (SMM) technology, 2. Establishing SMM new calibration routines, 3. Establishing electromagnetic 3D models for advanced materials including modelling platform, 4. Validation of GHz characterisation technology through the fabrication and the characterisation of reference materials and structures. 5. Demonstration of multi-scale microwave imaging technologies at pilot scale for in-line and off-line production. 6. Development of standard operating procedures and implementation of open access environment.

17:20 Alberto Alberdi & Iban Quintana Fundación TEKNIKER, Spain – **Guest speakers**

Title: Introduction to i-TRIBOMAT Project - Intelligent Open Test Bed for Materials Tribological Characterisation Services

17:40 Closing remarks

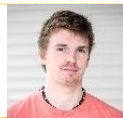
Note It is planned that all presentations would be followed by Q&A discussion. The organisers reserve the right to change the programme, speakers or venue should circumstances require. For any further enquires please do not hesitate to contact directly the **OYSTER Exploitation and Dissemination Manager** Dr Bojan Boskovic on info@oyster-project.eu or Bojan.Boskovic@CNT-Ltd.co.uk or on his mobile phone +447780874335.

OYSTER Open Day 2019 - Speakers

OYSTER Project Partners Speakers

	<p>Dr. Bojan Boskovic Cambridge Nanomaterials Technology Ltd UK</p>	
<p>Dr Bojan Boskovic 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,. 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 Characterisation 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 and nTRACK. Also in UK Government InnovateUK funded projects, such as UltraMAT and GRAPHOSITE He is also a leader of a private Nano-Carbon Enhanced Materials (NCEM) consortium</p>		
	<p>Dr. Eng. Marco Sebastiani University of Roma Tre Materials Science and Technology Italy</p>	
<p>Dr Marco Sebastiani PhD, is an assistant professor of Materials Science at the University of Rome "Roma Tre". His research is focused on surface engineering, micron-scale residual stress analysis and nano-mechanical testing of thin films and nanostructured materials. He is author of more than 85 papers on peer reviewed international journals.</p>		
	<p>Dr Raphaël Guillemet Thales Research & Technology France</p>	
<p>Dr Raphaël Guillemet, Ph.D. is Research Engineer at Thales Research & Technology. He started his carrier as engineer in the UMR CNRS/Thales lab, where he worked on AFM based current-controlled nano-indentation for nano-junctions fabrication, in the team of the 2007 Nobel Prize, Albert Fert. He received his PhD degree in Physics from ESIEE-Paris in 2012. He has now 10 years' experience on microfabrication and clean room processing and is involved in several thematics (superhydrophobic surfaces, 2D materials, RF-MEMS) as analysis engineer in the Laboratory for Technology and Advanced Characterization, within the Technology & Measure Group</p>		
	<p>Dr Charles Clifford National Physical Laboratory UK</p>	
<p>Dr Charles Clifford is a senior research scientist in the Surface Technology Group at the National Physical Laboratory, the UK's national metrology laboratory. He has extensive experience in international standardisation. He is UK head of delegation to ISO/TC229 (nanotechnologies), CEN TC 352 (European nanotechnologies) and IEC TC113 (electrotechnical nanotechnologies). He is also UK secretary to ISO TC201 (surface chemical analysis). He leads and participates in collaborative projects with a focus on nanomaterials and analysis at the nanoscale. He has a background in scanning probe microscopy.</p>		
	<p>Dr David Cant National Physical Laboratory UK</p>	
<p>Dr David Cant obtained his PhD from the University of Manchester 'NOWNANO' Centre for Doctoral Training for his thesis on the surface characterisation of nanoparticle films for use in photovoltaic applications. He joined the Surface Technologies group at NPL in 2015, where his work has focussed on the use of x-ray photoelectron spectroscopy for the measurement of nanoparticle and nanomaterial overlayers. This has included the development and application of models and techniques for characterisation of complex nanomaterial surfaces using XPS, running interlaboratory</p>		

studies on nanoparticle surface characterisation, and development of protocols and best practice around the preparation and handling of nanomaterial samples. He is also a nominated expert for the British Standards Institute on ISO Technical Committee 201 – Surface Chemical Analysis, in which he is directly involved in standardisation efforts for nanoparticle surface chemical analysis.



Dr Marius Specht
Fraunhofer IWM
Germany



Dr Marius Specht works at Fraunhofer IWM and got a PhD from the University of Freiburg (Germany).



Dr Christian Bippes
NANOSURF
Switzerland



Dr Christian Bippes studied biochemistry with a focus on biophysics before starting his Ph.D. studies at the Biotechnological Center of the Technical University of Dresden in 2004. From 2009 to 2013 Christian Bippes did postdoctoral studies at both the Biotechnological Center of the University of Dresden and the Basel-based Department of Biosystems Science and Engineering of the ETH Zürich. He joined Nanosurf in 2013 as application engineer. Throughout his Ph.D. and postdoctoral studies, research was focussed on high-resolution AFM imaging and AFM-based force spectroscopy analysis of biomolecules with a strong focus on membrane proteins.



Claude BECKER
Molecular Plasma Group (Funcoats)
Luxembourg



Dr Claude BECKER is a senior scientist with an expertise based on the elaboration, functionalisation and the characterization of thin layers and materials surfaces. Since more than 15 years working for LIST (Luxembourg Institute of Science and Technology) organization, his activities were focused on the development of innovative equipment/devices and methods dedicated to thin layers deposition and surfaces modification. In 2016 he has founded MPG (Molecular Plasma Group), a company based in Luxembourg, which delivers a unique surface functionalization technology enabling solutions such as: MolecularGrip[®] technology for adhesion improvement, biomolecules immobilization, superhydrophobicity and hydrophilicity, controlled release functionality oriented to aeronautic, automotive, electronic and packaging industries. He has an experience in consultancy in material science and project management.

Dr Pietro Asinari
Politecnico Di Tonino
Italy



POLITECNICO
DI TORINO

Dr Pietro Asinari received his B.S. and M.S. (cum laude) in Mechanical Engineering and his Ph.D. in Energetics. He is Full Professor of Heat and Mass Transfer and a member of the PhD Board in Energetics. Since 2002, he has (co-)authored over 90 publications in international journals. He is member of the Board of the European Materials Modeling Council. He won the ENI Award. Research fields: Heat Transfer; Transport theory; Kinetic modeling; Classical Molecular Dynamics; Thermodynamics; Numerical modelling and HPC. See publications on ResearchGate and Google Scholar



Dr. Ehtsham-ul Haq
University of Limerick
Ireland



UNIVERSITY of LIMERICK
OILESCOIL LUIMNIGH

Dr. Ehtsham-ul Haq is a Senior Research Fellow at the Department of Physics/Bernal Institute University of Limerick. Before his current role he was a Science Foundation Ireland/ Analog Devices International Industry Research Fellow at the Bernal Institute of University of Limerick. His expertise spans over preparation and characterization of materials for Biological, magnetic, optical and electrical sensors and devices. He has a track record in the development and extensive use of Atomic Force Microscope, Scanning Near field Optical Microscope and scanning tunnelling microscopy (STM) systems, and their applications to chemical and biological systems.



Dr Gerhard Goldbeck
Goldbeck Consulting Ltd
UK



Dr Gerhard Goldbeck is Executive Director of Goldbeck Consulting Ltd. He holds a Diplom in Physics from RWTH Aachen University and a PhD in Polymer Physics from Bristol University. His career encompassed research in solid state physics and polymer materials at Jülich, Bristol and Cambridge by means of a range of modelling and characterisation techniques, as well as software development, product management and marketing of materials

modelling software at Molecular Simulations/Accelrys/Biovia. In 2011 he formed Goldbeck Consulting Ltd with the aim to bridge gap in the materials modelling value chain from science to engineering and academia to industry. He is a member of the Management Board of the European Materials Characterisation Council and Executive Secretary of the European Materials Modelling Council.



Dr. Elias P. Koumoulos
IRES
Belgium



Dr. Elias P. Koumoulos holds a BSc in Chemical Engineering, followed by MSc in Materials Science and Technology and PhD in nanomechanics. To date, he has the authorship of over 70 published papers in ISI journals, 6 book chapters, 90 participations in national/international conferences, and has been thrice awarded for published research work in national and international level. Being occupied in EC and national funded projects, his interests include nanomaterials, nanomechanical properties of materials (metals, alloys, polymers, ceramics, functionally graded materials for brakes, thruster and valve applications, thin films, elastomers, packaging polymers), polymers (processing of plastics, forming, casting, films, biopolymers, petroleum products, environmental friendly processes), R&D, quality control, production process and design.



Valeriia Kudriavtceva
Nanoforce Technology Ltd.
UK



Valeriia Kudriavtceva is a PhD student in Queen Mary University of London and participant from Nanoforce Technology Limited the spin-off company at QMUL. Valeriia does research in Biomedical Materials.

OYSTER Guests speakers



Dr Yanaris Ortega-García,
European Commission
Brussels



Dr Yanaris Ortega-García is a Policy and Project Officer at Materials for Tomorrow at the European Commission. She completed her Physical Chemistry PhD from University of Seville in 2012. She has been working for more than 2 years for European Commission and prior to her role at the Commission, she had been working on the field of fuel cells and hydrogen production.



Dr Ennio Tito Capria - *Guest speaker*
European Synchrotron (ESRF),
France



Dr Ennio Tito Capria gained his PhD in Applied Physics at Cranfield University (UK). In his research career he has worked on the development of nanobiosensors and on nanocomposites. In 2011 Ennio joined Elettra where he worked on manufacturing of optoelectronic devices and particularly their characterisation with synchrotron light. In 2013 Ennio joined ESRF as the IRT NanoElec Industrial Liaison Engineer and in 2016 became the Deputy Head of the BDO.



Dr. Welch Leite Cavalcanti – *Guest speaker*
Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM
Germany



Dr. Welch Leite Cavalcanti is a theoretical physicist with strong background in computer simulations working in the “Applied Computational Chemistry” group at IFAM since 2008. Before joining IFAM, she worked as postdoc in computational science in the groups of Prof. Florian Müller-Plathe (Bremen and Darmstadt – 2003 to 2006) and Prof. Thomas Frauenheim (Bremen - 2006 to 2008). Besides her scientific activities on the computational modelling to investigate properties of polymeric materials, she has established and coordinated several ongoing collaborations and exchange programs in Europe, and between Europe and Brazil. She is active in international project management, and presently coordinates the H2020 project VIMMP (Grant no. 760907).



Dr Ferry Kienberger,
Keysight Labs Austria
Austria



Dr. Ferry Kienberger is Keysight Austria Country Manager and Keysight Labs Linz Group leader on nanotechnology and battery science since 2014. Prior to this he was Scientist at Agilent Technologies from 2007 - 2014. His University education includes a PhD in 2002 on Technical Physics and the Habilitation in Nanotechnology at JKU Linz in 2019. The scientific track record includes 100+ scientific peer reviewed publications (including Nature Publishing Group, AAAS Science, PNAS USA, and IEEE Transactions) with an H-factor 37 and 4000+ citations; he supervised 10 PhD theses. He was lead partner in 15+ EU projects (FP7 and H2020) for Keysight and Agilent, 7 national projects (FFG, CD-lab), 2 international projects (Economic Development Board EDB Singapore, and ATTRACT/CERN), and 3 EMPIR metrology EU projects. He serves as a vice-chair for the EU H2020 FET-Open and FET-Proactive program and is a for



Eduard Piqueras Jover
EURECAT – Technology Center
Spain



Eduard Piqueras Jover's background is in Industrial Engineering and project management of EU R&D projects. He has been involved in the coordination and management of European Research projects in the last 5 years in two different Technology centers. Prior to Eurecat, he has been working in the automotive industry and in the financial consulting in R&D and Innovation sector leading financial and technical management of national and international R&D projects and tasks of project analysis, protection, valorization of projects and commercialization within different industrial areas (process industry and manufacturing).

Eduard is the coordinator of the OITB for characterization of sheet metal materials "FormPlanet".



Alberto Alberdi.
Fundación TEKNIKER
Spain



Alberto Alberdi. Male, born in Eibar (SPAIN) on August 22nd 1957. Graduated in physics at the University of Valladolid in 1979 and Master in Metallurgy from the University of Navarra in 1983. He works for TEKNIKER since 1982. He has been Head of the Surface Engineering Lab of TEKNIKER (1989-2007) and Director of the Diagnostic and Technological Solutions Unit of this organization (2013-2016).

He has participated in about 40 research projects, mainly focused on Materials Science, Thin Coatings and Tribology. He has coordinated 4 European research projects, such as the FP5 research project "New Coating Materials for High Performance Cutting Tools (HIPERCUT)" G5RD-CT2000-00333; and the FP6 Integrated Project "Fullerene-based Opportunities for Robust Engineering: Making Optimised Surfaces for Tribology (FOREMOST)" NMP3-CT-2005-515840 (2005-2010). He is currently responsible for the work carried out by TEKNIKER in the i-TRIBOMAT project.



Dr. Iban Quintana
Fundación TEKNIKER
Spain



Dr. Iban Quintana (Male), obtained his Doctoral degree from Basque Country University (UPV - EHU) and Donostia International Physics Centre (DIPC) March 2007, working on the effect of temperature in the molecular dynamics of engineering thermoplastics. He joined TEKN in 2007, focusing his research activity on the material response to machining with pulsed laser with different pulse duration (fs, ps and μ s). During June -December 2007, he was a visitor researcher at Manufacturing Engineering Centre (MEC), Cardiff University, working on experimental and simulation aspects of laser micromachining with ps pulses. From 2011 to December 2016, he was the Head of the Ultra-Precision Processes Unit at IK4 - TEKNIKER, focussing the activity on developing high value – added products based on advanced micro-manufacturing technologies. In that period, his research group has participated in five European project funded by EU under the FP7, coordinating two of them (HINMICO: <http://hinmico.eu/> and NEURIMP: <http://neurimp.eu/>). From January 2017, he is in charge of the Advanced Material Group at the Physics of Surfaces and Materials Unit at IK4 – TEKNIKER. He is the author of 30 international publications.

Oyster Project Open Day 2019 – Partners

University of Roma Tre (*Project Coordinator*)

Web: phd.dimi.uniroma3.it



The Università degli Studi "Roma Tre" (**Roma Tre University**) has been established in 1991 and actually represents a central point of reference in the academic scenario at both local and national level hosting nearly 40000 students. The University has 12 Departments, 10 Libraries and 10 Centres and totals of about 970 teachers (553 professors I and II level, 353 research assistant professors and 36 language experts). Since its foundation, Roma Tre has paid a great importance to international cooperation, and it has been an active participant in the European Union exchange programs. Particularly, Roma Tre has taken part to the Erasmus program since 1993/1994. In the academic year 2002/2003, Roma Tre was awarded the Erasmus University Charter (EUC), thus obtaining the right to participate in the Erasmus Program. Roma Tre is involved, either as coordinator or partner, in about 78 International Research projects. In Oyster, the activity of UNIROMA3 team will be conducted by the Materials Science and Technology (STM) group, which is part of the Engineering department. The STM group has a consolidated experience in the field of advanced characterization of bulk materials and thin films, through the use of high-resolution microscopy, (TEM, FIB/SEM and AFM), nanoindentation (four different heads available, including the novel high-speed heads), nano-scratch testing and micro-tribological. The group is composed by four staff units (one full professor, two assistant professors and one senior technician) and a team, financed mainly through research projects, composed of about 6 unities with the following profiles: two fellowship researchers, three doctoral students and one person with technical-administrative role. The research group is deeply involved in the activities of the European Materials Characterisation Council (EMCC), and has already successfully completed a large European project as a coordinator (www.istress.eu).

National Technical University of Athens

Web: www.ntua.gr/en



The National Technical University of Athens, sometimes known as Athens Polytechnic, is among the oldest higher education institutions of Greece and the most prestigious among engineering schools. It is named Metsovio in honor of its benefactors Nikolaos Stournaris, Eleni Tositsa, Michail Tositsas and Georgios Averoff, whose origin is from the town of Metsovo in Epirus. It was founded in 1837 as a part-time vocational school named Royal School of Arts which, as its role in the technical development of the fledgling state grew, developed into Greece's sole institution providing engineering degrees up until the 1950s, when polytechnics were established outside Athens.

Thales Group

Web: www.thalesgroup.com



Thales is a world leader for mission critical information systems, with activities in 3 core businesses: aerospace (with all major aircraft manufacturers as customers), defence, and security (including ground transportation solutions). It employs 68000 people worldwide (50 countries). It provides its customers with all the key functions in the critical information loop, from detection and processing to transmission and distribution. **Thales Research & Technology (TRT)** comprises five research entities in France, the UK, the Netherlands, Canada and Singapore, as well as laboratories managed jointly by corporate research and Group subsidiaries and a network of research departments in operating units. TRT research comes under three main headings: Hardware systems and components research is mainly conducted by TRT France; Software technology research; Software system research. **Thales Research and Technology - France (TRT-Fr)** located near Paris, is the main multidisciplinary research unit of

the Thales group. Through its internal activities and scientific links with industries and universities, either in France or internationally, TRT-Fr is participating in the preparation of Thales industrial future in strategic R&D fields. In addition to R&D activities, TRT-Fr also provides scientific and technical advice, expertise or services for the company.

National Physical Laboratory

Web: www.npl.co.uk



The National Physical Laboratory (NPL) is the UK's National Measurement Institute, providing the measurement capability that underpins the UK's prosperity and quality of life. From new antibiotics to tackle resistance and more effective cancer treatments, to unhackable quantum communications and superfast 5G, technological advances must be built on a foundation of reliable measurement to succeed. Building on over a century's worth of expertise, our science, engineering and technology provides this foundation and helps to make the impossible possible. We save lives, protect the environment and enable citizens to feel safe and secure, as well as support international trade and commercial innovation. As a national laboratory, our advice is always impartial and independent, meaning consumers, investors, policymakers and entrepreneurs can always rely on the work we do. Based in Teddington, south-west London, NPL employs over 500 scientists and is home to 388 of the world's most extensive and sophisticated laboratories. NPL also has regional bases across the UK, including at the University of Surrey, the University of Strathclyde, the University of Cambridge and the University of Huddersfield's 3M Buckley Innovation Centre.

Cambridge Nanomaterials Technology Ltd

Web: www.cnt-ltd.co.uk



Cambridge Nanomaterials Technology (CNT) Ltd is an innovation management and nanotechnology consulting company based in Cambridge, UK. It is closely linked with a sister company in Brussels, CNT Innovation (www.cnt-innovation.be). The CNT Ltd helps companies, academic and government institutions to develop world-class innovative solutions for nanomaterials related R&D and IPR strategy, partnership, products, technologies, funding and markets. CNT Ltd is specialised in carbon nanomaterials R&D consulting and collaborative R&D project management, including exploitation and dissemination management, consortium and supply chain building. CNT has done a number of patent landscaping and market research analysis studies regarding production and use of various nanomaterials helping to link inventors and technology developers with end-users and investors. The CNT Ltd is a leader of two private membership based consortiums: Nano-Carbon Enhanced Materials (NCEM) and the new Advanced Materials for Additive Manufacturing (AMAM) with members coming from leading multinational companies and research institutions.

IRES

Web: innovation-res.eu



IRES, an R&D consulting company founded in 2015, is dedicated to new and innovative nanotechnology solutions. Headquartered in Brussels (Belgium), IRES is a team of key collaborators that provide supporting services such as IP, market research, environmental solutions and marketing advice. Our mission is to deliver to our customers world-class innovative solutions for development of materials based products. Customised and tailored solutions on demand, often in tool form, successfully identify possible business risks and provide sustainable directions. For this, the whole lifecycle of products is considered, through a holistic evaluation of social, environmental and economic aspects based on EU standards and regulations. IRES in collaboration with external bodies and related initiatives, is part of new technological events, arising innovative technologies and strategic research trends.

Fraunhofer IWM

Web: www.fraunhofer.de/en.html
www.iwm.fraunhofer.de



Fraunhofer is Europe's largest application-oriented research organization. It comprises 66 institutes at 43 different locations within Germany as well as remote research centres and representative offices in Europe, USA and Asia. The **FRAUNHOFER Institute for Mechanics of Materials (Fraunhofer)**, Freiburg is a leading research centre in the experimental and theoretical characterization of material properties. The institute combines know-how and experience in all fields of materials technology and materials science. Within the scope of Materials Design, Manufacturing Processes, Tribology, Component Safety and Lightweight Construction and Assessment of Materials, Lifetime Concepts we offer clients and project partners individual solutions, unexpected insights and immediately actionable results for the development, production and application of functional materials, high-performance components and resource efficient manufacturing processes.

Molecular Plasma Group (FUNCOATS)

Web: www.funcoats.com
www.molecularplasmagroup.com



FUNCOATS which belongs to MPG (Molecular Plasma Group) develops atmospheric plasma treatments, enables dedicated chemical functionalization of any substrate (plastics, glass, metal, composites, textile, etc.). Almost any chemical precursors can be grafted/coated onto a substrate in order to create a desired surface function. Funcoats finally provides industries with nanocoatings production methods to achieve surface functionalizations such as, superhydrophobic and oleophobic properties, adhesion enhancements, or bioactivities properties. FUNCOATS develops and distributes adapted solutions to various industrial specific requirements regarding surfaces modification and functionalization to control surfaces properties of a wide range of substrates (polymers, metals, ceramics, composites, textile, etc...). For example, our eco-friendly superhydrophobic nano-coating (LEAF TECHNOLOGY[®]) can be used for answering to various properties on 2D and 3D parts such as, anti-wetting, self-cleaning, anticorrosion, anti-condensation and anti-icing, antibacterial, anti-biofouling, etc. FUNCOATS succeeds in providing a durable and versatile superhydrophobic solution suitable with the most extreme conditions encountered in Building or Transport activities such as Aerospace, Automotive, Rail- ways, and Navy applications.

Goldbeck Consultancy Ltd

Web: materialsmodelling.com



Goldbeck Consultancy supports a wide range of aspects in the science to engineering, academia to industry spectrum of materials modelling: Multiscale materials modelling integration across science and engineering; Translation, guidance and coaching for using materials modelling in R&D projects; Economic impact analysis; Training; Product management, marketing and business development for science and engineering software; Software commercialisation strategies and planning: from academia to business; EU project proposal writing, team building, project management and monitoring.

NANOforce

Web: www.nanoforce.co.uk



Nanoforce Technology Limited was established in 2005, it is an open-door industry-facing research and development company committed to delivering state of the art material solutions based on advanced processing technologies. Nanoforce aims to enhance the quality and performance of customers' products by providing technical solutions in competitive timescales. It is driving innovation in the advanced materials sector through continuous development of industry-leading expertise, high

value added products and integrated services. Nanoforce consists of a team of experienced professionals specialising in high performance ceramics, advanced polymer composites, process modelling and materials characterisation. Each customer's particular application is supported by our well-equipped facilities and we provide unique solutions for a wide range of topics.

Nanosurf

Web: www.nanosurf.com/en



Founded in 1997, we are a Swiss based high-tech company providing scanning probe microscopes to customers around the globe. Our product range starts with very compact AFM and STM instruments, followed by state-of-the-art research atomic force microscope systems, all the way up to fully customized and comprehensive next-level solutions. Our customers in research, industry and teaching value the innovative approach, modularity, and ease of use of our products.

The Politecnico di Torino

Web: www.polito.it/index.php?lang=en

www.polito.it/small



The Politecnico di Torino was founded in 1859 as “Scuola di Applicazione per gli Ingegneri” (Technical School for Engineers), and it became Regio Politecnico di Torino in 1906. A long history, which bore out the University as a reference point for education and research in Italy and in Europe, a Research University of international level which attracts students from more than 100 countries and which activates about 800 collaborations per year with industries, public institutions and local organizations. The multi-Scale ModeLing Laboratory - SMA LL - is an engineering research group launched at Politecnico di Torino with the aim to propose and promote innovative solutions for applications related to the energy sector. It has been active for many years in modelling on various scales the thermal and transport properties of materials and composites, including those containing carbon nanomaterials. Moreover SMA LL has a relevant expertise regarding to the modelling interaction forces at nanoscale interfaces, even in the presence of water and adsorbed soft matter.

Spectrum Instruments

Web: www.spectrum-instr.com



Spectrum Instruments Limited (SIL) is an SME based in Limerick, Ireland and is a leading worldwide provider of Scanning Probe Microscopes and Accessories. SIL is involved in the development and production of traditional Atomic Force Microscopes (AFM's); AFM's combined with inverted microscopes; AFM combined with spectrometer; scanning near-field optical microscope and AFM in vacuum. SIL provides a versatile range of sample testing, consultations and demonstrations. SIL staff consists of employees with backgrounds in scientific and industrial product design and the companies activities include service & logistics, sales & marketing, product development, production assembly and testing on site. SIL is the exclusive worldwide distributor of NT-MDT products & accessories and is licensed to design, manufacture and distribute all NT-MDT equipment and services.

University of Limerick

Web: www.ul.ie



The University of Limerick (UL) is an, internationally focussed University with over 13,000 students and 1,300 faculty and staff. It is a young, energetic and enterprising institution with a proud record of innovation in education and excellence in research and scholarship. As a research-led university, UL's mission is to remain distinctive through the deliberate focus on research with impact, graduate employability, industry engagement and the provision of an outstanding campus environment.

The Bernal Institute at UL comprises over 300 researchers active in materials science and technology with relevant process and manufacturing engineering. Materials research is challenge-driven; whether addressing health (biomedical, pharmaceutical and nutritional); energy (electric and composites), transport (composites and fuels), or information (electronic), the combination of fundamental Materials Science and Technology knowledge alongside sustainable process engineering experience provides an unique eco-system for researchers at the Bernal Institute to generate research with impact to meet these challenges with and for society.

OYSTER Project Open Day 2019 – Guest Organisations

The European Synchrotron Radiation Facility (ESRF)

Web: 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.

The Fraunhofer IFAM

Web: www.ifam.fraunhofer.de/en



The **Fraunhofer IFAM** is one of the most important research institutions in Europe for adhesive bonding technology, surfaces, shaping and functional materials. At our institute's six locations – Bremen, Dresden, Oldenburg, Stade, Wolfsburg and Braunschweig as well as at the Test Center for Maritime Technologies on Helgoland – we put our central principles into practice: scientific excellence, a focus on the application of technology, measurable utility for customers and ensuring the highest quality. Our more than 680 employees, working in over 20 departments and numerous working groups combine their broad technological and scientific knowledge and expertise into core competencies: Metallic Materials; Polymeric Materials; Surface Technology; Adhesive Bonding Technology; Shaping and Functionalization; Electromobility; and Automatization and Digitalization. These core competencies - both individually and in combination with each other – are not only the basis of our strong position in the research market but also of future-forward developments that will be useful for society.

Ampashield NV

Web: www.ampashield.com



Ampashield is a Joint Venture Company between **Aurubis Belgium NV/SA** and **Cametics Ltd** specialized in nano-carbon enabled coating solutions. Cametics is an R&D enterprise born out of the University of Cambridge. It was founded in 2014 by Prof. Krzysztof Koziol and Dr Marek Burda with the mission of bringing to the market innovative solutions in the field of advanced materials, such as nano carbons, metals and polymers. Aurubis is part of a leading global copper group, engaged in the business of producing high purity, high quality copper from copper concentrates and recycling materials, destined for various industrial applications. Initial contact and collaboration between Cametics founders and Aurubis has been established in the UltraWire project funded by European Commission to develop novel nanocarbon- copper conductors, and has been followed further after the end of the project. A collaboration of Cametics and Aurubis was formed to bring the great ability of nanomaterials to the copper market. The expertise of Cametics in the field of carbon nanomaterials and Aurubis' speciality in copper products led to a productive scientific research and development project.



ANSYS Granta

Web: www.grantadesign.com



Granta is the leader in materials information technology – software, information resources, and services to advance materials education, and to enable better, greener, safer products. Granta Design is a subsidiary of ANSYS Inc.

UK Research and Innovation

Web: www.ukri.org



UK Research and Innovation works in partnership with universities, research organisations, businesses, charities, and government to create the best possible environment for research and innovation to flourish. We aim to maximise the contribution of each of our component parts, working individually and collectively. We work with our many partners to benefit everyone through knowledge, talent and ideas. UK Research and Innovation is also delivering specific aspects of the UK government's no deal planning for EU Exit. To keep up to date please visit our dedicated pages. Operating across the whole of the UK with a combined budget of more than £7 billion, UK Research and Innovation brings together the seven research councils, Innovate UK and Research England.

EURECAT

Web: eurecat.org/en



Eurecat is the main Research and Technology (RTO) centre in Catalonia and the second largest private non-profit research organization in Southern Europe. **Eurecat** is the leading Technology Centre in Catalonia, and the second largest private research organization in Southern Europe. Eurecat manages a turnover of 38M€ and 700 professionals, is involved in more than 160 R&D projects and has a customer portfolio of over 1.000 companies. Eurecat R&D, innovation and training activities span from Industrial Technologies (metallic, plastic and composite materials, manufacturing processes, autonomous and professional robotics, functional printing and fabrics, simulations and sustainability) to Digital Technologies (Digital Humanities, Big Data Analytics, IT Security and Smart Management Systems, e-health, data mining and multimedia technologies) and Biotech (Omic science and Nutrition & health). Additionally, EURECAT has recently been accepted by the European Commission as a KETs (Key Enabling Technologies) Technology Centre in order to collaborate with SMEs on close-to-market research and innovation activities.

Europlasma

Web: www.europlasma.be



Europlasma is a global technology leader in innovative nano-coating solutions based on low pressure plasma technology, for which it develops proprietary processes, designs and builds turnkey vacuum plasma treatment equipment and supplies process chemicals. With over 25 years of experience in plasma technology, Europlasma is assisting its clients in achieving the highest performance and protection for their products, with a production process that has the lowest environmental footprint.

Keysight Technologies

Web: www.keysight.com
about.keysight.com/en/companyinfo/labs



Keysight Laboratories is the central applied research laboratory of Keysight Technologies, dedicated to providing breakthrough competitive advantages that result in market leadership and value for

customers. Keysight Labs is the direct organizational descendant of the original HP Labs, which was formed by founders Bill Hewlett and Dave Packard in 1966 to dedicate a portion of the company's R&D investment to a separate team of researchers whose forward-looking technology investigations would strengthen and broaden the company's offerings to drive business growth - a philosophy that continues in Keysight today. **Keysight Technologies** has the broadest range of products in the industry to accelerate deployment of your new technologies. Keysight reflects our rich heritage - a direct line from both Hewlett-Packard's standards of integrity and innovation and Agilent's premier measurement business. The name Keysight conveys the ability to see what others cannot, offering the critical or key insight to understand and unlock the changing technology landscape.

Fundación TEKNIKER

Web: www.tekniker.es/en



TEKNIKER is a private non-profit research organization founded in 1981 with over 284 researchers and a turnover of about 26 M€ in 2018. TEKNIKER has participated in 247 EU Projects, 25% of them coordinated by TEKNIKER. TEKNIKER is a private non-profit research institution which specific mission is to help the industrial sector to increase its innovative capacity by means of generating and applying technology and knowledge in order to be more competitive. Its expertise covers a wide range of technologies allowing them to provide services to a range of sectors from automotive over aeronautics up to assistive technologies and to develop a good variety of products. With over 37 years of experience, TEKNIKER has achieved a high degree of specialization in 4 major areas (Advanced Manufacturing, Surface Engineering, TICs and Product Engineering), which allows it to offer a cutting-edge technology at the service of new challenges. To some extent related to OYSTER, TEKNIKER participates in the project i-TRIBOMAT, Intelligent Open Test Bed for Materials Tribological Characterisation Services, a TEST-BED for Material Characterization. Grant Agreement ID: 814494.

Technical University of Denmark Department of Energy Conversion and Storage

Web: www.energy.dtu.dk/english



The Department of Energy Conversion and Storage is focused on education, research, and development within functional materials and their application in sustainable energy technologies. The Department, which has 250 employees, was founded in 2012 by bringing research groups from Risø DTU and DTU Chemistry together. We are present both at Risø Campus and Lyngby Campus.