FINAL ANNOUNCEMENT
AND
CALL FOR PAPERS

14th - 17th September
(technical sessions)

14th - 16th September
(exhibition)

E-MRS 2020 Fall Meeting

The conference will include:
24 parallel symposia, one plenary session, one exhibition and much more

Conference and exhibition will be held
at the Main Campus of the Warsaw University of Technology

Plac Politechniki 1 - Warsaw, Poland

www.european-mrs.com

E-MRS 2020 FALL MEETING

14th-17th September
Warsaw University of Technology - POLAND

Introduction

The European Materials Research Society (E-MRS) was established in 1983 through the initiative of individual European Materials scientists. A number of European materials scientists who attended the MRS meetings in the U.S.A. realised that such a society could be of benefit to Europe to enhance the links between materials science and industry and to provide a voice for the materials community. Most of the problems facing the world such as energy supply and health will be solved only by breakthroughs in materials science. It is vital that the outcomes of research are utilised through technological experience and innovation for the benefit of mankind. The Fall Meeting provides the opportunity to exchange ideas, expand one's knowledge and make new contacts. The conference will consist of 24 parallel symposia and a plenary session and provides an international forum to discuss recent advances in the field of materials science. The conference will be augmented by an exhibition of products and services of interest to the conference participants. The Conference will be held at the Central Campus of the Warsaw University of Technology, from 14th to 17th September 2020 . It is the 17th E-MRS Fall Meeting following its launch in 2002 to run in parallel to the Spring Meeting in France.

Don't miss it! We look forward to welcoming you to Warsaw and your active contribution and participation in the conference.

The European Coordination Group

Peter WELLMANN
President

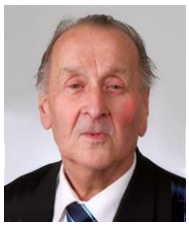
Materials Department 6
Electronic Materials and Energy Technology
University of Erlangen
Erlangen, Germany
peter.wellmann@ww.uni-erlangen.de

Valentin CRACIUN
Vice President

National Institute for Laser, Plasma, and Radiation
Physics Laser Department
Bucharest, Romania
valentin.craciun@inflpr.ro

Joan Ramon MORANTE
Vice President

IREC, Catalonia Institute for Energy Research
Jardí Dones de Negre 1
Sant Adrià del Besòs 08930
Spain
Tel +34933562615
jrmorante@irec.cat



Paul SIFFERT
General Secretary

E-MRS Headquarters
Strasbourg, France
paul.siffert@european-mrs.com

The Conference Chairpersons:

Franck TESSIER

Institut des Sciences Chimiques de Rennes
UMR CNRS 6226
Université de Rennes 1
35042 Rennes cedex
France
Franck.Tessier@univ-rennes1.fr

Ian W. BOYD

University of Brunel
Kingston Lane
Uxbridge UB8 3PH
UK
ian.boyd@me.com

Małgorzata LEWANDOWSKA

Warsaw University of Technology
Faculty of Materials Science & Engineering,
Warsaw, Poland
Malgorzata.lewandowska@pw.edu.pl

The Conference Organizers:

European Materials Research Society

Warsaw University of Technology

Polish Materials Science Society

Institute of Physics PAN

Plenary Session (Wednesday morning, 18th September)

1. Presentation of the Jan Czochralski Award to Professor Alexandra Navrotsky, School of Molecular Sciences and Center for Materials of the Universe Arizona State University, USA
   Lecture by Professor Alexandra Navrotsky *"Thermodynamics of Materials under Extreme Conditions in Planetary Science, Aerospace Engineering , and Nuclear Energy"*
2. Lecture by Professor Laura Na Liu, University of Heidelberg, Germany, Laureate of the 2019 EU-40 Materials Prize: *"Dynamic plasmonics"*
3. International Atomic Energy Agency (IAEA) representative

Poster Sessions:

1. Monday, 14th September - 17:30 – 19:30
2. Tuesday, 16th September - 17:30 – 19:30

Scheduled Symposia (14th – 17th September):

MATERIALS FOR ENERGY

Symposium A : Materials for energy applications: hydrogen storage/production, solar cells, super capacitors, thermoelectric & carbon based materials
Symposium B : Battery and energy storage devices: from materials to eco-design
Symposium C : Advanced catalytic materials for (photo)electrochemical energy conversion II
Symposium D : Materials for chemical and electrochemical energy storage
Symposium E : Nuclear materials

MODELLING AND CHARACTERIZATION

Symposium F : Computer-aided materials modelling: fundamental and applied insights merging physics and chemistry viewpoints at the atomic-scale
Symposium G : Modern computational methods and their applications in materials science: Synergy of theory and experiment
Symposium H : European Nanoanalysis Symposium (8th Dresden Nanoanalysis Symposium "on tour")

FUNCTIONAL MATERIALS

Symposium I : Materials and technological solutions preventing biofilms and antimicrobial resistance
Symposium J : Peptide self-assembly in materials science
Symposium K : Integration of advanced materials on silicon: from classical to neuromorphic and quantum applications
Symposium L : Emergent functional materials with respect to extreme conditions
Symposium M : Interface phenomena in emerging electronic and energy technologies
Symposium N : New frontiers in topological matters

OXIDES, FERROELECTRICS

Symposium O : Wide band gap (WBG) materials: theory, growth, characterization, and applications
Symposium P : Phase transitions and properties of ferroics in the form of single crystals, ceramics and thin films – II. 2020
Symposium Q : (Hf,Zr)O_2-based ferroelectrics: from fundamentals to applications

NANOPARTICLES AND NANOMATERIALS

Symposium R : Nanomaterials- electronics & -photonics
Symposium S : Design and Manufacturing of 3D optical nanostructures and nanophotonics
Symposium T : Organized nanostructures and nano-objects: fabrication, characterization and applications V
Symposium U : Advances in nanoparticles: synthesis, characterisation, theoretical modelling, and applications
Symposium V : Polytypism in semiconductors

MANUFACTURING AND TECHNOLOGY

Symposium W : 3D printing and additive manufacturing for the industry of the future (2nd edition)
Symposium X : Crystal Growth of Organic Materials

Introduction and scope:
A symposium dedicated to the wide range of materials with a focused application in the field of renewable and sustainable energy, is much needed which can connect the theory and experimental outcome spontaneously. Our symposium will be one such attempt in the field of energy research.

Due to simple covalent bonding, carbon shows vivid properties, which can be manifested into the energy applications through different dimensionality like carbon quantum dots, fullerene, carbon nanotubes, two-dimensional graphene and Diamond. They all have enormous applications in the field of solar cells, catalysis, batteries, hydrogen production and hydrogen storage. The ongoing feedback between the experiment and theory concerning energy harvesting opens up new direction of scientific thrust not only in the carbon based systems, but also materials that are attaining interesting electronic, structural, optical and transport properties in order to be applied for sustainable energy resolution. Materials modelling have become equally important along with the experimental investigation to predict such properties, which can be tuned in for different energy applications in the area mentioned above. This is because the atomistic insight of a material is one of the intuitive reasons behind its different properties and this insight we can derive from electronic structure of different materials.

The symposium will not only be limited to carbon materials, but also all other novel materials that have attracted the focus of the scientific community in the vast field of energy materials. The applications of such materials will be having a broad view in the area of solar cell, batteries, photocatalytic water splitting, hydrogen storage and fuel cells. Scientists doing their research in all the above area will be a getting a common platform to showcase their latest findings, which all will be attached through a common string named Energy. The symposium will be a mixture of theory and experiments with a strong view of bridging the gap between them. The choice of materials is having a wide range from oxide materials to recently synthesized transition metal di-chalcogenides and dimension-wise they can be in bulk, surface, monolayer phase or in form of hetero-structures and nano-composits.

Hot topics to be covered by the symposium:
- Carbon materials of different dimensionalities – present and next generation
- Application of Diamond in Energy Research
- Oxide materials and their application in energy research
- Two-dimensional materials for energy production and storage
- Perovskite based materials for solar cell
- Photocatalytic materials for hydrogen production
- Materials for super Capacitor Technology
- Thermoelectrics
- Heterostructured nano-materials and nanocomposits

List of confirmed invited speakers:
- Zhong Lin (Z.L.) Wang, Georgia Institute of Technology, USA
- Chris G. Van de Walle, University of California, Santa Barbara, USA
- Kevin Sivula, EPFL - Ecole polytechnique fédérale de Lausanne, Switzerland
- Maria Lukatskaya, ETH Zurich, Switzerland
- Kourosh Kalantar-zadeh, University of New South Wales, Sydney, Australia
- Wei Luo, Uppsala University, Sweden
- Maurizia Palummo, University Tor Vergata Rome, Italy
- Michael Nolan, Tyndall Natl. Institute, Cork
- Parameswar K. Iyer, Indian Institute of Technology Guwahati, India

Tentative list of scientific Ccmmittee members:
- T.W. Kang, South Korea
- B. Johansson, Sweden
- C. G.Granqvist, Sweden

Symposium Organizers:

Priya VASHISHTA
University of Southern California
3651 Watt Way, Los Angeles CA 90089, USA
priyav@email.usc.edu

Rajeev AHUJA (Main Organizer)
Department of Physics and Astronomy, Uppsala University
Box-516 SE-75120 Uppsala, Sweden
rajeev.ahuja@physics.uu.se

Yong-Mook KANG
Korea University
Dept. of Materials Science and Engineering - 145 Anam-ro, Seongbuk-gu, Seoul, 02841, Korea
dake1234@korea.ac.kr

Introduction and scope:

For future sustainable economic growth and environment protection, energy generated from renewable sources has to be stored in highly efficient and ecofriendly manner. Therefore, all over the world rechargeable batteries and supercapacitors are in the focal point for the development of efficient electrochemical energy storage systems from macroscale to microscale.

Electrochemical energy storage is a rapidly advancing field building on a continuous stream of innovative ideas. As renewable energy sources become increasingly prevalent the need for high energy-density, high-power storage devices with long cycle lives is greater than ever. The development of suitable materials for these devices begins with a complete understanding of the complex processes that govern energy storage and conversion spanning many orders of magnitude in length and time scales. Furthermore, new battery technologies have to be not only commercially and technically viable, but they should also deliver a lower environmental impact than the current state of the art. Therefore, a major challenge of modern battery technologies is to ensure that newly developed batteries are safe, efficient and follow the highest environmental and social standards at the level of production, use and disposal in a frame of a circular economy.

The focus of this meeting is to bring together all aspects of batteries and alternative electrochemical energy storage devices across the field, from modelling and nanoscale characterization to full-scale battery construction and testing regimes. An interdisciplinary selection of speakers will cover this broad range of topics to develop an overview of the current research and challenges in the battery field in a continuum from materials to eco-design. The intention is to bring together the international community working on the subjects and to enable effective interactions between research and engineering communities. Although a Europe-bound event, participation is invited from all continents. It provides an excellent opportunity for scientists, engineers and manufactures to present recent technical progress and products, to establish new contacts in the appreciated networking events and to exchange scientific and technical information. The symposium will be structured in ten different sections.

Hot topics to be covered by the symposium:

- lithium-ion cells and post-lithium ion technologies
- flow-batteries
- supercapacitors and metal-ion capacitors
- hybrid battery cells
- automotive and mobile application requirements
- stationary battery application requirements
- advanced manufacturing of batteries
- raw material supply / value chains
- recycling in battery storage technologies
- environmental challenges

Symposium Organizers:

Alexey Y. KOPOSOV
Institute for Energy Technology, Instituttveien 18, 2007 Kjeller, Norway
Alexey.Koposov@ife.no

Claudia D'URSO
CNR-ITAE
Via Salita Santa Lucia Sopra Contesse, 5-98126 Messina, Italy
durso@itae.cnr.it

Manuel BAUMANN
KIT-ITAS
Karlstraße 11, 76021 Karlsruhe, Germany
manuel.baumann@kit.edu

Introduction and scope:

This symposium will be the 2nd edition of E-MRS symposium with the same theme. Following the success of the 1st edition, the 2020 symposium aims to bring a wider spectrum of researchers who are interested in and actively working on catalytic materials and processes for use in various (photo)electrochemical energy conversion devices.

With the ever-growing deployment of renewable energy and the needs for load-levelling, rapid inter-conversion of electrical energy to chemical energy and vice versa provides an attractive solution to off-peak renewable energy storage and utilization. Using electrolyzers, water can be split producing hydrogen fuels that are clean and high-density energy carriers. Photoelectrochemical (PEC) water splitting using semiconductor photoelectrodes, including multi-junction architectures, offers a straightforward and potentially efficient means of hydrogen production, though formidable challenges for stable and un-assisted water splitting still remain and practical deployment of PEC cells may take few decades. Electro-fuels, i.e. chemicals produced by electrolyzers, have recently provoked increasing interest: a great deal of work on electrocatalytic and photoelecatalytic CO2 reduction has been done, and electrosynthesis of ammonia has lately emerged as an alternative to the energy-intensive Haber-Bosch process. As far as fuel cells are concerned, several European countries have announced a timetable for stopping the production and sales of petrol and diesel powered cars. This will open up a huge market for fuel-cell powered vehicles.

To achieve high conversion efficiency, the use of catalysts in (photo)electrolyzers and fuel cells is essential. Remarkable progress has been made in recent years towards the development of new catalytic materials, with particular emphasis on the substitution, either partially or completely, of precious noble metals. Recent advances in in-operando characterization techniques, as well as in theoretical approaches to the prediction of activity trends and catalyst screening allow for fundamental understanding of catalytic mechanisms and processes and rational design of efficient and durable catalytic materials.

This symposium will provide a platform for researchers working on catalytic materials to showcase and learn about the latest findings in this fast-growing field of research. The symposium covers, but is not limited to, both experimental and theoretical studies of advanced catalytic materials that can find applications in fuel cells and electrolyzers of different types. Contributions to the system design of these (photo)electrochemical energy conversion devices are also welcome.

Hot topics to be covered by the symposium:

- Water splitting and fuel cell catalysts
- Semiconductor materials including multijunctional/hybrid photoelectrodes
- Electrochemical and solar-driven CO2 reduction
- Catalytic materials for electro-fuel and chemical (e.g. methanol, ammonia) synthesis
- 2D materials for (photo)electrocatalysis
- Bi-functional and multi-functional electrocatalysts
- Reduction/replacement of critical metals by nano-design of abundant materials
- Theoretical and experimental approaches to catalyst screening and design
- Advanced characterization techniques (in particular in-operando) of photoelectrodes and catalysts
- Theoretical studies and computational modeling of catalytic mechanisms/processes

List of invited speakers:

- Prof. Brian Seger (Technical University of Denmark, Denmark)
- Prof. Clemens Heske (Karlsruhe Institute of Technology, Germany)
- Prof. James Durrant (Imperial College London, UK)
- Prof. Joel Ager (Lawrence Berkeley Laboratory, USA)
- Prof. Jordi Arbiol (Catalan Institute of Nanoscience and Nanotechnology, Spain)
- Prof. Jose Ramon Galan-Mascaros (Institut Catala dÍnvestigacio Quimica - ICIQ, Spain)
- Prof. Menny Shalom (Ben-Gurion University of the Negev, Israel)
- Prof. Qiang Zhang (Tsinghua University, China)
- Prof. Roland Marschall (Universitat Bayreuth, Germany)
- Dr. Teresa Andreu (IREC, Universitat de Barcelona, Spain)
- Prof. Tierui Zhang (Chinese Academy of Sciences, China)

Scientific Committee members:

- Dr. Friedhelm Finger (IEK-5, Forschungszentrum Juelich, Germany)
- Prof. Hyacinthe Randriamahazaka (University of Paris Diderot, France)
- Dr. Idan Hod (Ben Gurion University, Israel)
- Dr. Joachim John (IMEC R & D, Belgium)
- Dr. Leszek Zaraska (Jagiellonian University, Poland)
- Dr. Matthew Mayer (Helmholz Zentrum Berlin, Germany)
- Dr. Sebastian Metz (Frauhofer Institute for Solar Energy Systems, Germany)

Symposium Organizers:

Lifeng LIU
International Iberian Nanotechnology Laboratory (INL)
Av. Mestre Jose Veiga, s/n 4715-330 Braga, Portugal
lifeng.liu@inl.int

Vladimir SMIRNOV
Forschungszentrum Jülich GmbH Institute for Energy and Climate Research - 5 (IEK-5), Wilhelm-Johnen-Strasse, 52425 Juelich, Germany
v.smirnov@fz-juelich.de

Sixto Gimenez JULIA
Universitat Jaume I
Avda Sos Baynat sn, Spain
sjulia@uji.es

Byungha SHIN
Korea Advanced Institute of Science and Technology (KAIST)
291 Daehak-ro, Yuseong-gu, Daejeon, South Korea 34141
byungha@kaist.ac.kr

Introduction and scope:
Materials for chemical and electrochemical energy storage are the key for a diverse range of applications including batteries, hydrogen storage, sunlight conversion into fuels and thermal energy storage. The goal is to provide efficient solutions for a future energy scenario based on renewable energy sources.

The urgent need for energy storage materials for a sustainable and carbon-free society is the main stimulant for the new dawn in the development of functional material for energy storage and conversion. For example hydride based all-solid-state batteries or batteries based on alternative cations including Na+ and Mg2+, which are considered as safer, cheaper, and more abundant, while potentially higher energy density compared to Li-ion batteries are achievable. New reactive hydride composite systems (RHCs) for hydrogen storage application with operating conditions near room temperature are nowadays at the reach of a hand. New solutions to address the issue of intermittent supply from renewable energy sources through the synthesis of energy carriers such as H2, CH4, CH3OH etc. (e.g. through sunlight-driven processes) to provide an uninterrupted sustainable supply of energy for stationary systems and zero-emission vehicles are being developed. The proposed symposium will be chemistry neutral; it will not be limited to a certain class of materials. Materials covered in this symposium comprise (i) active materials for energy storage that require a certain structural and chemical flexibility, for instance as intercalation compounds for hydrogen storage or as cathode materials (ii) novel catalysts that combine high (electro-)chemical stability and selectivity, and (iii) solid state ionic conductors for batteries and fuel cells. Renewable energies combined with efficient storage systems will be the key enabler of the development of the human society in the incoming decades. The proposed symposium is therefore interdisciplinary and aspires to bring together ambitious young and established scientists from around the world to not only present the latest advances of the intense worldwide research but also exchange ideas as well as identify major challenges and hot-topics for future developments towards efficient solutions.

Hot topics to be covered by the symposium:
- Hydrogen storage material development
- Fundamental hydride structures, reaction mechanisms and thermodynamics
- Conduction mechanism of solid-state ion conductors
- Stable interfaces and structural transitions in solid-state batteries
- Materials for solar thermal energy storage
- Materials for sunlight conversion into chemical fuels
- Development of material and systems for thermal energy storage
- Computational methods for energy materials
- Towards application: engineering challenges

Symposium Organizers:

Arndt REMHOF
EMPA
Swiss Federal Laboratories for Materials Science and Technology, Überlandstrasse 129, CH-8600 Dübendorf, Switzerland
Arndt.Remhof@empa.ch

Claudio PISTIDDA
Helmholtz Zentrum Geesthacht Institute of Materials Research, Max Planck Strasse 1, Geesthacht 21502, Germany
claudio.pistidda@hzg.de

Dorthe BOMHOLDT RAVNSBÆK
University of Southern Denmark
Department of Physics, Chemistry and Pharmacy, Campucvej 55, 5230 Odense M, Denmark
dbra@sdu.dk

Michael HEERE
Karlsruhe Institute of Technology
Institute for Applied Materials - Energy Storage Systems (IAM-ESS),Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany
michael.heere@kit.edu

Deadline for abstract submission: **May 18th, 2020**

Introduction and scope:

During the coming decades, world is facing the challenge of prolonging the nuclear park life, or implanting new units with new technologies. As an example in the US, it was recently agreed that 'The Turkey Point Plant' in Florida extent its live time from 60 to 80 years and on the other side in UK EPR are under construction and several other are planned. In May 2019, the Polish National Atomic Energy Agency forecasted the completion of the first of six 1-1.5 GW units in 2033, with each successive unit to follow every two years, replacing coal-fired generation.

Nuclear energy production needs and will require materials that are extremely resistant under demanding environment: temperature, pressure and irradiation field. These materials are the barriers Their structural properties are investigated with emphasis on mechanical performance, durability, plasticity and stability. The symposium Nuclear Materials includes sessions dealing with materials ranging from structural components of fission thermal or fast reactors, fuel (solid or liquid) materials to waste forms. Production of these materials at the industrial level is discussed on the basis of economic, ecologic and safety considerations. Macro – properties such as quality, thermodynamics, thermophysical and mechanical as well as micro-structural analysis are studied from the atomic scale to the materials within a multi-scale approach.

The component materials for Gen II and III, as well as for Gen IV reactors are tested for their behaviour under irradiation with particles (neutrons, protons, deutons …) of high energy and large flux. These are structural materials such as alloys (steels) or composites (cercer, cermet …) or are the coolant e.g. liquid metals or molten salts. The session concerns the R&D for high temperature gas reactors and molten salt reactors.

The fuels consist of solids or liquids with their components (homogeneous/heterogeneous, matrices, fissiles, burnable poisons, fertiles and additives). These fuel materials (oxides, nitrides, carbides, silicides / solid, or fluoride, chloride / liquid …) are presented in a comprehensive way with emphasis of their intrinsic properties (thermal conductivity, high melting points). The new accident tolerant fuels and the inert matrix fuels shall be discussed in specific sub sessions. This section also includes liquid fuels such as molten fluorides (thermal) or chlorides (fast) for the molten salt reactors. Other liquids may also be investigated if acceptable. Again key properties such as melting points, thermal capacity, … are discussed in this session. A specific attention shall be carried to Post Irradiation Examination because these techniques deliver key results allowing fuel certification.

The waste forms must finally be recognized for their stability, durability, low solubility or leachability over geological time scale. The research includes materials such as homogeneous amorphous (glass) crystalline (spent UO2 fuels) or heterogeneous (Synroc, spent MOX fuel).

In all cases irradiation with accelerator guide the investigators in choosing optimal components prior irradiation in reactor. The challenge this century will be to work with much reliable and robust materials that make their use safer in nuclear system. Specific attention shall be given on the cost in Energy (EJ) during their production and their performance in term of retention of contaminants. The symposium shall contribute in enhancing the safety of the nuclear systems.

The symposium shall be followed by the IAEA technical meeting on Advances in Post-Irradiation Examination Techniques for Power Reactors and Innovative Fuels

Hot topics to be covered by the symposium:

- Green uranium/thorium mining
- Energy cheaper nuclear fuel cycle
- 'Stronger' structural materials
- Liquid fuel reactor components
- New nuclear industrial applications
- More performing waste forms
- Education in Nuclear Materials

Symposium Organizers:

Claude DEGUELDRE
Lancaster University
Engineering Department, Lancaster, UK
c.degueldre@lancaster.ac.uk

Jacek JAGIELSKI
National Centre for Nuclear Research
Material Physics Department, A. Sottana 7, 05-400 Otwock/Świerk, Poland
jacek.jagielski@ncbj.gov.pl

Nicolas DACHEUX
Université de Montpellier
Institut de Chimie Séparative de Marcoule-CEA, CNRS, ENSCM, Site de Marcoule, Bat 426, BP 17171 30207 Bagnols sur Ceze cedex, France
nicolas.dacheux@cea.fr

Valentin CRACIUN
INFLPR
National Institute for Laser, Plasma and Radiation Physics and Extreme Light Infrastructure-Nuclear Physics, Magurele, Romania
valentin.craciun@inflpr.ro

Introduction and scope:

The scope of the present symposium is to offer a survey of the most advanced modelling approaches exploited to gain fundamental and practical insights for a wide range of functional materials for multiple technological applications (optoelectronics, energy, biomaterials). Special attention is devoted to the recent forefront applications of first-principles methods (static and molecular dynamics) as well as machine-learning techniques. The atomic-level knowledge provided by the combination of high-performance computing and advanced computational methods pave the route for a rational approach, based on an accurate assessment of materials' chemistry and physics, to the design of novel materials with tailored properties for specific applications in next-generation technologies.

High-performance computing and advanced computational methods can offer nowadays an important contribution to the European Community Materials Research. Indeed, theoretical characterization from either first-principles or approaches that are more empirical are likely to provide important information in parallel to the experimental determinations. In that respect, the scope of this symposium aims at exploring the wide range of theoretical methods developed in the recent years. An important part will be devoted to theoretical and numerical developments to overcome nowadays-physical challenges.

This symposium will meet the challenge of assessing the role of chemical bonding in complex materials by employing as a theoretical endeavour, a survey of advanced computational approaches. The goal of these innovating methods is to investigate structural, dynamical, optical and electronic localization properties of specific materials of interest for next-generation devices (optoelectronics, energy harvesting and storage, spin or heat transport, thermoelectricity, biomaterials) coping with the current need for a sustainable technology.

Those approaches range from atomic-level first-principles methods to tight-binding models and molecular dynamics (MD) simulations. In addition, we will consider methods such as quantum Monte-Carlo or hybrid QM/MM methods for larger or biological systems. In parallel, machine-learning algorithms for materials screening would give a nice opening on future methodological perspectives in Materials Science.

Hence, another goal of the symposium is to present a general overview of theory and simulation contribution in the field. For example, we will consider applications in nanosciences and nanostructure materials, bulk, surfaces and interfaces, disordered and low-dimensional materials including graphene and bi-dimensional materials, organic molecules on metallic or oxide surfaces, magnetic and spin cross-over molecules, self-assembled molecular networks, and biological molecules.

In summary, this symposium will provide a wide and unique state of the art overview on the theoretical methods used to describe and characterize materials properties. It aims at having equilibrated contributions from important researchers in the community and young researchers to favor discussions and exchange, and draw some perspectives on the next challenges in the field.

Hot topics to be covered by the symposium:

- methods and developments in first-principles and semi-empirical methods
- molecular dynamics
- machine learning
- High Performance Computing
- QM/MM simulations
- graphene and 2D materials
- molecular electronics and spintronics, magnetism
- electronic transport and devices simulations, optical properties
- electron-phonon coupling, thermoelectricity
- metal/organic interfaces and frameworks
- biological molecules and mechanisms
- thermodynamics
- renewable energies and storage
- mass and heat transport
- surfaces and interfaces
- disordered, porous and hybrid organic-inorganic materials

Symposium Organizers:

Elena LEVCHENKO
University of Newcastle
School of Mathematical and Physical Sciences, Faculty of Science, University Drive, Callaghan NSW 2308 Australia
Elena.Levchenko@newcastle.edu.au

Guido ORI
Institut de Physique et Chimie des Matériaux de Strasbourg
IPCMS, CNRS - University of Strasbourg, 23 Rue du Loess, F-67034 Strasbourg, France
guido.ori@ipcms.unistra.fr

Michał HERMANOWICZ
University of Warsaw
Interdisciplinary Centre for Mathematical and Computational Modelling, ul. Tyniecka 15/17, 02-630 Warsaw, Poland
m.hermanowicz@icm.edu.pl

Yannick J. DAPPE
Service de Physique de l'Etat Condensé (SPEC – CNRS – CEA Saclay)
Bât. 771 Orme des Merisiers F-91191 Gif-sur-Yvette, France
yannick.dappe@cea.fr

Introduction and scope:
Computational methods offering first principles calculations, global or local optimization and other methods of materials design and modeling ensure a strong support for experimentalists. Symposium will provide an overview of computation and simulation methods used in solid state science and of their applications, creating a common forum for theorists and experimentalists.

Materials play a key role in modern technologies. Much remains to be explored in the field of selecting a specific material for a given application and its production. This is a very wide area, including chemical reactions, phase diagrams, crystal structure, physical properties, production, etc. There is a long way for a material from being proposed for an application to being commercially applied. The requested properties can be obtained by tuning the material composition and by technological parameter of synthesis. The number of variables for such optimization procedure is large, therefore exploring all compositions and all possible technological conditions is not possible. Consequently, there is a need for support though employment by theoretical approaches. There exist various computational, numerical and analytical, approaches allowing for design, modelling and refinement of complex materials.

The symposium will show the latest state of knowledge of application of advanced computational methods to solving tasks belonging to the field of materials science, The tasks will include design and modelling of crystal structure, physicochemical properties and applications. Review works will be presented. The symposium aims to present papers on concrete applications of these techniques in materials science, to promote these methods in the field of materials science and thus encourage their wider use in solving difficult scientific problems and technological challenges in the future. It is planned to present new applications and software presentations, that allow the use of methods by users taking their first steps in this field. The symposium will place special emphasis on the exchange of information on progress in methodology and on promoting the possibility of using the above-mentioned methods among scholars dealing with physics and chemistry of solid state. The symposium will become a forum where computational scientists will meet and discuss with experimental material scientists, where the needs of experimental materials scientists will be confronted with the computational opportunities offered by theorists. The exchange of ideas between theorists and experimentalists, enabling the extension of the use of computational methods.

Hot topics to be covered by the symposium:

General topics:
- computational challenges in the field of materials science,
- problems of storage and analysis of large datasets,
- hardware and software methods for accelerating calculations,
- multiscale approaches.

Computational methods:
- first principles calculations
- global and local optimization methods
- application limits of computational methods: present status and perspectives
- artificial intelligence methods,
- software presentation (allowed: commercial software from sponsors)

Applications:
- applications of first principles methods and optimization methods in materials physics and chemistry
- specific applications in nanoscience,
- specific applications for materials used for energy production and storage
- specific applications for semiconductors, functional oxides and magnetic materials
- development of artificial intelligence methods used in materials science,
- the future of computational methods in materials science,
- applications of computational methods for design of functional materials,
- structure-physical relationship

Symposium Organizers:

Alfonso MUNOZ
Department of Physics, Universidad de La Laguna
38200 La Laguna, Tenerife, Spain
amunoz@ull.edu.es

Cristian CIOBANU
Colorado School of Mines
1500 Illinois Street, Golden,
Colorado 80401, USA
cciobanu@mines.edu

Rita MAGRI
University of Modena and Reggio Emilia
Department of Physics, Informatics, and Mathematics (FIM), Modena, Italy
rita.magri@unimore.it

Wojciech PASZKOWICZ (Main organizer)
Institute of Physics PAS
Lotnikow 32 02-668 Warsaw, Poland
paszk@ifpan.edu.pl

Introduction and scope:

The topic of the symposium, which will be integrated into the E-MRS Fall Meeting for the first time, is nano-scale materials characterization. Advanced analytical techniques are essential for modern materials research and innovation. The specific motto will be: "Nano-scale materials characterization - Advances in data acquisition and data analysis".

Research and development in materials characterization techniques are increasingly needed for modern materials science, for innovation in high-tech branches and to guarantee the functionality, performance and reliability of advanced products. The sustained progress materials science and engineering is increasingly driven by computational materials science, multi-scale modeling and characterization. More thane ever before, materials-driven product innovations in industry and shorter time-to-market introductions for new poducts require high advancement rates and a tight coupling between research, development and manufacturing. Analytical techniques and respective tools, particuarly to investigate nanomaterials, are considered to be fundamental drivers for innovation in industry.

As a consequence, this symposium will cover the topics of nanoanalysis and materials characterization along the whole value and innovation chain, from fundamental research up to industrial applications. It will bring scientists and engineers together from universities, research institutions, equipment manufacturers and industrial end-users. New results in disruptive nanoanalysis techniques will be reported in several talks and in the poster sessions, and novel solutions in the field of materials characterization for process and quality control will be shown. The discussions and interactions between the stakeholders will help to identify gaps in the fields of advancing nanoanalysis and materials characterization and to propose actions to close them and to support industrial exploitation of innovative materials. The symposium aims at reinforcing ongoing collaborations and discussing ideas for new collaborations.

Hot topics to be covered by the symposium:

- Multi-scale materials analysis and multi-scale modelling
- Electron microscopy (SEM, TEM) including analytical techniques (EDX, EELS, diffraction)
- X-ray microscopy and high-resolution X-ray computed tomography
- X-ray diffraction and X-ray spectroscopy (XAS, XRF)
- Near-field analytical techniques
- Surface analysis techniques
- Mechanical studies at thin films and nanostructures
- In-situ and operando studies
- Application in materials science, physics, chemistry and biology
- Applications in materials for energy storage and conversion: operando studies
- Applications in microelectronics: physical failure analysis and metrology
- Application of AI algorithms for advanced data analysis

List of Invited speakers:

- Jaroslav Klima, Tescan Orsay Holding, Brno, Czech Republic
- Mathias Mosig, Protochips, Berlin, Germany
- Jan Neuman, Nenovision, Brno, Czech Republic
- Lukas Palatinus, Czech Academy of Science, Institute of Physics, Prague, Czech Republic
- Marco Sebastiani, Universita Roma Tre, Rome, Italy
- Alexander Soldatov, Southern Federal University, Rostov-on-Don, Russia
- Krzysztof Wozniak, University Warsaw, Poland
- Gerd Schneider, Helmholtz Zentrum Berlin, Germany

Scientific Committee members:

- Reiner Dietsch, AXO Dresden, Dresden (Germany)
- Narciso Gambacorti, CEA LETI MINATEC, Grenoble (France)
- Wolfgang Jäger, University of Kiel (Germany)
- Kristina Kutukova, Fraunhofer IKTS, Dresden, Germany
- Eckhard Langer, GLOBALFOUNDRIES, Dresden (Germany)
- Andreas Leson, Fraunhofer IWS, Dresden (Germany)
- Malgorzata Lewandowska, Warsaw University of Technology, Warsaw (Poland)
- Michael Mertig, Technische Universität Dresden, Dresden (Germany)
- Subodh Mhaisalkar, NTU Singapore (Singapore)
- Peter Sachsenmeier, Hankou University, Wuhan (China)
- Gerd Schneider, Helmholtz-Zentrum, Berlin (Germany)
- Olivier Thomas, University Marseille (France)
- Oden Warren, Bruker, Minnesota (USA)
- Thomas Weissgaerber, Fraunhofer IFAM, Dresden (Germany)

Journal Nanomaterials is planning a Special Issue "Nanoanalysis" with full proceedings papers of the invited speakers and with selected papers from contributing speakers and poster authors.

Symposium Organizers:

Ehrenfried ZSCHECH
Fraunhofer Institute for Ceramic Technologies and Systems Dresden
Department Microelectronic Materials and Nanoanalysis,
Maria-Reiche-Strasse 2,
01109 Dresden, Germany
ehrenfried.zschech@ikts.fraunhofer.de

Eva OLSSON
Chalmers University of Technology
Department of Physics, 412 96 Gothenburg, Sweden
eva.olsson@chalmers.se

Robert SINCLAIR
Stanford University
School of Engineering, 496 Lomita Mall, Stanford, CA 94305-4034, USA
bobsinc@stanford.edu

Rodrigo MARTINS
FCT – UNL
Quinta da Torre, 2829 516 Caparica, Portugal
rm@uninova.pt

Sabrina SARTORI
University of Oslo
P.O. Box 1072 Blindern, 0316 Oslo, Norway
sabrina.sartori@its.uio.no

Introduction and scope:

Biofilms and antimicrobial resistant microorganisms are the main source of infections in humans, and conventional disinfectants/antibiotics rarely succeed in destroying them. Materials science can offer non-conventional solutions, complementing the standard biomolecular and pharmaceutical approaches.

This symposium aims at:
(i) Providing a detailed and critical overview of the most successful results on novel smart materials or surface processes fighting antimicrobial-resistant strains and/or preventing biofilm formation;
(ii) Critically presenting next generation bioactive agents, targeting the ultimate prevention and destruction of antimicrobial resistant strains and /or biofilms in industrial and biomedical fields. Bioactive agents will include, for instance: inorganic nanomaterials, hybrid/synergistic nanoantimicrobials, and any other novel antimicrobial and antibiofilm compounds (bacteriophages, endolysins, exopolysaccharide depolymerases, bacteriocins, etc.);
(iii) Showcasing the different characterization approaches for the study of solid state surface-biofilm interactions at different stages of the biofilm growth;
(iv) Gaining fundamental knowledge about the (bio)physicochemical mechanisms of biofilm formation, including all the possible aspects contributing to the understanding and monitoring biofilm biogenesis and identification of new targets for detecting biofilms;
(v) Outlining all the possible materials science solutions for the assessment and/or prevention of nanotoxicology issues related to the use of novel nanoantimicrobials and related biocide agents;
(vi) Providing an integrated vision of active materials and technological solutions for early detecting and identifying biofilm formation with high sensitivity.

Hot topics to be covered by the symposium:

- Smart functional inorganic anti-biofilm nanomaterials and coatings of any composition
- Synergistic, hybrid and/or multifunctional materials fighting biofilms and antibiotic-resistant species
- Novel bioactive molecular/biogenic compounds (bacteriophages, endolysins, exopolysaccharide depolymerases, bacteriocins, etc) for biofilm inhibition and removal
- Materials science and characterization solutions for biofilm monitoring, including: sensors, electrochemical techniques, mass spectrometry, microscopy (electron, scanning probe, confocal, etc) and spectroscopy techniques of any kind

Symposium Organizers:

Christine KRANZ
Ulm University
Institute of Analytical and Bioanalytical Chemistry, Albert-Einstein-Allee 11, 89081 Ulm
Christine.kranz@uni-ulm.de

Maria Carmen BLANCO LÓPEZ
University of Oviedo
Department of Physical and Analytical Chemistry, C/ Julián Clavería 8, 33006 Oviedo, Spain
cblanco@uniovi.es

María FERNÁNDEZ
IPLA-CSIC
Paseo Rio Linares s/n 33300.
Villaviciosa, Asturias, Spain
mfernandez@ipla.csic.es

Nicola CIOFFI
University of Bari
Department of Chemistry, Campus Universitario, 4 via Orabona, I-70126, Bari, Italy
nicola.cioffi@uniba.it

Introduction and scope:
Peptide self-assembly is being increasingly used in materials science for creation of environmentally friendly, inexpensive and chemically-tunable materials due to their measured strong piezoelectricity (which can in some cases be higher than traditional inorganics), high mechanical strength, and electrochemical activity.

Despite the promise of the self-assembled peptide systems, practical applications have been limited due to the difficulty in obtaining stable, high-performance devices. In this symposium, we will gather world leading academic and industry researchers to discuss and debate the emergent physicochemical, electronic, optical and mechanical properties of peptide assemblies focusing on their understanding and further improvement. We will map the technological potential of their applications in future devices, such as controlling the self-assembly of peptides to design unique nanostructures for biocompatible acoustic transducers, tiny biosensors based on piezoelectric and plasmonic effects, transistors based on electrical properties, energy harvesters, and supercapacitors. We will cover several classes of self-assembling peptides and related molecules including amino acids and small peptide crystals, as well as peptide-derivative materials such as peptides nucleic acids and amino acid-derived metabolites, 1D peptide nanowires and nanotubes, 2D peptide films and sheets, and inorganic-peptide hybrid assemblies, and discuss how multi-scale modelling can aid experiments in the creation of tailor-made functional peptide nanostructures with controlled morphology.

Hot topics to be covered by the symposium:
- Theranostics – combining nanotechnology and biology for diagnostic and therapeutic goals
- Drug delivery, nanoreactors, Bio-organic electronics
- Biofunctionalization and biointegration of bio-materials
- Interactions between proteins/peptides supramolecular structures and nanomaterials
- Biohybrid nanostructures

Symposium Organizers:

Damien THOMPSON
University of Limerick
Bernal Institute, Department of Physics, Limerick, Ireland, V94 T9PX
Damien.Thompson@ul.ie

Kai TAO
Tel Aviv University
Molecular Microbiology and Biotechnology Department, Life Sciences Faculty, Israel
kaitao@post.tau.ac.il

Marek CIEPLAK
Polish Academy of Sciences
Institute of Physics
Al. Lotników 32/46, 02-668 Warsaw, Poland
mc@ifpan.edu.pl

Introduction and scope:

The symposium aims at gathering scientists working on monolithic and heterogeneous integrations of new materials, to enable additional functionalities on silicon-based platforms. It considers both classical approaches and emerging topics linked to neuromorphic and quantum applications. The various research fields covered in the symposium pave the way towards highly functionalized Sibased technologies which address current and future challenges in our society. The microelectronics industry has delivered faster and more efficient computing devices at a remarkably consistent pace for several decades. More recently, the demand for high performance devices and mass data transfer has soared. Driven by new societal needs, linked to the "Internet-ofthings" and the growing demand for ultra-fast data transfer, cognitive systems and new computing paradigms, such as neuromorphic and quantum information processing, have been developed. Industrials are therefore looking beyond classic architectures and concepts to secure future generations of devices that can be integrated with conventional silicon chip platform. Neuromorphic networks for example require dense arrays of interconnected devices, patterned on silicon using the processing know how generated by the conventional industry. For quantum information science, silicon is also emerging as a promising route. Even for emerging materials that are not yet widely used in the industry, like topological insulators, quantum-dots structures, magnetic or superconductor materials, silicon could be a platform of choice for device integration. The symposium aims at highlighting novel and innovative approaches that allow for monolithic and heterogeneous integration on silicon technology, application-specific integrated solutions (based on integrated photonics, neural networks, spintronic devices...) or quantum systems. The scope includes the fundamental understanding of new material properties, the implementation of novel integration schemes, the modelling techniques and new application fields. The focus will be on the fabrication, characterization and simulation of materials considered as non-standard for Si technology. Contributions related to innovative hetero-integration techniques will be encouraged. Finally, a particular attention will be given to devices and applications beyond current computation technologies that aim at addressing new computing paradigms such as quantum and neuromorphic computation.

Material growth, characterization and simulation

- *Group IV and compound semiconductors:* Group IV materials and alloys (SiGe, GeSn SiGeSn), III-V and II-VI compound semiconductors, grown or transferred on monocrystalline substrates or insulators. Group IV and III-V quantum dots and nanowires integrated on Si.
- *Oxides and nitrides:* Functional perovskites, ZnO, GaN and heterostructures, oxides with resistive or metal insulator transition, topological insulators, piezoelectric materials, materials for the implementation of neuromorphic devices.
- *Two dimensional materials:* Growth and transfer of Graphene, Transition Metal Dichalcogenides and Boron Nitride on semiconductors, hybrid 2D/semiconductor devices.
- *Novel materials for Quantum applications:* Semiconductor/Superconductor Interfaces, Topological insulators, Semiconductor Quantum Dot qubit materials, purified 28 Si, Spin qubit, Si/SiGe Heterostructures.

Integration Techniques

- *Advanced heteroepitaxy:* Selective growth on patterned substrates, epitaxial lateral overgrowth, self-assembly techniques, remote epitaxy.
- *Layer Transfer:* 2.5D & 3D integration (monolithic & heterogeneous) Innovative synthesis & integration methods of materials and devices used for quantum systems

Applications

- *Data processing and communication:* Advanced CMOS scaling, single electron & single photon devices, neuromorphicarchitectures, IOT, spintronics, ultra-low power & RF e lectronics, Integrated photonics, IR and THz lasers.
- *Neuromorphic systems:* Bioinspired nano electronics or photonics, neural networks on chips, with possible use in artificial intelligence and machine learning.
- *Quantum information science and emerging applications of quantum materials:* Quantum communication, quantum computing, quantum sensing.
- *Life-Sciences application and environmental sensors:* Semiconductor plasmonics, mid-infrared and THz sensing, gas sensors, integration with piezo-materials for MEMS-like sensors and opto-mechanics.

Scientific Committee members:

- Abderraouf Boucherif - Université de Sherbrooke
- Antonio Di Bartolomeo - University of Salerno
- Giordano Scappucci - TU Delft
- Jonatan Slotte - Aalto University
- Farid Medjdoub - IEMN-CNRS
- Thierry Taliercio - University of Montpellier
- Douglas Paul - University of Glasgow
- Luca Pirro - Global Foundries
- Detlev Grützmacher - Institute for Semiconductor Nanoelectronics

List of Invited speakers:

- Nikolay Abrosimov - IKZ Berlin
- Gina Adam - Washington University
- Michael S. Arnold - University of Wisconsin-Madison
- Alberta Bonanni - Johannes Kepler University Linz
- Nadine Collaert – IMEC
- Kimberly Dick – Lund University
- Inga Fischer - Brandeburg University of Technology Cottbus
- Anna Fontcuberta i Morral – EPFL
- Jan Grahn - Chalmers University of Technology
- José Menéndez - Arizona State University
- Oussama Moutanabbir - Polytechnique Montréal
- Nobuya Nakazaki - Sony
- Kim Sanghyeon - Korea Institute of Science and Technology

Symposium Organizers:

Cezar ZOTA
IBM Research GmbH
Saumerstrasse 4, Ruschlikon, Switzerland
zot@zurich.ibm.com

Clement PORRET
IMEC
Kapeldreef 75, 3001 Leuven, Belgium
Clement.Porret@imec.be

Giovanni ISELLA
Politecnico di Milano
LNESS Dipratimento di Fisica, via Anzani 42, 22100 Como, Italy
giovanni.isella@polimi.it

Monica DE SETA
Dept. of Science University Roma Tre
Via della Vasca Navale 79, 00146 Roma, Italy
monica.deseta@uniroma3.it

Symposium: L Emergent functional materials with respect to extreme conditions

Introduction and scope:

The functional materials with quantum emergent phenomena manifest profound phenomena, defining the current frontiers of condensed mattes. They cover the multiple spin, charge, and/or orbital interactions in the matrix of crystal lattices and display properties such as superconductivity, diluted magnetic semiconductor properties, and topological quantum phenomena, promising for applications.

The main scope will be focused on recent new emergent materials including superconductors, diluted magnetic semiconductors, topological ordered materials with respect to extreme conditions such as high pressure, low temperature or high magnetic fields, etc. The extreme conditions can be very effective in changing atomic distance, enhancing orbital overlap, and consequently modifying crystalline structures and tuning interactions or multiple couplings. One can thus realize novel materials states.

It is very well established that each material will usually undergo tens of phase transitions over the Mbar pressure range, strongly implying that high pressure could generate plenty of new states of materials. Hence high pressure is considered to be a powerful tool to develop novel condensed states. Pressure provides a new dimension for the study of quantum emergent compounds. Quantum emergent phenomena will have totally new critical relationships if one investigates the pressure dimension together with the usual temperature and composition parameters. More recently it has been shown that pressure variations stimulate dramatic enhancements of the Tc of superconductors. Pressure generally can drive the insulator-metal transition due to the band widening, overlapping effects, and the redistribution and transformation of outer shell electrons upon shortening the atomic distance. More important is that high pressure tends to stabilize novel compounds or states that otherwise could hardly obtained by conventional means. Using high pressure advantages to synthesize and study hydrides, borides or nitrides etc. is not only of industrial interest but also important for developing high pressure science itself since those low Z compounds are theoretically easier to analyse. Nevertheless pressure is a unique and irreplaceable probe to check and develop theoretical model. For instance, pressure can substantially modify the electron correlation and e-p interaction, the spin orientation, giving rise to superconductivity in conventional materials such as theoretically predicated metallic hydrogen. The delocalization tendency under pressure leads many insulators, semiconductors and molecular crystals to become metals that cover huge scope of emergent materials.

Hot topics to be covered by the symposium:

- Novel technologies to fabricate nano-materials
- Multifunctional materials
- Interface-based new or enhanced properties
- Materials for flexible electronics
- Proximity effects
- Interfaces between 2D materials
- Interfaces involving topologically protected states
- High-temperature superconductors
- Diluted magnetic semiconductors
- Topological ordered materials

Symposium Organizers:

Changqing JIN
Institute of Physics, Chinese Academy of Sciences
Beijing 100190, China
Jin@iphy.ac.cn

Roman PUZNIAK
Institute of Physics, Polish Academy of Sciences
Aleja Lotnikow 32/46, PL-02-668 Warsaw, Poland
puzni@ifpan.edu.pl

Shinichi UCHIDA
University of Tokyo
Wada 1-4-5-501, Suginami-ku, Tokyo 166-0012, Japan
uchida@phys.s.u-tokyo.ac.jp

Introduction and scope:

The functionality of electronic devices is often governed by their interface properties. Consequently, the design and optimization of functional interfaces is one of the key challenges in the development of novel energy and electronic technologies. This symposium covers recent advances in interface engineering and analysis in emerging technologies.

The functionality of electronic devices, including thin film transistors, LEDs as well as a wide variety of solar cells and batteries, is to a large part governed by their interface properties. Consequently, the development of next-generation technologies requires novel device structures with tailored interfaces. For many applications tunable, multi-property-functionality is required of the respective contact materials. In modern device structures the number of functional layers is often reduced, so that contact materials need to fulfill multiple purposes, ranging from surface passivation over charge collection to the formation of charge-selective electrical contacts. Constraints in processing compatibility as well as the use of abundant and non-toxic materials pose additional challenges to the development of novel devices. The synthesis of hetero-structures containing multiple metastable or volatile materials, such as flexible polymer substrates (e.g. in flexible solar cells or wearables), is particularly challenging and requires novel synthesis routes (e.g. HIPIMS sputtering), to avoid degradation of the underlying materials.

As operating conditions are becoming more demanding, research in interface degradation and related defect physics has become more relevant than ever. The increased availability of HAXPES and environmental ESCA techniques has enabled the study of buried interfaces as well as semiconductor-electrolyte interfaces in near operating conditions providing valuable insights in critical processes, such as changes in the electronic band alignment or chemical reactions resulting in the formation of interface defects.

A detailed understanding of interfacial phenomena and processes is crucial to improve performance and durability of novel device structures. Combined with contact material innovation and novel synthesis techniques for the preparation of thin-film heterostructures these insights will help drive the development of next-generation technologies.

The goal of this symposium is to provide a dedicated platform for a multidisciplinary community of materials and device scientists, to discuss recent advances and future needs in interface engineering, manufacturing and advanced analytical techniques.

Hot topics to be covered by the symposium:

- Electrode-Electrolyte Interfaces: Energy storage
- Semiconductor-Electrolyte Interfaces: Catalysis
- New Device Structures for Emerging Photovoltaic Materials
- Interface Phenomena in Emerging Transistor Technologies
- Multifunctional Nanolayers and 2D Materials for Interface Engineering
- Defect Science and Stability at Interfaces
- Near Ambient Characterization of Surfaces and Interfaces
- Hard X-ray Photoemission Studies on Buried Interfaces and Depth Profiling
- Advanced Analytical Techniques for Surface and Interface Analysis
- Theoretical Studies and Computational Approaches for Interface Design and Analysis

Symposium Organizers:

Anna REGOUTZ
University College London
Department of Chemistry, 20 Gordon Street, London, WC1H 01J, UK
a.regoutz@ucl.ac.uk

Maria HAHLIN
Uppsala University
Department of Physics and Astronomy, Box 530, 752 20 Uppsala Sweden
Maria.Hahlin@physics.uu.se

Philip SCHULZ
CNRS/IPVF
18 Boulevard Thomas Gobert, 91120 Palaiseau, France
philip.schulz@cnrs.fr

Sebastian SIOL
Empa - Swiss Federal Laboratories for Materials Science and Technology
Überlandstrasse 129, 8600 Dübendorf, Switzerland
sebastian.siol@empa.ch

Introduction and scope:

The symposium offers a venue for the discussion of the latest developments and research efforts related to topological materials and their functionality. There are three main goals the symposium want to achieve: (i) showcase the newest results and controversies in the field, both in theory and experiment (ii) connect research directions in topological matter across various fields (iii) give hints at the future directions and emerging topics in this always expanding and exotic field.

Topology has found a route from purely mathematical concepts to physics applications. The discovery of the quantum spin Hall effect and topological insulators more than a decade ago has revolutionized modern condensed matter physics. Today, the field of topological states of matter is one of the most active and fruitful research areas, and intense efforts have been devoted to the exploration of new phases of matter. This goal is driven not only by the prediction of fundamentally new physical phenomena, but also by the potential technological applications of such materials. Among such applications are topological quantum computation, information processing with very low dissipation, new devices, developments of new codes, new material engineering.

The field is expanding at the speed of light. New materials, even atomically thin ones, have been proposed to be topological insulators. Moreover, classification of topological phases is extended and candidates of higher order topological materials have been found. At the same time, the study of the interaction between superconductivity and topological materials, such as quantum anomalous Hall insulators and Weyl semimetals, is yielding new and interesting results. Many new systems have been proposed to host Majorana zero energy modes for quantum computation. During this symposium, we would like to bring in pioneers in the field of topological and correlated materials to share their latest findings and insights with the participants. Topological concepts are now widely used in many branches of physics, not only limited to condensed matter systems but also in ultracold atomic systems, photonic materials and trapped ions. We hope that this symposium will inspire new ideas through communication between different fields. Moreover, this will foster collaborations among researchers and provide an opportunity for young researchers to learn from leaders in the field.

Hot topics to be covered by the symposium:

- Topological crystalline insulators
- Topological superconductivity
- Majorana fermions and topological quantum computing
- Quantum anomalous Hall insulators
- Weyl and Dirac semimetals
- Higher order topological insulators and superconductors
- Topological insulating magnets
- Interplay of superconductivity and topological materials
- Floquet and interacting topological systems
- Topology in mesoscopic systems
- Dissipative topological matter

Symposium Organizers:

Mircea TRIF
International Research Centre MagTop, Institute of Physics, Polish Academy of Sciences
Aleja Lotnikow 32/46, PL-02668 Warsaw, Poland
trifmircea@gmail.com

Pascal SIMON
Laboratoire de Physique des Solides, CNRS, Univ. Paris-Sud, Université Paris Saclay
91405 Orsay cedex, France
pascal.simon@u-psud.fr

Stefano CHESI
Beijing Computational Science Research Center
Building 9, East Zone, ZPark II No. 10 Xibeiwang East Road, Haidan district, Beijing, China, 100093
stefano.chesi@csrc.ac.cn

Introduction and scope:

WBG materials are the subject of intensive research motivated by attractive electrical properties making them promising for electronic applications. The symposium is designed to exchange recent advances in the field of growth, characterization, material properties, theoretical predictions, device fabrication, and system applications.

Wide bandgap (WBG) materials such as Ga2O3, MgO, ZnO, TiO2, GaN and high-k oxides, like ZrO2 and HfO2, have attracted much attention due to their emerging application as an active layer in thin film transistors, light-emitting diodes in the ultraviolet region and as transparent electrodes. The ability to control the physicochemical properties by adjustment of crystallographic structure, arrangement of atoms inside sample's volume and along the surface, taking into account point defects, is of crucial importance from both fundamental and applied research points of view. Extensive knowledge on electronic and optical properties of single crystals, films, nano-objects (like nanowires, nanorods, quantum dots, heterostructures etc.) including interfaces helps us to construct the informational bridge between the structural and electronic properties of materials.

Two major goals of the proposed symposium are to:

- become a forum for exchanging knowledge and ideas between physicists and materials scientists, as well as experimentalists and theoreticians;
- provide an overview and establish the current state-of-the-art in applications of such materials.

The presentations will aim to cover the topics:

- synthesis and crystal growth of single crystals and low-dimensional materials;
- band structure and lattice defects in crystal thin films and heterostructures;
- optical, mechanical and thermal properties;
- electrical properties: doping technology, and transport properties;
- properties of interface processes studied in situ: (chemical synthesis reactions, phase transitions, catalytic processes).
- dynamical properties: charge transfer, chemical reactions, etc.
- theoretical modelling and prediction of properties using, e.g., ab initio and machine learning.
- prospective applications of the WBG materials in various industrial sectors.

Prospective applications of the WBG materials in various industrial sectors will be discussed, e.g.:

- high-performance optoelectronic, ultraviolet and electronic devices.
- high-k oxides based memories
- sustainable energy and solid-state lighting.
- catalysis.
- applications in biology and medicine.

Hot topics to be covered by the symposium:

- Novel nano-heterostructure materials and related functional devices.
- Advanced characterization methods of WBG based materials.
- Novel energy and bio-materials based on WBG materials.
- 'Structure – property' relationship in WBG based materials.
- Interface structure of WBG based materials and properties processes studied in situ.
- High-performance optoelectronic devices.

List of scientific committee members:

- Jaan Aarik, Estonian Academy of Sciences, Estonia
- Davide Barreca, ICMATE-CNR and INSTM, Italy
- Richard Catlow, University College, UK
- Hanna Dabkowska, University of Hamilton, Canada
- Ulrike Diebold, Technishe Uinversity Vienna, Austria
- Karol Frohlich, Slovak Academy of Sciences, Slovakia
- Johannes Heitmann, Technical University Freiberg, Germany
- Sanjay Mathur, Institute of Inorganic Chemistry, Germany
- Giafranco Pacchioni, Universita' degli Studi di Milano-Bicocca, Italy
- Wojciech Paszkowicz, Polish Academy of Sciences, Poland
- Magdalena Skompska, Warsaw University, Poland
- Imre Miklos Szilagyi, Budapest University of Technology and Economics, Hungary
- Samuel Graham, Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, USA

Selected papers will be published in a special issue of the journal 'Materials Science in Semiconductor Processing' (Elsevier Ltd.). Impact Factor: 2.722. Accepted papers will appear online immediately (with doi and page numbers) and subsequently be compiled in an online special issue. Submission opens from September 15 until October 17 2020. Attendance to the meeting is mandatory for the papers to be published.

Symposium Organizers:

Elżbieta GUZIEWICZ
Institute of Physics - PAS
Al. Lotnikow 32 /46 , PL - 02668 Warsaw, Poland
guzel@ifpan.edu.pl

Eric PELLEGRIN
Carl Zeiss SMT GmbH (SMT-ETRC), Rudolf-Eber-Str. 2, 73447 Oberkochen, Germany
eric.pellegrin@zeiss.com

(Main Organizer)
Iraida N. DEMCHENKO
Warsaw University
Department of Chemistry, ul. Pasteura 1, 02-093 Warsaw, Poland
idemchenko@chem.uw.edu.pl

Wladyslaw WALUKIEWICZ
University of California
Lawrence Berkeley National Laboratory, Department of Materials Science and Engineering Mailstop 2R0200, 1 Cyclotron Road, Berkeley, CA 94720 USA
W_Walukiewicz@lbl.gov

Yevgen MELIKHOV
Cardiff University
School of Engineering, Queens Bldg., The Parade, Cardiff, CF24 3AA, Wales, United Kingdom
melikhov@cardiff.ac.uk

Introduction and scope:

Ferroic materials undergo a large variety of phase transitions and also exhibit important physical properties, many of which are used in industries world-wide. The study of their phase transitions provides useful ways to understand the origin of the properties, and thus to suggest new materials. Functionality in ferroics can be considered independently on their sizes. They are functional in the macroscopic, microscopic and nanoscopic scales in the form of single crystals, ceramics and thin films. Additionally, the role of controlled content of defects and hence the surface-bulk interrelation makes these materials scientifically exciting and perspective.

Ferroics exhibit strong changes in their properties at a phase transition between a high-symmetry phase, where the material is in a non-ferroic state, and a low-symmetry phase, where the shape of the unit-cell is slightly altered. This breaking of symmetry leads to the appearance of a new physical quantity that can be switched in some way. For instance, the oldest known ferroic property is that of ferromagnetism where magnetization can be switched by an applied magnetic field, leading to magnetic hysteresis. By analogy with ferromagnetism, ferroelectrics are where an electric polarization is switched by an applied electric field, again with hysteresis; and ferroelastics are where strain is switched by an applied stress. These ferroics are known as primary ferroics. One can also have multiferroics where two or more such ferroic properties are present, e.g. magnetization can be switched by an applied electric field, and vice versa. It can be appreciated therefore that ferroics provide a rich field of materials with interesting properties and behaviour, many of which have very important industrial use.

Group-subgroup symmetry changes at phase transitions often define the properties of ferroics. However, changes in micro- and nano-structures are at least as important. It is possible to tune both by changing the form of the material: single crystal, ceramic or thin film. This led to major breakthroughs such as the discovery of unexpected phases and properties at interfaces, as well as giant responses and phase transitions induced by light or electric field. The recent interest for topological structures in ferroics, e.g. domain walls, vortexes, skyrmions, which exhibit their own functionalities and properties, brings a new playground which makes ferroic materials even more scientifically exciting. The symposium will bring together experts working at the theoretical and experimental level.

Hot topics to be covered by the symposium:

- Structural phase transitions and critical phenomena
- Magnetoelectric and multiferroic materials
- Topological structures, domain boundary engineering
- Interfacial properties, 2D gases
- Thin films, multilayers and heterostructures
- Advances in ab-initio calculations and experimental methods
- Electro/magneto/mechano-caloric effects
- Flexoelectricity
- Piezotronics and photo-piezotronics
- Integration and devices
- Light-induced phenomena
- Defects and disorder in ferroics
- Electronic structure and optical properties
- Ferroelectrics and antiferroelectrics
- Piezoelectrics and lead-free piezoelectrics
- Relaxors and applications
- Recent advances in electron microscopic study of atomic arrangements
- Structural aspects of photovoltaic perovskites, organic-inorganic photovoltaic materials

Symposium Organizers:

Anthony Michael GLAZER
University of Oxford
Clarendon Laboratory, Parks Road, Oxford OX1 3PU, UK
michael.glazer@physics.ox.ac.uk

Guillaume NATAF
University of Cambridge
Department of Materials Science, 27 Charles Babbage Road, Cambridge, UK
gn283@cam.ac.uk

Krystian ROLEDER
Institute of Physics | University of Silesia
Uniwersytecka 4 40-007 Katowice Poland
Krystian.Roleder@us.edu.pl

Marek PAŚCIAK
Institute of Physics, Czech Acad. Sci.
Na Slovance 2, 182 21 Prague 8, CZ
pasciak@fzu.cz

Introduction and scope:

HfO2/ZrO2-based ferroelectrics have been referred to as "the ferroelectrics of the future", because they retain their polar nature down to a few nanometers and are fully compatible with modern CMOS technology. However, their full application potential and fundamental science behind the formation of ferroelectricity are still being discovered.

In the first years after the report of ferroelectricity in Si:HfO2 thin films, people with background in semiconductor industry immediately started investigating the potential of the materials for ferroelectric memories with both capacitor- and transistor-based concepts. As HfO2 and ZrO2 are already integrated as dielectrics in state-of-the-art devices, the idea of "simply making them ferroelectric" to establish a non-volatile memory device was highly attractive. A few years later, the potential for steep-slope transistors utilizing the negative-capacitance effect (NC-FETs) was recognized and formed today's second major branch of application-driven research on the topic of fluorite-type ferroelectrics.

This very applied perspective, however, caused a much slower pace toward fundamental understanding of the formation of this ferroelectric behavior. Moreover, researchers with a strong background in ferroelectrics remained a bit skeptical at first as it was very surprising that such properties had been overlooked in such well-studied oxides. In recent years, the understanding solidified and the communities started interacting. Nonetheless, there is still a lot to be done, both theoretically and experimentally.

Meanwhile, applied research did not stop and further applications beyond the abovementioned memories and low-power logic devices have been suggested. Today, the range of applications is broad and includes neuromorphic computing, energy storage and energy harvesting, piezo- and pyroelectric devices in general, decoupling capacitors, microwave antennas, and phase shifters.

The aim of this symposium is to provide a platform:

- for people working on these material to gain insights into applications up to industrial level
- for applied and fundamental researchers to connect and exchange
- that serves as a step stone for people who consider starting to get engaged in this exciting and quickly growing new field

Hot topics to be covered by the symposium:

- Novel growth and fabrication schemes
- Fundamental insights from theory and experiments
- Electric field cycling behavior: root causes and solutions
- Negative-capacitance effect and NC-FETs
- Emerging ferroelectric memories (capacitors-based FRAM, FE-FETs, FTJs and novel concepts)
- Piezo- and pyroelectric properties and related applications
- Neuromorphics and further applications
- Application insights and viewpoints from industrial partners

Invited speakers from academia:

- Cheol Seong Hwang (Seoul National University, South Korea): "Charge boosting in stacked ferroelectric/dielectric layers based on transient negative capacitance effect in (Hf,Zr)O_2 film."
- Uwe Schroeder (NaMLab gGmbH, Germany): [Overview on Ferroelectric HfO_2]
- Evgeny Tsymbal (Univ. of Nebraska, United States): "Reversible spin texture in ferroelectric oxides"
- Mircea Dragoman (National Institute for Research and Development in Microtechnologies - IMT Bucharest, Romania): "Microwave and THz devices using HfO_2-based ferroelectrics"
- Takao Shimizu or Hiroshi Funakubo (Tokyo Institute of Technology, Japan): "Electric field driven phase changes in epitaxial HfO_2-based ferroelectric films"
- Roozbeh Tabrizian (Univ. Florida): [M/NEMS: HfO_2-based Acoustic Resonators]
- Michael Hoffmann (NaMLab gGmbH, Germany): "Negative Capacitance in HfO_2- and ZrO_2-based materials"
- Alexei Gruverman (Univ. of Nebraska, United States): [Nanoscopic Insights into Electric Field Cycling Behavior.]
- Seung Chul Chae (Seoul National University, South Korea): "Stable Sub-Loop Behavior in Ferroelectric Si-Doped HfO_2"
- Alfred Kersch (Munich University of Applied Science, Gemany): "Characteristics of doped hafnia and zirconia from DFT calculations"
- Sanghun Jeon (KAIST, South Korea): "Non volatile ferroelectric tunnel junction for neuromorphic device application"

Invited industry contributions:

- Sabine Kolodinski (Globalfoundries Inc., Germany): [View from Industry and Report on their activities on NC-FETs, AFE-RAM, FeFET, Pyroelectric applications]
- Jaegil Lee (SK Hynix, South Korea): "Ferroelectric Device Applications & Challenges"
- Anders Blom (Synopsys Inc. United States): [Capabilities of a New Simulation Framework for Ferroic Materials]
- Milan Pesic (Applied Materials Inc., United States): "Physical Mechanisms and Reliability of Ferroelectric Memories"
- Stefan Müller (Ferroelectric Memory GmbH, Germany): [Ferroelectric HfO_2 and its Impact on the Memory Landscape]
- Shingo Yoneda (Murata Manufacturing Co. Ltd., Japan): "Nonlinear Polarization Response of HfO_2-based Thin Films Fabricated by Chemical Solution Deposition"
- Bert Jan Offrein (IBM Research Zurich, Switzerland): [Neuromorphic Devices Based on FE HfO_2]

Symposium Organizers:

Min Hyuk PARK
School of Materials Science and Engineering, Pusan National University
2, Busandaehak-ro 63beon-gil, Geumjeong-gu, Busan, 46241, Republic of Korea
minhyukpark@pusan.ac.kr

Sergey V. BARABASH
Intermolecular Inc., a subsidiary of Merck KGaA, Darmstadt, Germany
3011 North First St., San Jose, CA 95134, USA
sergey.barabash@intermolecular.com

Tony SCHENK
Materials Research and Technology Department, Luxembourg Institute of Science and Technology (LIST)
41 Rue du Brill, L-4422 Belvaux, Luxembourg
tony.schenk@list.lu

Introduction and scope:

This symposium will cover:
(i) Nanomaterials Synthesis: From 0D, 1D, 2D, and 3D, Multifunctional Hybrids.
(ii) Investigations: Structures and Properties, Analytical and Computational Modeling.
(iii) Applications: (a) Electronics- Gas/Pressure/Chemical/Biological Nanosensing, (b) Photonics/Plasmonics/Photovoltaics/Lighting Technologies, (c) Energy/Piezotronics/Green Energy (e) Photocatalysis, Water Purification, (f) Biomedical Nanomaterials, (g) Advanced technologies.

Nanostructures, particularly from inorganic metal oxides, organic, carbon, polymers, etc. family, are very important material candidates because of their surface-to-volume and morphology-dependent extraordinary properties suitable for various advanced technologies. The ongoing deployments in the direction of 0D (quantum dots), 1D (hybrid nanowires), 2D (from new semiconductors) and 3D networked materials have further become very relevant towards various applications, due to their excellent nanoscale features and simplicity of utilization. Due to their compact synthesis forms, they can be easily handled or integrated in the desired manner in devices or sensors. The 0D, 1D, 2D nanostructures from noble metals (Au, Ag, Cu, etc.) have found immense applications in sensing, biomedical, waveguides and telecommunications, etc. Nanostructures from metal oxides have been very interesting (fundamental as well applied) materials due to interesting bandgap values (intermediate between metals and insulators), suitable for various advanced technologies. When these metal oxides and metals are combined together in hybrid nanomaterials, they become further very relevant in terms of understanding the properties and accordingly applications. The carbon nanostructure family, i.e., fullerenes, CNTs (MWCNTs), graphene, graphene oxide (GO), etc., have shown very strong potential ranging from fundamental properties to advanced energy applications and hence have been the subject of huge research attention in the last couple of decades. Recent developments in the direction of 3D carbon networks have opened an entirely new dimension in nanotechnology research. Research on 3D soft ceramics from metal oxides interconnected networks, which is currently in the mainstream research focus, is very important, because it can be very helpful in up scaling the nanotechnology-related applications in modern life.

Appropriate growth strategies of different structures (0D, 1D, 2D and 3D) using simple methods, understanding their properties, their applications in different directions, etc. are still key issues. Interdisciplinary research platforms are required, which are equipped with: (i) synthesis groups for developing different nanostructures, (ii) theoretical/computational scientists, who can analyze/simulate for understanding the structure-property relations, and (iii) application experts, who can accordingly utilize these materials in various applications, which will be actually the main aim of the proposed symposium.

Hot topics to be covered by the symposium:

- Hybrid Metal Oxide Materials (0D, 1D, 2D, 3D): Synthesis & Characterizations, Structure-property relations, Analytical/Simulation studies, Applications: Electronics-Chemistry-Energy-Sesning-Lightening-Biomedical-Environmenta - Applications,
- Plasmonic Nanostructures: Synthesis & Characterization, Computational Modeling, Sensing and Nanophotonics Applications
- Carbon Family (Fullerenes to 3D graphene): Fabrication & Characterizations, Structure-property relations, Simulations studies, Applications: Nanoelectronics-Sensing-Supercapacitor-Batteries-Energy.
- Quantum Dots: QDs are recently gaining huge interests and one session of the symposium will be devoted to only QDs.
- Perovskites: QDs, NCs, nanowires, thin films, synthesis and applications.
- Synchrotron radiation/Ion beam-based material characterization and engineering

Symposium Organizers:

Dawid JANAS
Silesian University of Technology, Gliwice, Poland
Krzywoustego 4, 44-100 Gliwice, Poland
Dawid.Janas@polsl.pl

Jost ADAM
NanoSYD, Mads Clausen Institute
University of Southern Denmark, Alsion 2, DK-6400 Sonderborg, Denmark
jostadam@mci.sdu.dk

Lakshminarayana POLAVARAPU
Ludwig- Maximilians-University (LMU)
Department of Physics, Amalienstr. 54, D-80799 Munich, Germany
l.polavarapu@physik.uni-muenchen.de

Rosaria PUGLISI
CNR - IMM
Strada Ottava 5 Z.I., 95121 Catania, Italy
rosaria.puglisi@imm.cnr.it

Yogendra MISHRA
University of Kiel
Institute for Materials Science, Kaiser Str. 2, 24143 Kiel, Germany
ykm@tf.uni-kiel.de

Introduction and scope:

"3D architectures at the micro and nanoscale are allowing the emergence of new optical structures, with unique properties. These allow breaking the limits of conventional optics and photonics packaging. The prospect of extraordinary imaging resolution, sensitivity of optical sensors, wavefront shaping and advanced light manipulation, together with the use of extremely thin, miniaturized and multifunctional optics and metaoptics, open the possibility for designing novel devices for a vast variety of applications and markets.

The use of optical 3D nanostructures and optically engineered surfaces is still being harnessed at the theoretical and practical level, with new effects being identified in resonant dielectric metastructures, hybrid metal/nonmetal nanostructures, among many others. However, precise and cost-efficient fabrication of such smart 3D optical structures and its up-scaling for industrial application is still a big challenge.

The symposium will cover all the aspects from fundamentals via applications to industrial fabrication, in the leading edge of engineered optical surfaces, stressing 3D nanostructured surfaces and volumes and optical metamaterials. The talks will cover the entire value chain from the fundamentals of optical nanostructures modeling techniques, manufacturing technology, materials, product design and industrial applications.

The session will be promoted and organized from the H2020 project PHENOMENON (Laser Manufacturing of 3D nanostructuring optics using Advanced Photochemistry, GA: 780278), coordinated by AIMEN and with the participation of THALES, CNRS, Multiphoton Optics, ICFO, FLUXIM, IMT-A, Flexenable, CDA, PSA, FNMT, and DesignLED."

Keywords:

Optical design, nanophotonics, plasmonics, metamaterials, metalenses

Symposium Organizers:

Pablo M. ROMERO
AIMEN Technology Centre
Cataboi S2P, E36418 - Porriño, Spain
promero@aimen.es

Patrice BALDECK
Lab.Chimie, ENS Lyon, CNRS
46, Allée d'Italie, 69364 Lyon Cedex 07, France
patrice.baldeck@ens-lyon.fr

Ruth HOUBERTH
Multiphoton Optics GmbH
Friedrich-Bergius-Ring, 15; D97076 - Würzburg, Germany
ruth.houbertz@multiphoton.de

Introduction and scope:

The symposium broadly covers the scientific and technological aspects of synthesis, physical/chemical characterization and application of organic, inorganic and hybrid nanomaterials with special emphasis on the multiscale organization and self-assembly of ordered structures, in view of their integration into functional devices.

Semiconductor, dielectric, or metallic nanostructures have been predicted as technological boost in various fields including nano-electronics, optoelectronics, photonics, magnetism, phononics, plasmonics, advanced sensing and photovoltaics. The capability to control size, shape, bulk composition and doping of these nanostructures as well as their interface is crucial to tailor their properties.

The integration of these elemental building blocks into functional devices hinges critically on precise control of their spatial arrangement at the nano-scale i.e., density and relative positioning, both in plane and in depth. The ability to fabricate and organize ordered arrays of nano-objects on the solid substrates or and in the bulk is the key to support the technological development of new device concepts with predictable functional characteristics. The systematic control and the homogeneity of arrangement of each building block in the organized array are crucial for their exploitation both in conventional and in quantum devices.

Following very successful symposia organized in 2012, 2014, 2016, and 2018, this symposium intends to draw on previous experience. In particular, a special focus on multiscale fabrication, organization and self-assembly, area selective deposition, hybrid organic-inorganic approaches, is requested by the scientific community working in the field of nanotechnology. The symposium will provide the opportunity to present insights into advanced nano-structures and nano-device architectures at different stages of research and development.

The symposium is open to all experimental and theoretical contributions to the topic of organized nano-structures; the control of their composition and structural parameters in relation to their properties and functionalities. Thus, the symposium is conceived as a multidisciplinary platform that gathers researchers coming from academia and industry and promotes interactions among scientists and engineers working on all the aspects of semiconductor, metallic or dielectric nano-structures, ranging from fundamental physics and material science to the technological implementation and the final application in functional devices.

Hot topics to be covered by the symposium:

- Top-down and Bottom-up synthesis of nanostructures on surface and in volume
- Area selective deposition and hybrid organic-inorganic approaches (SIS and VPI)
- Doping issues in nanostructures
- Self and induced organization of nanostructures (including BCP-, DNA-, LC- based nanofabrication)
- Synthesis and properties of chiral nanomaterials
- Advanced methodology to control synthesis, positioning, shape, size in nanostructures
- Nanostructures for novel logic or memory device and for neuromorphic or quantum architectures
- Nanostructures for energy applications: photovoltaic and thermoelectric
- Nanostructures for advanced sensing, photonic, phononic, and plasmonic applications

Symposium Organizers:

Daniel NAVARRO-URRIOS
Catalan Institute of Nanoscience and Nanotechnology
Campus Bellaterra - Edifici ICN2 08193 Bellaterra (Barcelona), Spain
daniel.navarro@icn2.cat

Gabriele SEGUINI
CNR-IMM, Laboratorio MDM
Via Carlo Olivetti 2, 20864 Agrate Brianza, Italy
gabriele.seguini@mdm.imm.cnr.it

Patrizio BENZO
SINanO Group, CEMES-CNRS
29 Rue J. Marvig 31055,
Toulouse Cedex 4, France
benzo@cemes.fr

Pawel W. MAJEWSKI
University of Warsaw
Department of Chemistry, 1 Pasteur St.
Warsaw, Poland
pmajewski@chem.uw.edu.pl

Introduction and scope:

Recent advances in nanoparticle synthesis, atomic-scale characterisation, drawing on insights from theoretical modelling, have opened exciting possibilities to tailor nanoparticles for many applications, e.g. in catalysis, plasmonics, sensors, magnetism, and biomedical applications.

Nanoparticles (NPs) have been attracting much fundamental and application-oriented interest. NP properties are strikingly different from those observed in the bulk, which can be exploited in fields as diverse as biomedical applications, environmental sciences, optics, electronics, and catalysis. Important recent progress is due to advances in controlled assembly of nanoparticles (both by wet-chemical as well as by physical preparation); in the resolution of characterisation techniques (both in time and space), offering increasing possibilities for in-situ and often operando study of the formation and functionality of NPs; whilst important developments in the field of computational chemistry and physics allow enhancing our understanding on the origins of and trends in their properties.

This symposium builds on the successful symposia (2018 and 2019), and will bring together again leading experts on advanced techniques for NP synthesis, in order to promote cross-fertilisation and to inspire progresses in the control of NP size, shape, composition and functionalisation as well as in the fabrication of NPs with controlled complex morphologies and composition. Characterisation techniques with high spatial, time and energy resolution, and chemical sensitivity are an essential tool to both investigate the output of synthetic procedures and to elucidate structure-property relationships of NPs. This interdisciplinary forum will attract the participation of renowned experts in theoretical modelling of NPs structures and properties, which is crucial both for understanding atomic and electronic structures, and to predict non-trivial unexpected behaviours and unprecedented phenomena. The symposium will include also a few selected experts on functionality and practical applications of these nanomaterials. Given the "hot topic" nature of the symposium and the unique interdisciplinary discussion opportunities it will provide, we expect a numerous and high quality attendance.

Hot topics to be covered by the symposium:

1. Recent development in nanoparticle synthesis techniques
   - Wet-chemical: colloidal preparation, emulsions, impregnation
   - Gas phase preparation: ALD, spark discharge, size-selected nanoclusters
   - Templating in porous materials
2. Structural / chemical analysis of nanoparticles
   - Electron microscopy: high resolution/in-situ/acquisition and detection methodology
   - Advanced spectroscopy
   - Advanced diffraction and scattering techniques (X-rays, neutrons…)
3. Theoretical modelling of nanoparticles
   - Atomic ordering and electronic structure
   - Dynamical processes, excitations, reactions
4. Applications of nanoparticles
   - Structure-property relationships
   - Theoretical predictions vs experiment
   - Optical, catalytic, electronic, magnetic, sensing, biomedical

Symposium Organizers:

Patricia ABELLAN
Jean Rouxel Institute of Materials in Nantes (IMN), CNRS
2 rue de la Houssinière, BP.32229, 44322 Nantes cedex 3, France
Patricia.Abellan@cnrs-imn.fr

Petra DE JONGH
Utrecht University
Inorganic Chemistry and Catalysis, Debye Institute for Nanomaterials Science,
Universiteitsweg 99, 3584 CG Utrecht, The Netherlands
P.E.deJongh@uu.nl

Petra Ágota SZILAGYI
Queen Mary University of London
Mile End Road, E1 4NS London, U.K.
p.szilagyi@qmul.ac.uk

Thomas REISINGER
Institute of Nanotechnology, Karlsruhe Institute of Technology
Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany
thomas.reisinger@kit.edu

Symposium: V Polytypism in semiconductors

Introduction and scope:

Recent advances in the fabrication and characterization of polytypes semiconductor nanostructures have made crystal phase engineering a well-established tool to tailor material properties. This interdisciplinary symposium aims to identify challenges in the synthesis and characterization of new polytype semiconductors.

Semiconductors constitute the building blocks of the current microelectronic and optoelectronic industry. The standard (low energy) crystal phases of most semiconductors have already revealed all their potential and limitations in the development of advanced devices. On the other hand, polytypes of most semiconductors possess very different and peculiar physical characteristics with respect to their lowest energy structures. Main scope of this symposium is to promote the progress in the fundamental understanding (in the broad sense of theory combined with experiments) of the role of crystal phase engineering in materials' design. Specific topics and issues that will be carefully considered are:

Synthesis: The synthesis (pressure, indentation, epitaxy…) of polytype single crystals or heterostructures in a controlled manner represents a great challenge for a long time. The growth of nanowires has initiated a new impetus to this effort. Besides, new paradigms such as selective area growth or remote epitaxy open plenty of rooms to explore for original phase synthesis.

Experimental characterization: It is expected that a novel phase may alter remarkably the properties of the nanostructures (such as band gap, effective mass, phonon and electron scattering processes and excitonic properties) due to the presence of distinct crystal symmetry or of a significant interface between two phases. This stimulates the development and application of advanced experimental methods.

Theoretical modelling: Experimental investigation of novel phases in nanostructures requires deep quantitative understanding of condensed matter at nanoscale. Indeed, a significant uncertainty prevails in discerning the fundamental effect of crystal phase-dependent factors, from other factors (size, shape, composition, local strain, interface states…) that affect the main physical and chemical properties. This is the role of theory, modeling and simulations in the description of semiconductors polytypes.

Hot topics to be covered by the symposium:

- Phase transformation under extreme conditions or indentation
- Appropriate growth strategies of new crystal phases (VLS growth, Van der Walls epitaxy, …) and synthesis of polytypic heterostructures
- Modeling of critical processes during the synthesis of polytypes nanostructures in order to reach controlled composition, structure, geometry
- Experimental methods for investigating the properties of polytypic structures
- Theoretical methods for the description of electronic, optical and transport properties of novel polytypes
- Devices for the exploitation of the properties of polytypic structures

List of invited speakers:

- Riccarco Rurali - Spain
- Anna Fontcuberta y Morral - Switzerland
- Val Zwiller- Sweden
- Xavier Cartoixa - Spain
- Claes Thelander - Sweeden
- Vladimir Dubrovski – Russia
- Yann le Godec – France
- Heinz Schmid- Germany
- Sebastien Lehmann - Sweeden
- Claudia Rodhl – Germany
- Federico Panceira – France

Scientific Committee members:

- Gilles Patriarche, C2N/CNRS/UPSaclay, France
- Kimberly Dick, Thelander Lund University, Sweeden
- F. Bechstedt, Friedrich-Schiller Universität Jena, Germany

Symposium Organizers:

Laetitia VINCENT (Main Organizer)
Centre de Nanosciences et de Nanotechnologies (C2N) / CNRS
10 Boulevard Thomas Gobert - 91120 Palaiseau, France
laetitia.vincent@c2n.upsaclay.fr

Ilaria ZARDO
University of Basel
Department of Physics,
Klingelbergstrasse 82, 4056 Basel, Switzerland
ilaria.zardo@unibas.ch

Michele AMATO
Laboratoire de Physique des solides (LPS), Université Paris Saclay
1 rue Nicolas Appert, Bâtiment 510, 91405 Orsay Cedex, France
michele.amato@u-psud.fr

Claudia Fasolato
Dipartimento di fisica e geologia
FIS/01 – Fisica Sperimentale
Università degli Studi di Perugia
P.zza Università - 06123 – Perugia
claudia.fasolato@unipg.it

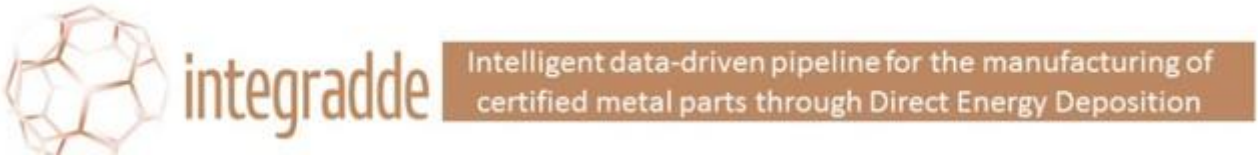
Introduction and scope:
3D printing and additive manufacturing processes are of strategic importance for the industry of the future. This is the reason why the second edition of our symposium is expected to cover the most innovative 3D fabrication techniques able to respond to the future market. For this second edition, more attention will be given to materials and processes hybridization. In addition, economical and industrials aspects of the 3D fabrication will be also considered.

The symposium will cover the most innovative 3D manufacturing processes for the industry of future as detailed in the following list :

- 3d nano and micro printing
- 4D printing
- Optimization and quality control of DED - LPBF - EPBF processes
- New developments in metal AM with binder jetting, material jetting and FDM
- Recent improvements of the SLS - SLA processes
- Performances and limits of modelling
- New materials, multimaterials, functionally graded materials for 3D printing
- Additive manufacturing of smart devices with buried sensors
- Post-processing - finishing - functionalization of surfaces and parts

Hot topics to be covered by the symposium:
3D printing and additive manufacturing of metals, ceramics and polymers are able to deliver tailored products with customized geometry and physical properties. These fully scalable processes offer cost-effective solutions for producing both small and large objects of different materials on a large scale in order to respond to the new market demands. The global 3D printing market is expected to reach $21 billion by 2020 — quadrupling its size in just four years. While 3D printing, also referred to as additive manufacturing, comes with many benefits, such as freedom of design, easy prototyping, customization and streamlined logistics, it also poses many challenges both from scientific and technological point of view, which will be covered by this symposium.

Regarding the strategic importance of this topic for the European market, it is proposed to associate the H2020 INTEGRADDE project (Intelligent data-driven pipeline for the manufacturing of certified metal parts through Directed Energy Deposition processes) to the program of our symposium. We can notice that two of the co-chairmen of our symposium are involved in this European project.



Symposium Organizers:

Ambroise VANDEWYNCKELE
AIMEN
Head of Advanced Manufacturing Department, Polígono Industrial de Cataboi SUR-PPI-2 (Sector 2) Parcela 3, 36418 O Porriño (Pontevedra), Spain
ambroise@aimen.es

Claude BARLIER
CIRTES
29bis, voie de l'Innovation, 88100 Saint-Dié-des Vosges, France
claude.barlier@cirtes.fr

Jean-Paul GAUFILLET
IREPA LASER – Institut Carnot MICA
Pole API Parc d'Innovation
67400 Illkirch, France
jpg@irepa-laser.com

Thomas GRAF
IFSW
thomas.graf@ifsw.uni-stuttgart.de

Introduction and scope:
This symposium will draw together researchers and industrialists from across the EU and the World to discuss the latest developments in the field of organic crystal growth. Topics will cover areas such as polymorphism, understanding fundamental crystal growth, computer modelling, augmented functional properties and alternative routes to organic crystals.

The aim of this symposium is to promote discussions and stimulate fundamental and applied research in the field of organic crystal growth and to encourage a discussion into the application of organic crystals in such diverse fields as transistors, pharmaceutical and agrochemical production and photovoltaics. The symposium will also serve as a conduit for the meeting of researchers in public and private entities and facilitate augmented cooperation between academia and industry. By showcasing the current state-of-the-art in organic crystal growth and the deeper understanding of the fundamentals of how they grow, we hope to encourage cross-fertilization of ideas and thereby further raise the profile of organic crystal research in the EU.

Hot topics to be covered by the symposium:
new crystal syntheses, deeper understanding of organic crystal growth, improved functionality, organic electronics and superconductivity

List of invited speakers:
- Prof. Jack Dunitz – ETH Zurich
- Prof. Gautam Desiraju - Indian Institute of Science
- Prof. Klaus Mullen – MPI, Mainz
- Prof. Alan Myerson - MIT
- Prof. Christopher Aakeroy – Kansas State University
- Dr Mauro Gemmi – IIT, Pisa
- Dr Rui Guo - UCL
- Dr Asma Buanz - UCL
- Dr Jenn Coockman – University of Limerick
- Dr Enrico da Como – University of bath
- Dr Iryna Andrusenko – IIT, Pisa
- Dr. Enrico Mugnaioli – IIT, Pisa
- Dr. Ariana Lanza – IIT, Pisa
- Dr Jan Gerit Brandenburg - UCL
- Dr Aurora J. Cruz-Cabeza – University of Manchestere
- Dr Matteo Salvalaglio - UCL
- Prof. Joop van der Horst – University of Strathclyde
- Prof. Alastair Florence – University of Strathclyde
- Prof. Kevin Roberts – University of Leeds
- Dr Ivo Rietveld – University of Rouen

Proceedings of this symposium will be published as a Virtual Special Issue of Crystal Growth & Design.

CRYSTAL GROWTH & DESIGN

Crystal Growth & Design have graciously offered to sponsor a student to attend Symposium X. Applications for this sponsorship should be submitted to the organizing committee of Symposium X, via simon.hall@bristol.ac.uk and will be decided by the organizing committee.

Symposium Organizers:

Peter CHRISTIANEN
Radboud University Nijmegen
Houtlaan 4, 6525 XZ - PO Box 9102, 6500 HC
Nijmegen, The Netherlands
Peter.Christianen@ru.nl

Simon HALL
School of Chemistry - University of Bristol
Bristol, BS8 1TS, UK
simon.hall@bristol.ac.uk

Ursel BANGERT
University of Limerick
Limerick, V94 T9PX, Ireland
ursel.bangert@ul.ie

Full information about the scientific programme, abstract submission, registration and accommodation can be found through the link to

www.european-mrs.com

For general information about the conference contact the E-MRS Fall Meeting Conference Secretary

CONFERENCE SECRETARIAT
Faculty of Materials Science and Engineering
Warsaw University of Technology
Woloska 141
02-507 Warsaw, Poland
Phone: +48 22 234 87 94
Fax: +48 22 234 85 14
Email: emrs@pw.edu.pl

All information regarding a specific symposium can be obtained by making direct contact with the symposium organisers. The email addresses will be found at the end of the description of each symposium given in this announcement.

LANGUAGE
The conference language is English.

CONFERENCE VENUE

Central Campus of Warsaw University of Technology
Pl. Politechniki 1,
00-661 Warsaw, Poland

Many places of interest are within easy walking distance of the University. The area around the campus has a 'student town' atmosphere with many student pubs, which are excellent places to meet and share experiences after the symposia.

Good public transport connections to the university, by metro, tramway, or by bus are available from anywhere in Warsaw. The Central Campus is located just 10 minutes from the city centre and 20-30 minutes from the Old Town.

REGISTRATION
All participants (including chairpersons, authors, presenting authors, invited speakers, scientific committee members…) must register. Online registration and payment is recommended to avoid long queues.

PLEASE NOTE: Registration for the conference and abstract submission are separate items and are not linked.

On-line registration is open until 2nd September, 2019.
On-site registration will be open on Sunday, September 15th, 2019, from 14:00 to 18:00 and during the conference from 08:00-18:00.

On-site payment hours:

Sunday, September 13th, 2020	14:00 - 18:00
Monday,September14th, 2020	08:00 - 18:00
Tuesday, September 15th, 2020	08:00 - 18:00
Wednesday, September 16th, 2020	08:00 - 18:00
Thursday, September 17th, 2020	08:00 - 18:00

REGISTRATION FEES

FULL RATE
including: access to symposia, access to poster sessions, access to exhibition, access to workshops & tutorials, conference booklet, lunches from Mon. to Thu., coffee breaks, social event, E-MRS membership for one year and one proceedings volume (if applicable).

BEFORE August 8th, 2020	430 EUR net
AFTER August 8th, 2020	520 EUR net
ON SITE	560 EUR net

STUDENT RATE
including: access to symposia, access to poster sessions, access to exhibition, access to workshops & tutorials, conference booklet, lunches from Mon. to Thu., coffee breaks, social event, E-MRS membership for one year and one proceedings volume (if applicable). (Students have to give evidence of their university registration at the main desk)

BEFORE August 8th, 2020	260 EUR net
AFTER August 8th, 2020	350 EUR net
ON SITE	390 EUR net

E-MRS is a non-profit organization, no subject to VAT.

The following payment options are offered:
- Credit card (Carte Bleue, Visa, Eurocard/Mastercard)
- Cheque (to the order of E-MRS)
- Bank transfer (cf. BANK INFORMATION section)

NB: Purchase order from company are accepted too.

IMPORTANT DEADLINES
- May 18th, 2020: Deadline for abstract submission.
- June 30th, 2020: Notification of acceptance and mode of presentation.
- August 8th, 2020: Last day for early registration at the reduced fee.

Please note that the early registration fee is applicable only for a participant who registers and submits payment by 8th August, 2020.

ABSTRACT SUBMISSION
Abstract length: Website submissions are limited to 1500 characters. (plain text only, no figures, no formulae…)
Note: All abstracts must be submitted through the E-MRS website at www.european-mrs.com
Submitting abstracts through the website is very easy. Follow the step-by-step instructions on the template, making sure that the complete mailing address is included for the presenting and corresponding authors. After submitting the abstract, please use the given Control ID number in all communications with E-MRS regarding the abstract UNTIL a paper number (e.g., A 8) has been assigned. After that date, any change must be submitted to: emrs@inmat.pw.edu.pl with the Subject: Abstract Revision and the email must include your Paper number. Please state exactly where the text revisions are located (e.g., title, author, body, etc)

POSTER PRESENTATIONS
Poster sessions will be held on 14th and 15th of September. The authors presenting posters are required to be present at the appropriate session to discuss or defend the paper.
The maximum poster size is A0 (841×1189 mm) verticaly; No tapes or pins will be needed for hanging posters;
The posters must be removed immediately after the session and the Conference Organisers accept no responsibility for posters left up after this time.
Conference participants may preview the posters during the morning and afternoon sessions, before the formal poster sessions.

ORAL PRESENTATIONS
Duration of oral presentations, including discussion, depends on the Symposium Organisers but the strong recommendations are:
45 minutes for plenary talks,
30 minutes for invited talks,
15 minutes for contributed talks.
Close adherence to these times will enable participants to move seamlessly from one symposium to another

GRADUATE STUDENT AWARD
E-MRS announces the availability of awards (up to 2 per symposium) for graduate students conducting research on a topic to be addressed in a symposium held during the E-MRS 2019 Fall Meeting.

Each award will consist of a grant of 350 EUR which will be presented with a diploma

Criteria for selection are:
- Participation at the E-MRS 2020 Fall Meeting as an attendee and author or co-author of a symposium paper and must be entrusted with the (oral or poster) presentation of the paper
- Outstanding performance in the conduct of this project and promise for future substantial achievement in materials research as judged by the faculty advisor
- Significant and timely research results

Application materials required:
- Application form duly completed
- Abstract of paper to be presented at the meeting
- Letter of support from research supervisor

Submit the complete application form by email emrs@pw.edu.pl to the E-MRS Secretariat by July 15th, 2020 at the latest.

Winners will be notified on-site directly by the concerned symposium organizer.
E-MRS Graduate Student Award winners must be present during the ceremony on Wednesday evening, 16th September, to get their prices.

CONFERENCE SCIENTIFIC PROGRAMME
The complete scientific program will be available on the website from mid July 2020.

EXHIBITION
The industrial exhibition will be held from September 14th – 16th in the historic Main Hall of Warsaw University of Technology, close to the symposium rooms. The Main Hall is also the venue for all refreshment breaks between the scheduled sessions to facilitate the maximum contact between exhibitors and participants.
The Exhibition at the 2020 E-MRS Fall Meeting will provide an excellent opportunity for participants to become acquainted with some of the latest equipment and services relevant for materials science research and to obtain information, costs and availability.

PROCEEDINGS
The submitted manuscripts being considered for publication will be subjected to a peer review procedure. The decisions on the deadline and procedure for submitting manuscripts are made by the SYMPOSIUM ORGANISERS. The authors of papers accepted for presentation at the conference should ensure that they have the appropriate instructions for preparing the manuscript.

ACCOMMODATION
Nobell Congressing, as the OFFICIAL HOTEL PROVIDER FOR E-MRS 2020 FALL MEETING, is pleased to offer you various standards of accommodation at discounted rates. We offer hotel accommodation in hotels located a few steps from a conference venue – in walking distance. You may choose from a range of hotel standards to suite all budgets. All prices are discounted specifically for participants at the E-MRS 2020 Fall Meeting. Book your hotel at https://emrs.nobell.pl/hotels.

Booking team
Nobell Congressing
Norbert Karczmarczyk
phone: +48 22 621 67 37
email: norbert@nobell.pl

Please note that hotel booking and conference registration are totally separate systems and are not linked in any way.

SOCIAL EVENT
All participants are invited to attend the Conference Reception on Wednesday September 16th, 2020 starting at 18:00. Musical entertainment and refreshments will be provided as part of conference arrangements. Symposium organizers and Gradute Student Award winners will be honoured at the commencement of the reception.

AUDIOVISUAL EQUIPMENT
For the oral presentations - the following equipment will be available:
- laptops with XP or Windows 7 and Microsoft Office Power Point. It is preferable that presentations are on CD or USB flash memory stick, if an author requires something else please contact the organisers
- digital projector
- laser pointers and microphones if necessary

INTERNET ACCESS / WIFI
The Computer Lab will be open from 8:00 to 18:00 for all participants during the conference. In addition wireless access to the internet will be provided for all conference participants possessing their own laptops.

PASSPORTS AND VISAS
Citizen having passports from certain countries need a visa to enter Poland. If you need any assistance to obtain your visa, please contact us as soon as possible (indicate your address, date and place of birth, your passport number and date of expiration).
By email: emrs@pw.edu.pl
Subject: VISA ASSISTANCE - FALL MEETING
All letters of invitation will be sent by airmail and by PDF e-mail attachment unless a courier account number is provided with the original request. E-MRS is not able to contact Embassies in support of an individual attempting to gain entry to attend the meeting. Because the application for a visa can be a lengthy process, we recommend that you start your visa application process as soon as you have been notified that your paper has been accepted. We also recommend that you secure your travel visa before registering for the symposium.

LETTERS OF INVITATION
The Scientific Secretariat will, on request, send a personal invitation to participate. This invitation is only to assist potential participants to raise funds or to obtain a visa, and is not a commitment on the part of the organisers to provide any financial support.

LIABILITY
The E-MRS and Local Organizers of the 2020 Fall Meeting cannot accept liability for any personal accidents, loss of belongings or damage to the private property of participants, either during, or directly arising from, the E-MRS 2020 Fall Meeting. Participants are requested to make their own arrangements with respect to health, travel and property insurance before leaving for the conference. Participants who are citizens of a European Union member state may obtain a European Health Insurance Card which gives some entitlement to medical treatment whilst in Poland.

GETTING TO and AROUND WARSAW

By plane

Warsaw Chopin Airport

Departures and Arrivals Information, phone + +48 22 650 42 20

On-line timetable www.lotnisko-chopina.pl

Warsaw's Chopin Airport is located about 10 km from the city centre, which can be easily reached by car, public bus or taxi. https://www.lotnisko-chopina.pl/en/index.html

Warsaw Modlin Airport

Airport Information, phone +48 22 315 18 80

Airport webpage: http://www.modlinairport.pl/

Train: By Modlin shuttle-bus to Modlin train station, then by train (KM) to Central Railway Station. (4-5 €)

Bus: Modlin-bus connects Modlin Airport and Central Railway Station

Taxis

For arrivals at Chopin airport use the official taxi rank as the airport is served only by 3 Radio-Taxi companies: Ele Taxi, iTaxi and MPT Taxi and the fare to the city centre should not exceed 40PLN. When using taxis in Warsaw, it is strongly recommended that you use only those showing: the symbol of Warsaw – a mermaid – on both front doors, yellow/red stripes affixed to the glass along the front doors, a number on the side of the vehicle, a hologram with the licence number and the vehicle's registration number on the upper right-hand corner of the front glass and a sticker with price information per kilometer displayed on the glass of the right-hand side back door. It is recommended that you use one of the city's official Radio-Taxi companies shown above, and order a taxi by telephone or through your hotel.

By train

There are three train stations in Warsaw that handle international and domestic traffic:

- Warszawa Centralna (Central Warsaw) (Aleje Jerozolimskie 54) - situated in the city centre with very good connections to all parts of the city'.
- Warszawa Zachodnia (West Warsaw) (Aleje Jerozolimskie 144) – adjacent to the international bus terminal where those travelling in or out of the country make their transfers.
- Warszawa Wschodnia (East Warsaw) (Lubelska 1) - located on the east side of Vistula River (Praga)

Railway tickets can be purchased using cash or credit cards at the windows (kasa) in the stations, on the Internet or at selected travel agencies. You can also purchase your ticket on the train from the conductor, immediately after boarding the train. This is not applicable for travel on the Intercity Pendolino services as prior reservation is mandatory. Tickets sold on the train are subject to an additional fee.

The train Timetable is available at: www.pkp.pl or www.intercity.pl

Parking

There is no free parking around the Conference Venue.

The whole area of Warsaw city centre is a controlled parking zone. This rule applies from Monday to Friday, from 8 am to 6 pm. On Saturdays, Sundays and public holidays parking is free.

Warsaw Car parks system "Park & ride":
http://www.ztm.waw.pl/parkujijedz.php?c=116&l=2

Useful links:
http://www.ztm.waw.pl/
http://warsawtour.pl/en

LOCAL PUBLIC TRANSPORT

The WUT Central Campus can be easily reached using public transport. The tram stop "Plac Politechniki" for lines 10, 14 and 15 is immediately outside the university and the Metro station "Politechnika" is a 10 min. walk from the venue.

From the city centre's main railway station "Warszawa Centralna" it is about a 20 min. walk, or 3 min.by tram No. 10, to the conference venue. Tram 10 departures from the stop "Dworzec Centralny" in the direction "Wyscigi" and "Służewiec" every 10-15 minutes. There are three stops to the "Plac Politechniki" tram stop.

The local trains (SKM -Fast Urban Railway, and KM - Masovian Railways), buses, trams and metro require a valid ticket – the one-way price is 1-2 € and can be bought in any kiosk, in ticket machines at most bus stops or inside trains and buses) or from the bus or tram driver.