Renaissance Cloister by Sangallo
Faculty of Civil and Industrial Engineering

September 11-14 2018

Nano Innovation 2018
Conference & Exhibition

Rome, 11-14 September

www.nanoinnovation.eu
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Institutional Patronages

Scientific Patronage

Corporate Partner

Got Talent

call for young researchers by BRACCO FOUNDATION

WarrantGroup

GRUPPO TECNOINVESTIMENTI

Fondazione Bracco

The printed version of NanolInnovation 2018 programme is updated at September 3rd.

All subsequent changes and updates will be available on the official website: www.nanoinnovation.eu

Please, refer to the website for the updated version of the official programme.
After the successful experience of the former events Nanolitaly and Nanotechitaly, their promoting Organizations, namely Nanolitaly Association and Airi - Italian Association for Industrial Research, respectively, have agreed in 2016 to organize a new joined event: NanoInnovation.

The second edition of NanoInnovation has successfully finished with the following numbers: 1.150 participants, 23 co-organizers, 27 exhibitors, 24 industrial sponsors, 4 scientific sponsors, 1 corporate partner, 70 chairs, more than 300 speakers, 3 plenary sessions, 4 tutorial lectures, 13 international keynote lectures, 54 technical thematic symposia, 8 special sessions, 1 round table, 4 workshops, 4 satellite events, 2 poster sessions, 2 prizes for young researchers, 4 international delegations coming from South Korea, Poland, Switzerland and Taiwan and 50 networking participants with 171 B2B meetings organized.

The third edition of NanoInnovation will be held from 11 to 14 September 2018, still hosted in the renaissance cloister by Sangallo at the Faculty of Civil and Industrial Engineering of “Sapienza” University of Rome.

NanoInnovation is the reference national event for the wide and multidisciplinary community involved in the study and development of micro and nanotechnologies and in their integration with other enabling technologies (KETs) in all application fields.

Main goals of NanoInnovation 2018 still are:
• Providing a meeting forum among academy, research and companies.
• Displaying the State of the Art in applied research on nanotechnology.
• Acting as a showcase for the most important innovation deriving from nanotechnology and KETs
• Supporting the knowledge transfer among different application sectors.

The promotion of a Responsible Research and Innovation, toward a sustainable development in the social environment and economic frames is one of the driving themes of the event.

The programme of NanoInnovation 2018, strongly oriented toward application and market aspects of nanotechnology and KETs, foresees the presence of highly qualified speakers and institutions, coming from national and international companies, research centers and universities.

NanoInnovation also offers to students, PhDs and young researchers an excellent and unique opportunity of updating on the latest developments on nanotechnologies, meeting leading players in the field. Several participation opportunities will be scheduled, ranging from the presentation of the research results on applicative technologies to the organization of technical-scientific sessions, workshops and satellite events, also with the purpose of presenting new instruments or disseminating projects results.

We would like to thank the Faculty of Civil and Industrial Engineering of “Sapienza” University of Rome for kindly hosting the conference, the Department of Basic and Applied Sciences for Engineering for logistic and scientific support, the Steering and Programme Committees for setting up the program structure, the Session Chairpersons and the Speakers who accepted our invitation to share their expertise.

A particular thank to the companies and organizations sponsoring the event, and making possible to participate for free.

We extend our thanks to all the people that worked hardly to make NanoInnovation a valuable and informative experience.

The NanoInnovation 2018 Organizing Committee
Steering Committee

Elvio MANTOVANI (chair)
- Airi

Maria Letizia TERRANOVA (vice chair)
- NanotItaly Association

Elisabetta AGOSTINELLI
- CNR ISM
- Materiali Nanofasici

Massimo BERSANI
- Fondazione Bruno Kessler

Chiara CAPPELLI
- Scuola Normale Superiore

Sergio D’ALBERTO
- LFoundry

Massimo DEL MARRO
- Assing Spa

Annalisa GHIGLIA
- Nanoforum

Andrea LAMBERTI
- Polytechnic of Turin

Giulio LAMEDICA
- ZEISS

Patrizia LIVRERI
- University of Palermo

Luca MARCHIOL
- University of Udine

Francesco MATTEUCCI
- Dhitech

Vittorio MORANDI
- CNR - IMM
Corrado SPINELLA
- CNR - DSCTM

Donatella PAOLINO
- University "Magna Graecia" of Catanzaro

Maurizio PERUZZINI
- CNR - DSCTM

Francesco PRIOLO
- Distretto Tecnologico Sicilia Micro e Nano Sitem

Giancarlo RUOCCHIO
- IIT
- Sapienza University of Rome

Corrado SPINELLA
- CNR - DSCTM

Sergio VALERI
- University of Modena and Reggio Emilia

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Programme Committee

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- NanolTal Association

Sesto VITICOLI (vice chair)
- Airi

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- ZEISS

Stefano BIANCO
- Polytechnic of Turin

Enrico BRAIDOT
- University of Udine

Onofrio Antonino CACIOPPO
- LFoundry

Sabrina CONOCI
- STMicroelectronics

Filippo D’ARPA
- CEA Leti / PAC-G

Luciana DINI
- Sapienza University of Rome
- CNR NANOTEC

Narciso GAMBARCORTI
- CEA Leti / PAC-G

Ettore GAROFALO
- Assing Spa

Roberto GIANNANTONIO
- Dhitech

Rodorico GIORGI
- CSGI
- University of Florence

Carlo MARIANI
- Sapienza University of Rome
Programme Committee

Gaspare VARVARO
• CNR ISM
• Materiali Nanofasici

Daniele PASSERI
• Sapienza University of Rome

Davide PEDDIS
• CNR ISM
• Materiali Nanofasici

Giancarlo PEPPONI
• Fondazione Bruno Kessler

Maria Sabrina SARTO
• Sapienza University of Rome

Emanuela TAMBURRI
• NanoShare

Gaspare VARVARO
• CNR ISM
• Materiali Nanofasici

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• Scuola Normale Superiore

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Giovambattista DE SARRO
• University "Magna Graecia" of Catanzaro

Sergio GALBIATI
• LFoundry

Luigi NICOLAI
• University of Naples "Federico II"

Emanuele RIMINI
• University of Catania
Open Infrastructure for Advanced TOmography and Microscopies (ATOM)


The aim of the project is the foundation of an open research infrastructure for materials and devices characterization, using advanced tomography and microscopy techniques.

The presence in the region of a cluster of scientific instrumentation operating at the nanoscale is one of the fundamental requirements for fast technological transfer in the field of nanotechnology. The ATOM project is jointly presented by the Department of Basic and Applied Sciences for Engineering of Rome Sapienza University, together with other institutions of the same University (CNIS - Research Center for Nanotechnologies applied to Engineering and the Department of Chemistry), and by the Rome Unit of the CNR Institute of Nanotechnology, carrying out cutting-edge research in the nanotechnology sector in the region Lazio, as well as in Italy and internationally.

The network that these research institutions intend to set up in order to develop the ATOM infrastructure will be joined, as strategic partners, by some of the most significant companies in the sector operating in the region, such as Leonardo Finmeccanica, ASSING, Rina-CSM, CRISEL and ZEISS.

ATOM is founded with the aim of investigating in detail the 3D structure of materials, devices, components and biological tissues, from the mesoscopic to the nanoscopic scale, through functional and dynamic nano-characterization.

The planned acquisition will provide users with innovative instrumental platforms with applications to the bio-medical, micro- and nano-electronics, cultural heritage and additive manufacturing sectors.

ATOM is conceived as a link between research and business, in virtuous synergy between public and private, to stimulate research and, at the same time, to develop the market linked to its technological applications.

The public sector, which will host the scientific instrumentation and will provide the staff for management and research development, aims to acquire state-of-the-art equipment to enhance nanotechnology skills and international competitiveness.

The private sector, which will guarantee the use of the equipment and, hence, the financial sustainability of ATOM, needs to position itself in the making of products in activity sectors of higher added value. It, thus, requires access to advanced characterization equipment, both to speed up production and to verify the quality of the products.

Regional, national and international companies and research institutions will have access to the services provided by ATOM through an online reservation platform, according to a specific Access Regulation for the Infrastructure.


ENTE FINANZIATORE

REGIONE LAZIO

LAZIO INNOVA

PARTNER di PROGETTO
Airi is a private, not-for profit Association, funded in 1974 to promote industrial Research and Innovation in Italy and to enhance co-operation between the private and public sector.

The Association is the focal point for about 100 members, representing private industrial enterprises, large and SMEs, active in Research & Innovation, as well as public research organizations. Researchers of Airi members constitute about the 45% of the researchers in the Country.

In 2003, Airi has created Airi/Nanotec IT, a division dedicated to promote nanotechnologies and their application. A large part of the Italian players in nanotechnology is member of Airi/Nanotec IT, which, since 2014, has extended its attention to the integration of nanotechnologies with the other Key Enabling Technologies (KETs).

To pursue its mission, Airi, monitors scientific R&D trends and their applications, disseminates information, facilitates technology transfer and promotes Responsible Research and Innovation (RRI). International contacts and cooperation are pivotal to its activity. Airi has a long experience in participation in co-operative European projects (FP 6, FP 7, Horizon 2020). Often as co-ordinator.

Due to its broad representative base and experience, Airi is a key opinion leader for the National decision-makers in addressing industrial research and innovation strategies aimed to sustain the technological development of the Country, strengthen its competitive position. Airi, periodically publish a report “Prioritary Technologies for the Italian Industry”, which has become a guide for National technology planning. In 2015, together with CNR, Airi has published a report on Responsible Research and Innovation. MIUR has embodied its indications in the National Plan for Research 2015-2020.

The organization, by Airi, of an International Conference dedicated to nanotechnologies (NanotechItaly) dates back several years. NanotechItaly 2015 was at the 8th Edition.

Web Site: www.airi.it - www.nanotec.it
The NanoItaly Association has been recently established with the aim of promoting, enhancing and supporting the role of bio-nano technologies in the Italian and European societies in all applicative, social and economic contexts, with particular reference to the development of technologies of industrial interest and to the social impact on the population of product innovations based on nano aspects.

NanoItaly is a cultural no-profit, non-political association, organized on the sovereignty of the members’ assembly and whose corporate offices are elective and held without charge.

The main purpose of the Association is to promote and support the integration of the scientific and industrial communities relating the wide field of bio-nano technologies, composed of researchers, technologists and professionals from public research and industrial laboratories, in order to discuss innovative ideas, exchange knowledge and help transfer of know-how, allowing the integration of ideas and knowledge between different areas of application.

We are strongly convinced that meeting and integration of scientific and technological communities traditionally separated from each other to build a new reality able to define new goals and influence the transfer of skills and knowledge from laboratories to businesses and markets, is an absolute need for a profitable development of nanotechnology in our country.

The Association aims to support and encourage collaboration between research institutions and industry, in order to jointly contribute to the regional, national and European programs, to promote the creation of research networks and infrastructure for the needs of research in nano-bio-technology and nanoscience.

The association membership is open to both individuals and organizations interested in participating in the development of the variegated world of nano-bio-technology.

For more information and adhesion please refer to the Association website: www.associazione-nanoitaly.it which will be available since October 1st 2015.

The Association is managed by a Scientific Board which is presently composed by:

Luigi Ambrosio  
Francesco Cubadda  
Luciana Dini  
Roberto Morabito  
Fabrizio Pirri (Scientific Secretary)  
Marco Rossi (Vice-President)  
Giancarlo Ruocco  
Giancarlo Salviati  
Pietro Siciliano  
Corrado Spinella  
Maria Letizia Terranova (Treasurer)  
Marco Vittori Antisari (President)

Associazione Nanoitaly  
c/o Dip.to di Scienze di Base ed Applicate  
Sapienza Università di Roma  
Via Antonio Scarpa, 16 – 00161 Roma  
Contact person: Marco Vittori Antisari (marco.vittori@nanoitaly.it)

Web Site: www.associazione-nanoitaly.it
Sapienza University of Rome

SAPIENZA UNIVERSITY OF ROME
The Largest University in Europe
The Oldest University in Rome

Sapienza University of Rome, founded in 1303 by Pope Boniface VIII, is one of the oldest universities in the world and a high performer among the largest universities in international rankings. It is the first University in Rome and the largest University in Europe: a city within a city, with over 700 years of history. With over 125,000 students, 4,000 professors and nearly as many administrative and technical staff, Sapienza represents a vast knowledge community.

Since its founding over 700 years ago, Sapienza has played an important role in Italian history and has been directly involved in key changes and developments in society, economics and politics. It has contributed to the development of Italian and European science and culture in all areas of knowledge.

The University offers a vast array of courses including 290 degree programmes, over 74 PhD courses, 200 professional courses and 121 Specialization Schools in Medicine and Health, run by 63 Departments and 11 Faculties. There are 59 libraries and 21 museums, as well as comprehensive student services. The student body includes over 8,000 foreign students from all over the world. Ciao and Hello (the welcoming centre for foreign students), SoRT (Counselling and tutorship services) and assistance for disabled students.

Sapienza plans and carries out important scientific investigations in almost all disciplines, achieving high-standard results both on a national and on an international level, thanks to the work of its faculties, departments and centres devoted to scientific research. There are also more than 1.50 PhD programmes which include almost all major fields of knowledge. The first University in Rome is proud to have had many famous scholars among his students. Dealing with the field of Physics’ students, members of the so called ‘Via Panisperna’ group – including the scientists Enrico Fermi, Edoardo Amaldi and Emilio Segrè – gave a crucial contribute to Physics and left an important heritage in subjects like Quantum Physics, Physics of Disordered Systems and Astrophysics. Sapienza enhances research by offering opportunities also to international human resources. Thanks to a special programme for visiting professors, many foreign researchers and professors periodically come to Sapienza, consolidating the quality of its education and research programmes.

Sapienza University of Rome is a public, autonomous and free university, involved in the development of society through research, higher level of education and international cooperation.

The University has an annual budget of 1 billion euros, one of the most important in the region. The future of Sapienza starts today thanks to its rich past and the contribution of the entire University community.

Faculty of Civil and Industrial Engineering

The Faculty was founded in 1817 by Pope Pius VII, following the model of the most famous Parisian and Viennese School of Engineering of the time; in 1935, due to the Gentile’s reform, the School became the Faculty of Engineering. The Faculty was founded with the aim of training professionals of high cultural background, qualified to meet the real needs of training and research company, possessing the ability to promote and to develop technological innovation processes in different cultural environments. The ancient Faculty of Engineering has a long educational tradition which is appreciated all over the world. This rich experience has allowed the Faculty to offer a very innovative syllabus today, including also a specific program on Nanotechnology Engineering. It aims particularly at satisfying local engineering needs, yet also at preparing graduates for employment in an increasingly globalised and international job market. Recently, a more general internal reorganization of Sapienza required a thematic splitting of the research and teaching activity, with the consequent born of the new Faculty of Civil and Industrial Engineering, the headquarter of which remained in the pristine site, and of the new Faculty of Information Engineering, Informatics and Statistics.

The Faculty of Civil and Industrial Engineering is spread among various buildings in the area of via Eudossiana, the most representative is the old monastery of the church of San Pietro in Vincoli (San Peter in Chains), also known as basilica Eudossiana, but educational and scientific activities are also held in other locations in Rome and Lazio, like Latin and Rieti.

An ancient tale

An ancient tale connects the name of Eudossia and San Pietro in Vincoli: the empress Eudossia, wife of Teodosio II (408-550), emperor of the East, sent from Costantinoples to her daughter Eudossia part of the chains (“vincoli”) of San Peter which she found at Jerusalem. These chains were donated to the Pope Leone Magno. He put them near the ones that hold San Peter during his roman captivity, and the miracle happened: The two chains melted together.
CNIS
Research Centre for Nanotechnology applied to Engineering of Sapienza University of Rome

(Centro per le Nanotecnologie applicate all’Ingegneria di Sapienza Università di Roma)

CNIS has been constituted in 2006, and now involves over 90 professors and researchers, coming from different Departments of the Faculties of Engineering, Sciences and Medicine. The vision and goal of CNIS is to embrace and support a multidisciplinary user base of researchers of Sapienza and co-workers of other universities or private laboratories. CNIS activities are now developed in the new (2012) Sapienza Nanotechnology & Nanoscience Laboratory (SNN Lab), which is the core-facility at Sapienza devoted to nanoscience and nanotech multidisciplinary applications in materials science, life sciences, engineering and solid state physics. It gathers state-of-art instrumentation for nanotechnology together with an experienced staff that will perform the structural and functional characterization of all the materials, devices and systems in the framework of the foreseen project activities.

In particular, a wide set of microscopy and nanoscopy techniques is available. The facility also offers our users a variety of sample preparation equipment, a light microscopy lab with image analysis, an X-ray lab, and a materials testing lab.

The SNN-Lab is finalized to:

- Integrate the multidisciplinary competencies available at Sapienza University in the fields of nanotechnology and nanosciences, with the aim of creating synergies among research groups operating in different areas of science, engineering, medicine.

- Constitute a research infrastructure at Sapienza as support to the design, realization and characterization of nanostructures and innovative micro/nano-devices for different fields of applications.

- Provide instrumentation and services to high quality research in the field of: micro/nano-fabrication, micro/nano-manipulation, advanced characterization (functional and structural microscopy) of the chemical-physical properties of micro/nanostructured materials, engineerization of the designed micro/nanostructured devices and systems, nanomedicine and genomics.

- Create a reference structure for territory and enterprise, responding to the research and technological development needs of the research programs at regional, national and international levels.

The SNN-Lab has been realized also thanks to financing from Lazio Region aimed at promoting innovation and technological transfer. The Lab is located on an area of 400 mq, at Sapienza University main campus.

More information on: web.uniroma1.it/cnis/

SNN Lab – CNIS
Sapienza University of Rome, P.le A. Moro n. 5 - 00185 Rome
Director: Ruggero Caminiti (ruggero.caminiti@uniroma1.it) - Contact person: Prof. Marco Rossi (marco.rossi@uniroma1.it)
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Advanced Quantitative Phase Imaging
Wide variety of microanalytical techniques
Nanotechnology is largely based on the peculiar features of nanomaterials, which can be considered as an intermediate state between bulk materials and atoms. In the proper size range, in fact, the properties of a material become dependent on morphological parameters, like dimension, aspect ratio, surface structure and so on.

In order to master the peculiar features of a nanomaterial, the knowledge of the local structure and of the local functional properties are of mandatory importance, considering that the development of a material proceeds generally through the classical iteration among synthesis process, structural characterization and functionality under the supervision of structural and functional numerical simulations.

These short pre-conference tutorials complement the technical program and want to introduce the audience to the basic principles underlying investigation methods, mandatorily requiring the use of electron beams, in cases of interest ranging from material science to life sciences.

The lectures address an audience composed by young researchers, doctorate students and whichever person interested in a basic description of the investigation methods.

The last lecture will give a short overview on the European Marie Skłodowska-Curie Actions (MSCA) providing significant financial support to young researchers in order to enhance their employability and career development.

Chairs: Marco VITTORI ANTISARI, Nanoitaly Association & Beatrice VALLONE, Sapienza University of Rome

**TL.I - MICROSCOPES, NANOTECHNOLOGY AND CARRIER OPPORTUNITIES FOR YOUNG RESEARCHER**

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<tr>
<th>Time</th>
<th>Lecture</th>
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<tr>
<td>09:00 - 10:40</td>
<td>Vittorio MORANDI, CNR-IMM, Bologna</td>
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<tr>
<td></td>
<td><strong>Why electron microscopies and diffractions for nanotechnology</strong></td>
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<td>10:40 - 11:00</td>
<td>Coffee Break</td>
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<td>11:00 - 13:00</td>
<td>Linda Celeste MONTEMIGLIO, Sapienza University of Rome</td>
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<td></td>
<td><strong>Single-particle Cryo Electron Microscopy for Structural Biology and Biomedicine: Sample Preparation and Data Collection</strong></td>
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<td>11:00 - 13:00</td>
<td>Claudia TESTI, Sapienza University of Rome</td>
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<td></td>
<td><strong>Single-particle Cryo Electron Microscopy for Structural Biology and Biomedicine: Data Analysis and Structure Determination</strong></td>
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<tr>
<td>11:00 - 13:00</td>
<td>Radenka KRSMANOVIC WHIFFEN, MSCA Individual Fellow, ENEA, Casaccia Research Centre, Rome</td>
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### 14:00 - 14:20
**WS.I - WELCOME SESSION**

Chair: Maria Sabrina SARTO, Sapienza University of Rome  
(Deputy Rector for Research Tools and Infrastructure)

| **WS.I.1** | Massimiliano SMERIGLIO  
Regione Lazio (Vice-President) |
|------------|-----------------------------|
| **WS.I.2** | Eugenio GAUDIO  
Sapienza University of Rome (Rector) |
| **WS.I.3** | Antonio D’ANDREA  
Sapienza University of Rome (Dean of Faculty of Civil and Industrial Engineering) |
| **WS.I.4** | Ferdinando PASTORE  
ICE-Italian Trade Agency, Director of the Machinery, Energy and Environment Office |

### 14:20 - 15:30
**PS.I - PLENARY SESSION I**

Advances on Nanotechnology and Nanosciences  
Chair: Carlo MARIANI, Sapienza University of Rome

| **PS.I.1** | Yulia DYAKOVA  
NRC Kurchatov Institute, Head of the complex of the NBICS-nature-like technologies, Moscow, Russia  
Nature-like Technology: The New Challenge and New Risks |
| **PS.I.2** | Juergen PLITZKO  
Max Planck Institute of Biochemistry (Project Group Leader), Martinsried, Germany  
Cryo - Electron Microscopy and Tomography - The Past, the Present and the Future |

15:30 - 15:50  Coffee Break
**15:50 - 17:10**

**PS.II - PLENARY SESSION II**

**Innovation at the Nanoscale and Market Exploitation Strategies**
Chair: Marco Vittori Antisari, Associazione Nanoitaly

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<th>PS.II.1</th>
<th>Sergio GALBIATI, LFoundry Vice Chairman</th>
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<td></td>
<td>Innovation in a Semiconductor Industry</td>
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<tr>
<th>PS.II.2</th>
<th>Igor POPKOV, Russian Nanoindustry Association - RNA (Head of the committee for development of markets &amp; Chairman of the board of &quot;Ruschembio&quot;), Russia</th>
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<tr>
<td></td>
<td>State support measures for the transfer of nanotechnology and product promotion. Examples of an implementation</td>
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<th>PS.II.3</th>
<th>Sergio GRANDE, Innovation and Technology Transfer Officer @ European Commission, Joint Research Centre</th>
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<td>The TTO circle workshop on &quot;Technology Transfer in Nanotechnology&quot;</td>
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<th>PS.II.4</th>
<th>Ennio Tito CAPRIA, ESRF Grenoble, France</th>
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<td>GIANT innovation campus - The hearth of a unique technological ecosystem in Grenoble</td>
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<th>PS.II.5</th>
<th>Michele MUCCINI, MIST E-R S.c.r.l.</th>
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<td>Bridging the gap from research to market: the innovation ecosystem @ CNR Technopole Bologna</td>
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<th>PS.II.6</th>
<th>Vincenzo RICCO, Scientific Director and Founder of CrestOptics s.p.a., Rome</th>
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<td></td>
<td>How to build a successful startup in high tech instrumentations, a look at a real case</td>
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**17:10 - 18:30**

**PS.III - PLENARY SESSION III**

**Funding Strategies and Opportunities**
Chair: Donata FOLESANI, Responsabile ASTER - Area Strumenti Finanziari

<table>
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<tr>
<th>PS.III.1</th>
<th>Gian Paolo MANZELLA, Councilor for Economic Development, Trade and Crafts, Start-Up, &quot;Lazio Creative&quot; and Innovation, Regione Lazio (to be confirmed)</th>
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<th>PS.III.2</th>
<th>Marco FALZETTI, Director of APRE</th>
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<td>From H2020 to Horizon Europe – how does Material Research governance change?</td>
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<th>PS.III.3</th>
<th>Alexey KACHAY, Deputy CEO, Fund for Infrastructure and educational programs (RUSNANO Group), Russia</th>
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<tr>
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<td>Fund for Infrastructure and Educational Programs: areas of activities and international cooperation</td>
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<th>PS.III.4</th>
<th>Alessandro OLIVI, Councilor for industry, crafts, trade and cooperation, Autonomy Province of Trento</th>
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<td>FESR strategy in the Autonomy Province of Trento</td>
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<th>PS.III.5</th>
<th>Fabrizio CIARMATORI, ASTER - European and International Development Unit</th>
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<td></td>
<td>The Vanguard Initiative: an inspiring approach for the European Industrial Renaissance</td>
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**18:30 - 19:30**

**WELCOME Cocktail & NEST PRIZE Winners**
### Keynote Session: Ultimate TEM characterization and imaging
**Chair:** Vittorio MORANDI, CNR-IMM, Bologna
*The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences*

### Keynote Session: Challenges in semiconductor technologies
**Chair:** Romeo BECCHERELLI, CNR IMM, Roma
*In collaboration with: MICRON*

### Keynote Session: Nanotechnology and nanofabrication: opportunities for innovation
**Chair:** Fabrizio PIRRI, Politecnico of Turin

### Keynote Session: Nanotechnology and Advances in Biotech Applications
**Chair:** Stefano LINARI, Linari Engineering Srl

*10:30 - 11:00 Coffee Break*
### TT.I - TECHNICAL MULTI-TRACK - PARALLEL SYMPOSIA

<table>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Details</th>
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| 11:00 - 12:30 | **TT.I.A**                           | X-Ray Microscopy  
Chair: Narciso GAMBACORTI, Cea-Leti & PAC-G, Grenoble, France  
The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences |
|               | **TT.I.B**                           | Nano perspectives in the Agri-Food sector  
Chair: Nelson MARMIROLI, University of Parma  
The symposium is part of the workshop WS.II on AgriNanoTechniques |
|               | **TT.I.C**                           | Photocatalytic nanomaterials for water remediation  
Chair: Roberto GIANNANTONIO, DHITECH  
In collaboration with: DHITECH |
|               | **TT.I.D**                           | Synthesis and Microstructural properties I  
Chair: Gaspare VARVARO, CNR ISM, Roma  
The symposium is part of the Joint Event JE.I Materiali Nanofasici |
|               | **TT.I.E**                           | Nanotechnology for bio-medical applications  
Chair: Eugenio AMENDOLA, CNR IPCB, Portici, Napoli (to be confirmed) |
|               | **TT.I.F**                           | Electrochemical Energy Storage: use of nanomaterials as components of batteries  
Chair: Pierpaolo PROSINI, ENEA Casaccia  
In collaboration with: ENEA |
|               | **TT.I.G**                           | Innovative nano-materials and methods for fuel cell electrodes implementation  
Chair: Marcello ROMAGNOLI, University of Modena & Reggio Emilia  
In collaboration with: University of Modena & Reggio Emilia |
|               | **12:30 - 14:00 Light Lunch**        |                                                                        |
### 14:00 - 15:30
**TT.II - TECHNICAL MULTI-TRACK - PARALLEL SYMPOSIA**

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<tr>
<th>Session</th>
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<tr>
<td><strong>TT.II.A</strong>&lt;br&gt;WS.I.3</td>
<td>Advances in Microscopy-based Nanocharacterization Methodologies&lt;br&gt;Chair: Elvio CARLINO, CNR-IMM, Lecce (to be confirmed)&lt;br&gt;<strong>In collaboration with:</strong> ZEISS</td>
<td>The symposium is part of the workshop WS.I on <em>Advanced Characterization Techniques for Nanotechnologies and Nanosciences</em></td>
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<tr>
<td><strong>TT.II.B</strong>&lt;br&gt;WS.II.2</td>
<td>Nanomaterials and Plant Nutrition&lt;br&gt;Chair: Zeno VARANINI, University of Verona</td>
<td>The symposium is part of the workshop WS.II on <em>AgriNanoTechniques</em></td>
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<tr>
<td><strong>TT.II.C</strong>&lt;br&gt;</td>
<td>European nanotechnology research infrastructures: their support to innovation 1&lt;br&gt;Chair: Lorenza FERRARIO, FBK, Trento&lt;br&gt;<strong>In collaboration with:</strong> FBK</td>
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<tr>
<td><strong>TT.II.D</strong>&lt;br&gt;</td>
<td>Sustainable (bio-)technologies for CO2 capture and usage&lt;br&gt;Chair: Angela RE, IIT, Torino &amp; Sergio BOCCHINI, IIT, Torino&lt;br&gt;<strong>In collaboration with:</strong> Polytechnic of Turin &amp; IIT</td>
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<tr>
<td><strong>TT.II.E</strong>&lt;br&gt;</td>
<td>Nanotechnology in medicine&lt;br&gt;Chair: Donatella PAOLINO, University &quot;Magna Graecia&quot; of Catanzaro&lt;br&gt;<strong>In collaboration with:</strong> University &quot;Magna Graecia&quot; of Catanzaro</td>
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<tr>
<td><strong>TT.II.F</strong>&lt;br&gt;</td>
<td>Computer aided design of innovative materials&lt;br&gt;Chair: Massimo CELINO &amp; Francesco BUONOCORE, ENEA Casaccia&lt;br&gt;<strong>In collaboration with:</strong> ENEA</td>
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<tr>
<td><strong>TT.II.G</strong>&lt;br&gt;</td>
<td>Nanomaterials fabrication and characterization advances&lt;br&gt;Chair: Francesco MARRA, Sapienza University of Rome</td>
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**15:30 - 16:00 Coffee Break**
| TT.III.A | WS.I. 4 | Cryo Electron Microscopy: the resolution revolution  
Chair: Beatrice VALLONE, Sapienza University of Rome  
*In collaboration with: JEOL, THERMO FISHER SCIENTIFIC & ZEISS*  
The symposium is part of the workshop WS.I on *Advanced Characterization Techniques for Nanotechnologies and Nanosciences*
| TT.III.B | WS.II. 3 | Research Pathways  
Chair: Luca MARCHIOL, University of Udine  
The symposium is part of the workshop WS.II on *AgriNanoTechniques*
| TT.III.C |  | Physical Characterizations on semiconductor devices  
Chair: Onofrio Antonino CACIOPPO, LFoundry  
*In collaboration with: LFOUNDARY, RENISHAW*
| TT.III.D | JE.I.2 | Synthesis and Microstrucural Properties II  
Chair: Amelia MONTONE, CNR ISM, Roma  
The symposium is part of the Joint Event JE.I *Materiali Nanofasici*
| TT.III.E |  | From Nanotherapeutics to NanoBiomaterials  
Chair: Giovanni TOSI, University of Modena & Reggio Emilia  
*In collaboration with: University of Modena & Reggio Emilia*
| TT.III.F |  | Nanostructures and Spectroscopy for Quantum confined Systems, Photonics, Biosystems and Cultural Heritage  
Chair: Carlo MARIANI, Sapienza University of Rome  
*In collaboration with: Sapienza University of Rome*
| TT.III.G |  | European nanotechnology research infrastructures: their support to innovation 2  
Chair: Riccardo BERTACCO, Polytechnic of Milan - PoliFAB  
*In collaboration with: FBK*
### 09:00 - 10:30
**HT.II - Highlight multi-Track - parallel COLLOQUIA**

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<tr>
<th>Time</th>
<th>Session</th>
<th>Chair/Institution</th>
<th>Collaboration</th>
<th>Description</th>
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</table>
| 09:00 | **HT.II.A** **WS.I.5** Keynote Session: *Scanning Ion Microscopy: Nanocharacterization and Nanofabrication*  
Chair: Marco VITTORI ANTISARI, Associazione Nanoitaly  
In collaboration with: ASSING/Tescan | Marco VITTORI ANTISARI, Associazione Nanoitaly                      | ASSING/Tescan                                | The symposium is part of the workshop WS.I on *Advanced Characterization Techniques for Nanotechnologies and Nanosciences* |
| 09:30 | **HT.II.B** **WS.III.1** Keynote Session: *Scanning Probe Microscopy: Touching and Probing Matter at the Nanoscale*  
Chair: Daniele PASSERI, Sapienza University of Rome  
In collaboration with: ASSING/Bruker | Daniele PASSERI, Sapienza University of Rome  
ASSING/Bruker                                     |                                                             | The symposium is part of the workshop WS.III on *Advanced Scanning Probe Microscopies*             |
| 10:00 | **HT.II.C** **WS.V.1** Keynote Session: *Nanotechnologies for innovative medicine*  
Chair: Sabrina CONOCI, STMicroelectronics  
In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi | Sabrina CONOCI, STMicroelectronics  
Distretto Tecnologico Sicilia Micro e Nano Sistemi |                                                             | The symposium is part of the workshop WS.V on *Nanotechnologies for innovative medicine*              |
| 10:30 | **HT.II.D** Keynote Session: *Nanotechnology and advances in electronic devices*  
Chair: Guglielmo FORTUNATO, CNR IMM, Roma | Guglielmo FORTUNATO, CNR IMM, Roma                               |                                                             |                                                                                              |

**10:30 - 11:00 Coffee Break**
## 11:00 - 12:30
**TT.IV - Technical multi-Track - parallel SYMPOSIA**

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<tr>
<th>Session</th>
<th>Title</th>
<th>Chair</th>
<th>Institution(s)</th>
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</table>
| TT.IV.A  | **WS.I.6**
Advance in FIB/SEM Technology and its Contribution to Scientific Problem Solving  
Chair: Daniele DE FELICIS, University of Roma Tre  
In collaboration with: TESCAN & ASSING  
The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences" |  |  |
| TT.IV.B  | **WS.III.2**
Advanced SPM techniques: methods and applications 1  
Chair: Marco RENZELLI, LFoundry  
In collaboration with: LFoundry  
The symposium is part of the workshop WS.III on "Advanced Scanning Probe Microscopies" |  |  |
| TT.IV.C  | **WS.V.2**
New Materials and Nanotechnologies for Innovative therapeutic Approaches  
Chair: Rosalba PARENTI, University of Catania  
In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi  
The symposium is part of the workshop WS.V on "Nanotechnologies for innovative medicine" |  |  |
| TT.IV.D  | Standardisation of nanomaterials in the VAMAS project  
(the Versailles project on Advanced Materials Standardisation)  
Chair: Laura DEPERO, University of Brescia & VAMAS Italia and Luca BOARINO, INRIM  
In collaboration with: INRIM |  |  |
| TT.IV.E  | **JE.I.3**
Nanomaterials for next generation of electric motors  
Chair: Emanuela TAMBURRI, Nanoshare Srl  
The symposium is part of the Joint Event JE.I **Materiali Nanofasici** |  |  |
| TT.IV.F  | Advanced science and surfaces engineering on the multi-scale  
Chair: Sergio VALERI, University of Modena & Reggio Emilia  
In collaboration with: University of Modena & Reggio Emilia |  |  |
| TT.IV.G  | NanolInnovation’s Got Talent  
Chair: Fulvio UGGERI, Bracco Imaging  
In collaboration with: Fondazione Bracco |  |  |

### Afternoon Break

12:30 - 14:00 Light Lunch
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<th>TT.V</th>
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<tr>
<td><strong>TT.V.A</strong>&lt;br&gt;WS.I.7</td>
<td>Innovation in Scanning Electron Microscopy&lt;br&gt;Chair: Luca ORTOLANI, CNR IMM, Bologna&lt;br&gt;In collaboration with: ZEISS, THERMO FISHER SCIENTIFIC &amp; JEOL&lt;br&gt;The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences</td>
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<tr>
<td><strong>TT.V.B</strong>&lt;br&gt;WS.III.3</td>
<td>Advanced SPM techniques: methods and applications 2&lt;br&gt;Chair: Daniele PASSERI, Sapienza University of Rome&lt;br&gt;The symposium is part of the workshop WS.III on Advanced Scanning Probe Microscopies</td>
</tr>
<tr>
<td><strong>TT.V.C</strong></td>
<td>Electrochemical Energy Storage: new materials and technologies for batteries and supercapacitors&lt;br&gt;Chair: Andrea LAMBERTI, Polytechnic of Turin&lt;br&gt;In collaboration with: Polytechnic of Turin</td>
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<tr>
<td><strong>TT.V.D</strong>&lt;br&gt;WS.V.3</td>
<td>Materials and Devices for implants and regenerative medicine&lt;br&gt;Chair: Salvo PETRALIA, STMicroelectronics&lt;br&gt;In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi&lt;br&gt;The symposium is part of the workshop WS.V on Nanotechnologies for innovative medicine</td>
</tr>
<tr>
<td><strong>TT.V.E</strong></td>
<td>Nanoemulsions: a versatile platform in health and wellness products&lt;br&gt;Chairs: Maria CARAFA &amp; Carlotta MARIANECCI, Sapienza University of Rome&lt;br&gt;In collaboration with: Sapienza University of Rome</td>
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<td><strong>TT.V.F</strong>&lt;br&gt;JE.I.4</td>
<td>Magnetic, Transport and Optical Properties&lt;br&gt;Chair: Gaspare VARVARO, ISM CNR, Roma&lt;br&gt;The symposium is part of the Joint Event JE.I Materiali Nanofasici</td>
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<tr>
<td><strong>TT.V.G</strong></td>
<td>Gallium Nitride for power and high-frequency electronics&lt;br&gt;Chair: Guglielmo FORTUNATO, CNR IMM, Roma&lt;br&gt;In collaboration with: CNR-DSFTM</td>
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15:30 - 16:00 Coffee Break
## TT.VI - Technical multi-Track - parallel SYMPOSIA

### TT.VI.A

**WS.I.8**

**Innovation in Transmission Electron Microscopy**
Chair: Andrea PARISINI, CNR-IMM, Bologna

*The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences*

### TT.VI.B

**WS.III.4**

**Advance in Near Field Probe Microwave and mm-wave Microscopy for Surface and Subsurface Characterization of Materials**
Chair: Emanuela PROIETTI, CNR IMM, Roma

*In collaboration with: CNR IMM - Ministry of Foreign Affairs and International Cooperation - National Institute of Standards and Technology (NIST)*

*The symposium is part of the workshop WS.III on Advanced Scanning Probe Microscopies*

### TT.VI.C

**WS.V.4**

**Molecular Biosensors: the next generation devices**
Chair: Filippo D’ARPA, Distretto Tecnologico Sicilia Micro e Nano Sistemi

*In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi*

*The symposium is part of the workshop WS.V on Nanotechnologies for innovative medicine*

### TT.VI.D

**Advanced technologies and nanomaterials for sustainability in oil & gas off-shore platforms**
Chair: Elena TRESSO, Polytechnic of Turin & Roberto CIANELLA, Ministry of the Economic Development

*In collaboration with: Polytechnic of Turin*

### TT.VI.E

**Responsible Innovation in Nanotech applications for healthcare and wellbeing**
Chair: Elvio MANTOVANI, AIRI & Andrea PORCARI, AIRI

*In collaboration with: AIRI/PRISMA PROJECT*

### TT.VI.F

**Je.I.5**

**Synthesis and Microstructrual Properties III**
Chair: Sara LAURETI, ISM CNR, Roma

*The symposium is part of the Joint Event Je.I Materiali Nanofasici*

### TT.VI.G

**Nanocomposite materials applications**
Chair: Isella VICINI, Warrant Group

*In collaboration with: Warrant Group*
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<td>09:00 - 10:30</td>
<td><strong>HT.III</strong> - Highlight multi-Track - parallel COLLOQUIA</td>
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</table>
| **HT.III.A** | Keynote Session: *Spectroscopic characterization and imaging*  
Chair: Regina CIANCIO, CNR-IOM, Trieste  
*The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences* |
| **HT.III.B** | Keynote Session: *2D materials and beyond*  
Chair: Fabiola LISCIO, CNR IMM, Bologna |
| **HT.III.C** | Keynote Session: *Advanced approaches for investigating cells and neurons*  
Chair: Leandro LORENZELLI, FBK, Trento  
*In collaboration with: FBK*  
*The symposium is part of the workshop WS.IV on Microfluidics and Biosystems for personalized medicine* |
| **HT.III.D** | Special Session: *Il rapporto tra Innovazione e Conoscenza in Italia. Il sistema della ricerca privata.*  
Chair: Alberto CIGADA, Polytechnic of Milan & President Comitato Scientifico Cluster Made in Italy  
*In collaboration with: Airi, Associazione NanotItaly and Sapienza*  
*The symposium is part of the Joint Event JE.II Open innovation and Open Science* |
| **HT.III.E** | Special Session: *3D Additive Manufacturing*  
Chair: Francesco VENIALI, Sapienza Università di Roma |
<p>| 10:30 - 11:00 | <strong>Coffee Break</strong> |</p>
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<th>Chair and Affiliation</th>
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<td>11:00 - 12:30</td>
<td><strong>TT.VII - Technical multi-Track - parallel SYMPOSIA</strong></td>
<td>Microscopy techniques for industrial needs 1</td>
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<td><strong>TT.VII.A</strong> WA.I.10</td>
<td>Chair: Onofrio Antonino CACIOPPO, LFoundry</td>
<td>In collaboration with: LFoundry</td>
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<td>The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences</td>
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<td>Nanotechnologies for space: missions, opportunities and challenges</td>
<td>Chair: Roberto FORMARO &amp; Marco DI CLEMENTE, ASI</td>
<td>In collaboration with: Italian Space Agency (ASI)</td>
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<td>2D materials beyond graphene: from fundamental physics to device applications</td>
<td>Chair: Giancarlo CICERO, Polytechnic of Turin &amp; Paola PRETE, CNR IMM, Lecce</td>
<td>In collaboration with: Polytechnic of Turin &amp; CNR IMM</td>
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<td></td>
<td>Applications: Catalysis, Micro/Nanoelectronics, Biomedicine and other I</td>
<td>Chair: Elisabetta AGOSTINELLI, CNR ISM, Roma</td>
<td>The symposium is part of the Joint Event JE.I Materiali Nanofasici</td>
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<tr>
<td></td>
<td>Microfluidics concepts, technologies and applications</td>
<td>Chair: Leandro LORENZELLI, FBK, Trento</td>
<td>In collaboration with: FBK &amp; Polytechnic of Turin</td>
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<td></td>
<td>Nanomaterials and advanced solutions for the restoration of Cultural Heritage</td>
<td>Chair: Rodorico GIORGI, CSGI and Isella VICINI, Warrant Group</td>
<td>In collaboration with: CSGI &amp; WARRANT GROUP</td>
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<td></td>
<td>Il rapporto tra Innovazione e Conoscenza in Italia. Il sistema della ricerca pubblica</td>
<td>Chair: Alberto CIGADA, Polytechnic of Milan &amp; President Comitato Scientifico Cluster Made in Italy</td>
<td>In collaboration with: Airi, Associazione NanoItaly and Sapienza</td>
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12:30 - 14:00 Light Lunch
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<th>Collaboration</th>
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<td><strong>TT.VIII.A</strong>&lt;br&gt;WS.I.11</td>
<td>Innovation in Optical Microscopy  &lt;br&gt;Chair: Marco LEONETTI, IIT@SAPIENZA  &lt;br&gt;The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences</td>
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<tr>
<td><strong>TT.VIII.B</strong>&lt;br&gt;JE.II.3</td>
<td>Promozione e sviluppo del trasferimento tecnologico e dell’innovazione a livello territoriale  &lt;br&gt;Chair: In definition (by Regione Lazio)  &lt;br&gt;The symposium is part of the Joint Event JE.II Open innovation and Open Science</td>
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<tr>
<td><strong>TT.VIII.C</strong>&lt;br&gt;JE.I.7</td>
<td>Applications: Catalysis, Micro/Nanoelectronics, Biomedicine and other II  &lt;br&gt;Chair: Davide PEDDIS, CNR ISM, Roma  &lt;br&gt;The symposium is part of the Joint Event JE.I Materiali Nanofasici</td>
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<td><strong>TT.VIII.D</strong></td>
<td>Trend topics in PV  &lt;br&gt;Chair: Mario TUCCI, ENEA Casaccia  &lt;br&gt;In collaboration with: ENEA</td>
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<tr>
<td><strong>TT.VIII.E</strong>&lt;br&gt;WS.IV.3</td>
<td>Advances in biosensors and microfluidic devices in life science  &lt;br&gt;Chair: Fabrizio PIRRI, Polytechnic of Turin &amp; Pietro SICILIANO, CNR IMM, Lecce  &lt;br&gt;In collaboration with: FBK &amp; Polytechnic of Turin  &lt;br&gt;The symposium is part of the workshop WS.IV on Microfluidics and Biosystems for personalized medicine</td>
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<td><strong>TT.VIII.F</strong></td>
<td>Multifunctional Nanocomposites for Energy and Sensing applications  &lt;br&gt;Chair: Giovanni DEBELLIS, Sapienza University of Rome  &lt;br&gt;In collaboration with: Sapienza University of Rome</td>
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<tr>
<td><strong>TT.VIII.G</strong></td>
<td>Nanochemistry meets heritage science for the creation, analysis and conservation of artworks  &lt;br&gt;Chair: Alessandra SANSON, CNR ISTEC, Faenza  &lt;br&gt;In collaboration with: CNR DSTCM</td>
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**14:00 - 15:30**<br>**TT.VIII - Technical multi-Track - parallel SYMPOSIA**

**15:30 - 16:00** Coffee Break
# TT.IX - Technical multi-Track - parallel SYMPOSIA

## TT.IX.A
**WS.I.12**
### Microscopy techniques for industrial needs 2
**Chair:** Onofrio Antonino CACIOPPO, LFoundry  
*In collaboration with:* Leonardo  
The symposium is part of the workshop WS.I on Advanced Characterization Techniques for Nanotechnologies and Nanosciences

## TT.IX.B
**JE.I.8**
### Carbon-based materials
**Chair:** Maria Letizia TERRANOVA, University of Rome Tor Vergata  
The symposium is part of the Joint Event JE.I Materiali Nanofasici

## TT.IX.C
**WS.IV.4**
### Applications in personalized medicine
**Chair:** Cecilia PEDERZOLLI, FBK & Pietro SICILIANO, CNR IMM, Lecce  
*In collaboration with:* FBK & Polytechnic of Turin  
The symposium is part of the workshop WS.IV on Microfluidics and Biosystems for personalized medicine

## TT.IX.D
### Technological Integration of graphene and 2D materials
**Chair:** Rita RIZZOLI, CNR IMM, Bologna  
*In collaboration with:* with CNR-IMM

## TT.IX.E
**JE.II.4**
### Un approccio innovativo della Regione Lazio: Infrastrutture Aperte per la Ricerca
**Chair:** Marco ROSSI, Sapienza University of Rome  
The symposium is part of the Joint Event JE.II Open innovation and Open Science

## TT.IX.F
### Smart Textiles
**Chair:** Giuseppe ROSACE, University of Bergamo
Would you like to discuss your business idea, your research and innovation projects, your technologies with other interested and very skilled people?

THE NETWORKING EVENT IS YOUR GREAT CHANCE!

The collaboration between NanoInnovation and APRE- Italian Agency for the Promotion of European Research - is renewed also this year.

On the 12th and 13th of September, NanoInnovation 2018 offers different chances for presenting your ideas and meet potential research and business partners.

The networking event is the best way to meet potential cooperation partners during face-to-face meetings. People have the possibility to meet each other with a pre-set schedule (around 20 minutes for each meeting) for sharing ideas and experience, building connection, exchanging information, and evaluating new opportunities of collaboration at all levels.

A wide spectrum of businessmen, entrepreneurs, researchers and innovators from Europe and beyond the network event will participate at the event, looking for new business and cooperation opportunities: do not miss this great chance!

The networking event is free for the conference participants.

The whole event is managed by APRE – Agency for the Promotion of European Research

Contacts: Matteo Sabini (sabini@apre.it) and Serena Borgna (borgna@apre.it)

TOPICS

The network event will be focused on nanotechnologies in the following sectors:

- CONSTRUCTION, BUILDING & RESTORATION
- ELECTRONICS, MICRO AND NANOSYSTEMS
- ENERGY & ENVIRONMENT
- FOOD AND AGRICULTURE
- INNOVATIVE AND SMART TEXTILES
- NANO-BIO RELATED PRODUCTS
- HEALTH & NANOMEDICINE
- NANO-MATERIALS BASED INNOVATION
- NANOSCALE CHARACTERIZATION AND MEASUREMENTS
- SAFETY AND SOCIAL IMPACTS
- SMART MANUFACTURING
- TRANSPORT, SPACE & AERONAUTICS

HOW IT WORKS

Just few minutes and you will be able to participate to the network event

FIRST STEP
- Go to https://nanoinnovation2018.b2match.io/ and click on “register”
- Insert your data, write a brief description of your organisation and your expertise
- Select the networking sessions where you are available for bilateral meeting
- Do not forget to choose the main areas of activity you are interested in

SECOND STEP
- You will be validated by APRE within 2-3 days after registration
- You will receive an invitation to select your potential partners available on the networking tool
- Go to https://nanoinnovation2018.b2match.io/ log-in and book meetings with other registered participants you would like to meet during the networking event in order to discuss collaborative partnerships

THIRD STEP
- Few days before the event, APRE will send your networking agenda with scheduled face to face meetings
- Attend the networking event!
**Elevator Pitch**

*Cloister Area*  
**Wednesday 12 September, 17:30 - 18:30**

**Share your best ideas, present your innovative products or research results, draw commercial partners attention and win a prize for your pitch!**

**Innovation and Market Uptake Elevator Pitch**

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Elevator Pitch is free for the conference participants. The event will take place during NanoInnovation 2018, in the Renaissance Closter of the Faculty of Civil and Industrial Engineering, Sapienza University of Rome on the 12th of September from 17:30 to 18:30.

The whole event is managed by APRE – Agency for the Promotion of European Research

**Contacts:** Matteo Sabini (sabini@apre.it) and Serena Borgna (borgna@apre.it)

Registration form, pitches evaluation criteria and rules are available at this link:  
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H2020 Flash Presentation is free for the conference participants. The event will take place during NanoInnovation 2018, at the Faculty of Civil and Industrial Engineering, Sapienza University of Rome on the 13th of September from 09:00 to 10:30.

The whole event is managed by APRE – Agency for the Promotion of European Research

**Contacts:** Matteo Sabini (sabini@apre.it) and Serena Borgna (borgna@apre.it)

Find more on the session and apply for the H2020 Flash Presentation at the following link: [https://nanoinnovation2018.b2match.io/page-341](https://nanoinnovation2018.b2match.io/page-341)
HT.I.A - Ultimate TEM characterization and imaging

Single Particle Cryo-EM structure of the complex between human Ferritin and Transferrin Receptor: a gateway for targeted delivery and theranostics

Beatrice VALLONE, Sapienza University of Rome

The human transferrin receptor 1 (TfR1) is a heavy duty carrier capable of recognizing and internalizing iron-loaded transferrin and ferritin in order to guarantee adequate cellular iron supply, providing the main contribution to the regulation of intracellular iron homeostasis. The receptor is also opportunistically exploited by several viruses and malaria parasites as a preferential entry for cell invasion. The structural features of TfR1 interaction with transferrin and viruses have been recently clarified and specific transferrin and viruses recognition epitopes have been identified. Conversely, information on the structural elements that guide the TfR1-ferritin recognition was missing and we obtained by single-particle cryo-electron microscopy the CD71/H-ferritin complex at 3.9 Å resolution, revealing the structural basis of this interaction. We observed that two short motifs upon the H-ferritin homopolymer recognize a precise epitope on CD71 that overlaps the arenaviruses and Plasmodium vivax binding region in the apical part of the receptor ectodomain. Our structural data account for transferrin independent binding of ferritin to CD71 and suggest that viruses and parasites have adapted to enter cells by mimicking ferritin access gate. The use of single-particle cryo-electron microscopy in designing nanoparticles for targeted delivery and theranostics will be discussed highlighting its potential in the field of nanomedicine.

Atomic Resolution Transmission Electron Microscopy: On the way toward the ultimate spatial resolution and accuracy

Elvio CARLINO, CNR-IMM, Lecce

The capability to see where the atoms are in the matter, distinguishing from atom to atom, has been an old dream since the time of Democritus. This dream has contributed along the centuries to milestone stories in the Science Fiction. Today we are close to make this dream true by atomic resolution methods in electron microscopy. Nevertheless, despite the recent strong advances, still significant efforts are necessary to achieve the ultimate resolution and accuracy, overcoming the intrinsic limitations related to the physics of the electron-matter interaction and to the electron optics. In this lecture I shall discuss, with the help of many experimental examples, the features of atomic resolution imaging methods in a Transmission Electron Microscope (TEM) and Scanning TEM (STEM). The intention is to make evident how the ultimate result is a puzzle that, in order to be solved, needs equipment capable to achieve the spatial resolution down to the diffraction limit, but this is definitely not enough. Definitely it needs knowledge and relevant methods capable to maximize and quantify the information that can be extracted from the experimental data. In particular, electron coherent diffraction imaging in a TEM has demonstrated promising results that will be discussed in this lecture. The strong electron-matter interaction makes TEM/STEM approaches very effective in achieving information from nano-volumes of the matter but at the same time it complicates the quantitative interpretation of results, posing also the issue of the damage of the specimen structure. This is of particular relevance for materials containing weakly-bound low atomic number atoms, like polymers or proteins, with a paramount relevance for basic and applicative points of view. It is widely recognized that, in many cases, the spatial resolution in a TEM experiment on radiation sensitive specimens is not related only to the electron-optic limitations of a TEM but mainly on the damage threshold of the specimen. Hence, TEM methods capable to handle the radiation damage in a specimen are of paramount importance as testified by the Nobel prize in chemistry in 2017 to Henderson, Dubochet and Frank for the development of cryo-microscopy in TEM to image the structure of biomolecules at spatial resolution otherwise not achievable. The development of TEM/STEM methodologies capable to tackle these issues will be discussed underlining how the concurrence of theoretical, experimental and computational efforts are definitively necessary to awake and make the dream true.
HT.I.B - Challenges in semiconductor technologies

Semiconductor characterization challenges addressed by Large Scale Facilities

Narciso GAMBACORTI, CEA-Leti/PAC-G, Grenoble, France

The performances of the modern nanoelectronics devices are tightly connected with the properties of the different materials and with their organization in three-dimensional space. Information on material composition, dopant distribution, dimensions, roughness, interface quality, strain, grain size, phase, defects and so on need to be extracted to support the development of these devices. The possibility to access Large Scale Facilities (LSF) to address some characterization challenges presents in modern nanoelectronic materials and devices will be presented. Three examples of the use of LSF facilities will be shown and discussed: 1) The use of Neutron Reflectivity (NR) to characterize the penetration of water into direct bonded SiO2/SiO2 interface. 2) in-situ X-ray diffraction study of solid-state reaction of Ni and GeSn on Si substrate. Smooth phase transformation is observed during the annealing and some kinetic parameters could be withdrawn. 3) X-ray nano-tomography with 30nm spatial resolution at LSF for the characterization of Through Silicon Vias (TSV) and Copper Pillars (CuP).

Neural network and Pattern recognition implemented on memory technology

Tommaso VALI, Micron

Nowadays five big technology trends, namely, networking, machine to machine, mobile, cloud, big data, are shaping the modern society and all human interaction. At the same time, memories are becoming more and more important in driving the system performance and cost in all electronic systems. Moreover, these trends are requiring a higher memory density lower power and improved performance. Such evolution is also facilitating the implementation of specific applications directly on the memory hardware. Neural network and Pattern recognition system may find a good substrate to implement in hardware key building blocks needed for their functionality.
**HT.I.C - Nanotechnology and nanofabrication: opportunities for innovation**

**Research and innovation Dilemma on Nanotechnology**

**Massimo BERSANI, FBK, Trento**

The Horizon 2020 program represents a paradigm shift with respect to the past introducing a strong focus on innovation. In fact, two of the three pillars of the European program and numerous instruments are aimed to promote and develop innovation processes. Despite the resources committed by the H2020 program and various national and regional programs, the effects on society and the productive system are in many cases below expectations. An emblematic case is that of nanotechnologies, which have the potential to strongly affect vital fields such as healthcare, energy, environment and manufacturing. To unlock potential benefits at the most, it is necessary to reduce the ‘valley of death’ and enhance the track record in transforming breakthroughs into commercially valuable innovations. Meeting these challenges involves understanding the internal (to the innovation process) and external (related to the surrounding environment) bottlenecks of the innovation cycle. Europe is therefore in need of studies aiming at developing an analytical framework for offering a novel perspective on innovation in nanotechnologies and for strengthening their systemic economic impact. In the present talks is based on the analysis of the situation following two main way the studies undertaken by EC and the evaluation of specific case. The European scenario on nanotechnology innovation is pointed out as well the main challenges and obstacles are analyzed in order to stimulate a participating discussion and promote further studies to support the EU innovation processes on nanotechnology field.

**Design, characterization and lithographic application of Si nanocrystals patterns via templated dewetting**

**Monica BOLLANI, CNR IFN, Milano**

The Horizon 2020 program represents a paradigm shift with respect to the past introducing a strong focus on innovation. In fact, two of the three pillars of the European program and numerous instruments are aimed to promote and develop innovation processes. Despite the resources committed by the H2020 program and various national and regional programs, the effects on society and the productive system are in many cases below expectations. An emblematic case is that of nanotechnologies, which have the potential to strongly affect vital fields such as healthcare, energy, environment and manufacturing. To unlock potential benefits at the most, it is necessary to reduce the ‘valley of death’ and enhance the track record in transforming breakthroughs into commercially valuable innovations. Meeting these challenges involves understanding the internal (to the innovation process) and external (related to the surrounding environment) bottlenecks of the innovation cycle. Europe is therefore in need of studies aiming at developing an analytical framework for offering a novel perspective on innovation in nanotechnologies and for strengthening their systemic economic impact. In the present talks is based on the analysis of the situation following two main way the studies undertaken by EC and the evaluation of specific case. The European scenario on nanotechnology innovation is pointed out as well the main challenges and obstacles are analyzed in order to stimulate a participating discussion and promote further studies to support the EU innovation processes on nanotechnology field.


Keynote Sessions

Wednesday 12 September, 09:00 - 10:30

**HT.I.D - Nanotechnology and Advances in Biotech Applications**

**Drug, medical device and cosmetic containing nanocarrier: regulatory perspective**

Paola MINGHETTI, University of Milan

The growing application of nanomaterials in healthcare products (i.e., cosmetics, medical devices and medicinal products) within the European Union (EU) has encouraged the regulatory authorities to upgrade the regulatory framework for improving the quality of healthcare products and managing the risk of negative effects on human health and environment due to nanotoxicity. The first definition of nanomaterial in EU was established in 2011. However, such definition presents several criticisms and cannot be strictly applied to all healthcare products on the EU market. Considering the complexity of nanotechnology-based products, the EMA issued several reflection papers on nanomedicine-specific topics (i.e., coated nanomedicine products, micellar systems, liposomal systems, iron-core nanoparticles). Moreover, specific requirements for the use of nanomaterials (and nanocarriers) in cosmetic products are reported in the Regulation (EC) No 1223/2009, whereas a new Regulation on medical devices was released in 2017. In conclusion, the current European regulatory framework supervising the presence of nanomaterials in healthcare products is stratified and far from being harmonized. Despite the efforts of European Authorities, inevitably there are several criticisms to deal with due to the lack of well-established scientific knowledge of properties and characterization of nanosystems.

**Electrospinning of nanofibers for tissue engineering**

Carlo Alberto MARCOALDI, LINARI Nanotech

Tissue engineering is the new frontier for body organ regeneration or replacement. Extra cellular matrixes or scaffoldings can be manufactured by non woven tissues having specific profiles of biocompatibility, biodegradability, porosity, mechanical properties, topology. Effectiveness depends also on the capacity to create multi-material (biobased as well as synthetic polimers or ceramics) and multiscale (from micro to nano meter diameters) fibers. Electrospinning is probably the most complete answer to all those challenges by combining several extrusion heads with different target shapes and materials and by controlling continuously the production variables (pressure, temperature, voltage, flowrate). Hundreds of Linari electrospinning machines are currently used in research centers around the world to test the new generation of nanofibers most suitable for "tissue engineering".
HT.II.A - Scanning Ion Microscopy: Nanocharacterization and Nanofabrication

Preparation of Aluminum Specimen with Gallium and Xenon Plasma Focused Ion Beam for Further Nano-characterization

Petr KLIMEK, Tescan Orsay Holding

Focused ion beam scanning electron microscopes (FIB-SEM) enable highly-localized and site-specific material removal with practically no restriction on sample composition. Depending on the ion source (e.g. Ga+, Xe+), the rate of material removal differs significantly. In general, the design of Xe+ source allows using high ion beam currents that can be up to a few µA while maintaining beam quality and performance, something which is not possible with the Ga+ sources. Such high ion currents are achievable due to the fact that the Xe+ source is broader, more collimated and has higher angular intensity. In addition, Xe+ ions are more massive than Ga+ thus more atoms are ejected from the target per incident ion, which also contributes to obtain significantly higher sputtering rates. However, the most relevant feature of Xe ions for this study is their non-metallic and inert nature which prevents any chemical interaction with the target material and formation of unwanted metallic compounds that alter the original properties of the sample that is being analyzed. Furthermore, the penetration depth of Xe ions is significantly less than Ga ion for a given energy resulting in less ion implantation that could induce local changes in the crystalline structure of the sample and, in turn, lead to changes in the mechanical properties of the sample. As some materials such as Al, Cu and Ga are sensitive to Ga ions, Xe+ ion milling can be a good asset for many FIB applications that involve working with these materials. This can be considered as a significant advantage over Ga ion source FIBs especially in microanalysis and nano-mechanical characterization. A way to perform nano-mechanical characterization of materials is to prepare nano-pillars to test their mechanical properties. As the Ga+ ions penetrating into the material (aluminum in our case) during the FIB milling process, they get implanted and can even weaken the material intended for testing. In contrast, it is advantageous to prepare aluminum nano-pillars with Xe+ plasma FIB since – for the reasons mentioned above – does not introduce significant changes in the material and, as a consequence, the results will be more reliable compared to those in which the pillars had been prepared with a Ga source FIB. Taking these facts into consideration, we pursue the following objectives: (1) Demonstrate the process of pillar preparation with Ga+ and Xe+ FIB and show the advantages of the wider ion beam range offered by the Xe+ plasma FIB. (2) Indicate the influence of gallium implantation on Al materials, (3) Describe the effect of gallium on properties of micron-range grains of aluminum sample treated by the ECAP method via different methods.

Focused Ion Beam (FIB) and Focused Electron Beam Induced Deposition (FEBID) for advanced nanocharacterization and nanofabrication

Gian Carlo GAZZADI, CNR - Nano, Modena

Focused Ion Beam (FIB) combined with scanning electron microscope (SEM) is a powerful and versatile instrument for the nanoscience lab. Besides the well-established capabilities in sample preparation for transmission electron microscopy (TEM), cross-section material analysis, device prototyping and sample nanomachining, the recent developments in beam-induced deposition using gas precursors have opened interesting perspectives in 3D nanofabrication, nanomagnetism and sensors. In this keynote lecture, the latest advances and applications of these techniques will be reviewed.
HT.II.B - Scanning Probe Microscopy: Touching and Probing Matter at the Nanoscale

Exploring Nanoscale Viscoelasticity with a Surface Coupled Scanning Probe Microscope

Jason KILLGORE, NIST, USA

Viscoelastic properties dictate a material’s ability to withstand loads over time and dissipate various forms of energy. In nanoscale materials, such as nanoparticles, nanocomposites and copolymers, viscoelastic properties can vary substantially over distances of a few nanometers, with characteristics very different than bulk counterparts. The need for rigorous viscoelastic measurement tools capable of probing the nanoscale and providing robust, quantitative property measurement is thus significant. With a periodic stress state, and quantification rooted in frequency determination rather than absolute displacement, viscoelastic contact resonance force microscopy (VE-CRFM), an advanced scanning probe microscopy method, is uniquely suited to the task. In VE-CRFM, the storage modulus, loss modulus and loss tangent of the probed material are determined from variations in the resonance frequency and quality factor of the coupled tip-sample system.

Here, we will discuss the development of VE-CRFM from experimental protocols to theoretical models. We will show how measurements can be performed in air and liquid environments, while still providing accurate quantification. Two recent developments within VE-CRFM will be discussed in detail. The first employs VE-CRFM as a local, in-situ probe of photorheological changes in polymer materials. A 405 nm laser is used to induce photopolymerization of the volume immediately beneath the tip. The fast mechanical bandwidth of the contact resonance enables transformation of the viscoelastic properties to be resolved with sub-millisecond temporal resolution; far faster than afforded by conventional rheological methods. In situ viscoelastic nanorheology is demonstrated on a rubber-to-glass transition and during voxel-scale cure of an additive manufacturing resin. In addition to demonstrating this new rheological tool, we will exhibit a new method of VE-CRFM wherein data are deliberately resolved at a constant CR frequency for all pixels in the image, rather than letting frequency vary. In existing CR methods, the variation in CR frequency leads to a nonmonotonic relationship between quality factor and material damping – making intuitive interpretation of raw data difficult. Furthermore, the variation in frequency means that viscoelastic properties (which themselves are frequency dependent) are measured at a different frequency for each pixel in the image. This calls into question whether observed variations are because of intrinsic differences in dissipation, or simply a result of the frequency change. We achieve constant CR frequency by varying the static load and hence contact stiffness in a force volume map while exciting the cantilever near the contact resonance frequency. The force at constant CR frequency becomes a measurable parameter that can be directly used to quantify variations in elastic modulus while the quality factor becomes an intuitive and monotonic function of loss tangent.

Advance measurement in Atomic Force Microscopy. What’s the latest in mechanical and electrical AFM characterization?

Emmanuel PARIS, Bruker Europe

New DataCube modes will be presented for correlative electrical and mechanical data. For materials scientists and engineers these new capabilities provide simultaneous capture of nanometer-scale electrical and mechanical characteristics in high-density data cubes, previously impossible to attain in a single measurement.
Dye Doped Silica Nanoparticles as Luminescent Organized Systems for Nanomedicine

Luca PRODI, University of Bologna

Silica nanoparticles are versatile platforms with many intrinsic features, including a low toxicity. Proper design and derivatization yield particularly stable, very bright nanosystems displaying multiple functions, which can be used for either photoluminescence (PL), or electrochemi-luminescence (ECL) sensing, labelling or imaging applications. For these reasons silica nanoparticles already offer unique opportunities, and further improvement and optimization can substantially expand their possible applications in fields of high impact, such as medical diagnostics and therapy, environmental and food analysis, and security. In this context, we have developed a direct micelle assisted strategy based on the use of Pluronic F127 as high molecular weight surfactant. The one-pot synthesis yields PEGylated silica nanoparticles endowed with very high monodispersity, colloidal stability and core-shell structure. These nanoparticles were recently reported with the acronym PluS NPs (Pluronic Silica NanoParticles). These NPs had a silica core of about 10 nm and an overall hydrodynamic diameter of about 25 nm. Interestingly, PluS NPs can be tailored for optimization of processes such as directional energy transfer, which provide those systems with extremely valuable functions: high light-harvesting capability, signal-to-noise maximization, multiplex output, and signal amplification. In-vivo experiment proved the absence of toxic effects on mice even after three months after injection. We also found that cellular uptake was influenced by nanoparticle functionalization while the drug loading ability can be tuned with a suitable choice of the silica precursor.

Nanomedicine in the field of Orthopedic surgery

Francesco TRAINA, University of Messina

The application of nanotechnology to bone substitutes is relatively a new frontier in orthopedic research, nevertheless they have been utilized in a number of applications, that include targeted drug delivery for orthopedic oncology, implantable materials for bone, cartilage and vertebral disk regeneration, surface enhancement for joint prosthesis, and diagnostic modalities. A variety of nanostructures with unique chemical, physical, and biological properties have been engineered to improve to achieve all these goals, including ceramics, polymers, metals, and composites. All these nanomaterials can be used to improve orthopedic implant by controlling their surface properties and their interaction with host environment. Since natural tissues are nanometer in dimensions and cells directly interact with nanostructured extracellular matrices, the biomimetic features and excellent physiochemical properties of nanomaterials play a crucial role in stimulating cell growth as well as tissue regeneration. Some of the key characteristics that make nanomaterials attractive for orthopedic applications include high strength-to-weight ratio, wear/corrosion resistance, antimicrobial/drug release potentials, and tissue integration/regeneration capabilities. However, mimicking living bone tissue is still a challenge. The scope of this presentation is to highlight the most recent accomplishments and trends in designing nanomaterials and their applications in orthopedics with an outline on future directions and challenges.
**HT.II.D - Nanotechnology and advances in electronic devices**

**Iontronics or controlling electronics via ionic motion and arrangement: fundamentals and applications**

**Francesco ROSELLA, Scuola Normale Superiore/NEST**

Iontronics targets the control of electrical properties and functionality of electronic devices by exploiting ionic motion and arrangement. It represents an interdisciplinary field encompassing electrochemistry, solid-state physics, energy storage, electronics and biological sciences. A key element driving the functionality of iontronic devices is the electric-double-layer (EDL) formed at the interface between an (electronically-insulating) ionic conductor and an electronic conductor such as an organic system or an inorganic semiconductor. In particular, the use of ionic liquids for the realization of EDL transistors (EDLTs) yields very high local electric fields and efficient carrier-density modulation. These approaches are widely exploited for the control of semiconductor nanostructure-based devices such as nanowire-FETs. In this case, the perspectives include fundamental studies such as carrier density induced phase-transitions and also applications in bioelectronics, light emission and detection at the nanoscale, bio-sensing.

**Physics and technology of gallium nitride materials for power electronics**

**Fabrizio ROCCAFORTE, CNR-IMM, Catania**

Since decades, silicon (Si) is the “lord” of microelectronics industry. However, to meet the current societal need of reducing the global energy consumption, the next generation of power devices will have to guarantee an improved energy efficiency with respect to the existing Si devices. For this purpose, the introduction of new semiconductors technologies has become mandatory. Owing to its outstanding physical and electronic properties, gallium nitride (GaN) and related alloys are promising materials that can find application in the fields of high-power and high-frequency electronics, with a high energy efficiency. However, several hurdles are still hindering the full exploitation of these materials. For that reason the scientific community working on GaN-based materials is intensively involved in the solution of a variety of physical and technological problems encountered in the fabrication of GaN devices. This keynote speech aims to give an overview on some selected scientific aspects of GaN technology for power electronics devices, with a special attention to the case of high electron mobility transistors (HEMTs). In particular, after an introduction on the fundamental physical properties of the material, emphasis will be given to the current transport at metal/GaN interfaces, considering either Ohmic and Schottky contacts, which are important bricks of any power device. Afterwards, the relevance of dielectrics for GaN, either as passivation or gate insulation layers, will be briefly highlighted. Finally, the possible approaches to control the two dimensional electron gas (2DEG) in AlGaN/GaN heterostructures and to fabricate normally-OFF HEMTs will be presented, thus being one of the most important challenges in GaN technology.
**HT.III.A - Spectroscopic characterization and imaging**

**HIM with SIMS - High resolution Imaging and Nano-analytics with He and Ne ions**

**Lars- Oliver KAUTSHOR, Carl Zeiss Microscopy GmbH**

The Helium Ion Microscope (HIM) has been described as an impact technology offering new insights into the structure and function of nanomaterials. Combining a high brightness Gas Field Ion Source (GFIS) with unique sample interaction dynamics, the helium ion microscope provides images, offering unique contrast and complementary information to existing charged particle imaging instruments such as the SEM and TEM. Formed by a single atom at the emitter tip, the helium probe can be focused to below 0.25 nm offering the highest recorded resolution for secondary electron images. The small interaction volume between the helion beam and the sample also results in images with stunning surface detail. By analyzing the sputtered material by means of SIMS the Helium Ion microscope can be transferred into a powerful nano-analytical system. The combination of the high-brightness He/Ne GFIS source with secondary ion mass spectrometry detection capabilities opens up the prospect of obtaining chemical information with high lateral resolution and high sensitivity on the ZEISS ORION helium ion microscope. A lateral resolution for SIMS imaging <20 nm has been shown. Simulation based study reveals that a lateral resolution <10 nm can be obtained.

**Chemical and spectroscopic characterization from nm to sub-nm scale with EFTEM and STEM-EELS**

**Giovanni BERTONI, CNR IMEM, Trento**

Advanced materials require control of the structural properties at the sub-nanometer or atomic scale. To fully characterize these systems, the chemical information at high spatial resolution must be achieved. This is possible by using electron energy loss spectroscopy in a scanning transmission microscope (STEM-EELS), or in filtered mode with a parallel beam (EFTEM). The latter can be used, for instance, to reveal the oxidized shell after treatments in assembled nanocrystals. Taking advantage of probe aberration correction in STEM and high-resolution spectrometers, sub-nm and atomic resolution is possible. Here I will show some examples of the use of this technique for mapping the chemical composition and the oxidation state (valence) of atoms in different nanosystems. An example is a CeO2/Pt epitaxial heterostructure, in which EELS from the Ce-M ionization edge reveals a one atomic thick layer with partly reduced Ce 3+ atoms at the interface in agreement with theory predicting 1 reduced Ce 3+ atom per cell to be stable at the interface. Other examples focus on nanoparticles and functionalized nanostructures. For instance, EELS mapping can be used to resolve the oxidation state of the metal atoms in core/shell particles. Moreover, EELS can be used to determine the bandgap in ultrathin perovskite nanosheets, or to map the extension of the plasmons and excitons states in a coupled system such as Au functionalized ZnO nanostructures.
**HT.III.B - 2D materials and beyond**

**Designer artificial 2D materials**

**Alessandro MOLLE, CNR-IMM Agrate**

Making adjustable two-dimensional (2D) materials is an emerging route to reach a superior control of new functional properties. With this aim in mind, here I will give consideration to two distinct cases. On one hand is the case of the epitaxial Xenes, an emerging class of 2D monoelemental lattice beyond graphene; on the other hand is the anisotropy design in MoS2 nanosheets. By close analogy with graphene, epitaxial Xenes are comprised of monoelemental atoms arranged in a honeycomb lattice but unlike graphene, Xenes are epitaxially grown on substrates and exhibit a varying degree of buckling and/or puckering in the lattice structure. Examples in this respect are silicene, germanene, stanene, borophene, epitaxial phosphorene, and recently synthesized antimonene and tellurene. Buckling in Xenes can be taken as a leverage to tune the electronic and quantum properties making it possible for Xenes to appear as semiconductors, semimetals, metals topological and trivial insulators. Not only the wealth of electronic states in the Xenes makes them suitable as nanotechnology platform, but also topological transitions among these electronic states are predicted to take place as a function of an external solicitation (e.g. vertical electric field, applied stress) thus paving the way to the full exploitation of topology in devices at the 2D level. I will show the route and challenges for Xenes to be integrated in nanoelectronic devices by briefly describing a universal approach to Xene processing and eventually the concept of a topological field effect transistor.

A different case of morphology design at the 2D level is the chemical vapour deposition of MoS2 nanosheets on patterned substrates. The highly conformal character of the MoS2 growth allows for the achievement of an anisotropically modulated MoS2 nanosheet where the phonon and electronic properties are observed to be strongly morphology dependent. The so-induced morphological anisotropy is reflected in the anisotropy of the physical characteristics, such as the phonon spectrum, intrinsic charge fluctuations, and the exciton dynamics. Implications on the band-gap and exciton engineering will be discussed, and the potential for applications envisioned.

**Single and multilayer graphene embedded in a Fabry-Perot cavity for tunable NIR absorption**

**Maria Luisa GRILLI, ENEA Casaccia**

Recently, optical absorption enhancement of graphene in the visible and near infrared (NIR) regions has attracted increasing interest of researchers. While field induced enhanced optical absorption has been modeled by some authors, reports on its experimental validation are still lacking.

In this work we report on our preliminary study on the design and experimental fabrication of a Fabry-Perot (FP) filter which employs single layer graphene or multilayer graphene in its cavity. The FP filter was modeled by COMSOL Multiphysics. The central wavelength of the FP filter, consisting of Si and SiO2 layers, was chosen in the wavelength range of 2200-2500 nm. FP was fabricated by radio frequency sputtering starting from a 99.999 % purity Si target. Oxygen gas was used for the deposition of the SiO2 layers. After the first mirror fabrication, graphene single layer (or multilayers) grown by Chemical Vapour Deposition on a Cu foil was successfully transferred on the stack. Several experimental conditions were investigated with the aim to not oxidize nor damage the graphene layer during the sputtering process of the SiO2 layer of the subsequent mirror.

Results showed an enhanced NIR absorption (close to the central FP wavelength) of the graphene layers when embedded in the FP filter. Absorption wavelength may be tuned by opportunely choosing the materials and the thickness of the layers of the FP filter.
HT.III.C - Advanced approaches for investigating cells and neurons

Advanced Diagnosis at single cell level by Coherent Imaging in Lab on Chip Platforms

Pietro FERRARO, CNR - ISASI, Pozzuoli (Napoli)

Tomography is one of the most powerful imaging tools for analyzing biological samples, able to furnish complete mapping of the object in 3D. In particular, tomographic phase microscopy (TPM) exploits quantitative phase imaging (QPI) techniques to map the 3D refractive index (RI) of cells, by adopting laser beam deflection, direct mechanical rotation or holographic optical tweezers (HOTs) to probe the sample along a number of controlled directions. In general, all TPM set-ups require the sample to be observed along different directions with respect to the probing beam. To date, all tomographic methods require a high-precision, opto-mechanical and/or opto-electronic device to acquire a set of many images by probing the sample along a large number of controlled directions. Here we report on a smart solution to obtain TPM of samples at lab-on-chip scale, by exploiting their tumbling inside microfluidic channels. This method, recently developed, presents the following advantages: (i) Permits to observe full 360° of rotating cells, thus avoiding the limitation in the accuracy of tomograms; (ii) no mechanical contact neither holographic optical tweezers are needed to rotate the sample; (iii) it is suitable for application in flowing conditions with high-throughput performances. This would allow real microfluidic biomedical applications on a large scale. The results shown in [4] for RBCs and diatoms are here extended to quasi-spherical cells, by exploiting a new algorithm for rolling angle recovery in TPM. In particular, we performed the 3D imaging of human breast adenocarcinoma MCF-7 cells, opening the way for the full characterization of circulating tumor cells (CTCs) in the new paradigm of liquid biopsy.

Networking brain and silicon spiking neurons with nanoscale memristors: first steps, next challenges and perspectives for brain-machine interfaces

Stefano VASSANELLI, University of Padova

Neural interfaces for recording and stimulation of brain neurons are experiencing a dramatic development, boosting large-scale and high-density implementations that represent an ideal bi-directional gateway to micro- and nanoelectronic devices emulating fundamental properties of neurons, such as action potential firing and synaptic plasticity. Thus, in perspective, a new concept of brain-machine interfacing may emerge where brain and silicon neurons are physically connected for seamless spike-based computation, and differently from current signal processing approaches based on Von Neumann machines. As a first step in this direction, we will present results in vitro from the RAMP project (http://www.rampproject.eu/) where nanoscale memristors are used as part of synaptic-like elements between biological and very-large integration spiking neurons. We show that memristors can mimic synapses in compressing information on spikes occurrence and with minimal power consumption and emulate plasticity across an elementary biohybrid network.
HT.III.E - 3D Additive Manufacturing

Additive manufacturing of nanocomposite materials for optics

Andrea CAMPOSEO, Scuola Normale Superiore/NEST

Additive manufacturing technologies are currently introducing novel paradigms for the design of optical devices and for their fabrication. The object fabrication can be accomplished by either curing a liquid pre-polymer via exposure to UV radiation, or by depositing fused polymers and viscous inks, in a layer-by-layer approach. In this framework, the production of 3D optical structures is still challenging, because such components require optical transparent matrices, which can be optionally doped with nanoparticles and active molecular compounds to achieve specific optical properties, such as light diffusion, absorption, emission at particular wavelengths and nonlinear optical response. In this presentation, 3D printing processes for both passive and active optical components developed in our laboratories will be presented. We investigated 3D printing process of transparent matrices and nanocomposite functional optical materials, and characterized the process variables of various composite materials.

Virtual reality tools for advanced modeling

Giordano MANCINI, Scuola Normale Superiore/SMART

The role of Virtual Reality (VR) tools in molecular sciences is analyzed in this contribution through the presentation of the Caffeine software. Caffeine, developed at Scuola Normale Superiore, is specifically tailored for molecular representation and data visualization with VR systems, such as VR theaters and helmeTT. Researchers are cast into the world of atoms and molecules, where they can visualize at a human time and spatial scale phenomena such as the density of molecules around a specified coordinates set, bond formation, biopolymers structure, electron charge rearrangement or vector fields. Common chemical abstractions for (macro) molecular structures such as ball and stick and ribbon representations are used, in conjuction with isosurfaces and glyphs for non atomic data. The application is coupled by a desktop version and integrates (both in 2D and 3D) data analysis tools to allow plot 2D charts in an augmented reality like fashion or select molecular structures with specific features.
I.A Keynote Session: Ultimate TEM characterization and imaging
Chair: Vittorio MORANDI, CNR - IMM, Bologna

The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

I.A.1 Beatrice VALLONE, Sapienza University of Rome
Single Particle Cryo-EM structure of the complex between human Ferritin and Transferrin Receptor: a gateway for targeted delivery and theranostics

I.A.2 Elvio CARLINO, CNR-IMM, Lecce
Atomic Resolution Transmission Electron Microscopy: On the way toward the ultimate spatial resolution and accuracy

I.B Keynote Session: Challenges in semiconductor technologies
Chair: Romeo BECCHERELLI, CNR IMM, Roma
In collaboration with: MICRON

I.B.1 Narciso GAMBACORTI, CEA-Leti/PAC-G, Grenoble, France
Semiconductor characterization challenges addressed by Large Scale Facilities

I.B.2 Tommaso VALI, Micron
Neural network and Pattern recognition implemented on memory technology

I.C Keynote Session: Nanotechnology and nanofabrication: opportunities for innovation
Chair: Fabrizio PIRRI, Polytechnic of Turin

I.C.1 Massimo BERSANI, FBK, Trento
Research and innovation Dilemma on Nanotechnology

I.C.2 Monica BOLLANI, CNR IFN, Milano
Design, characterization and lithographic application of Si nanocrystals patterns via templated dewetting

I.D Keynote Session: Nanotechnology and Advances in Biotech Applications
Chair: Stefano LINARI, Linari Engineering Srl

I.D.1 Paola MINGHETTI, University of Milan
Drug, medical device and cosmetic containing nanocarrier: regulatory perspective

I.D.2 Carlo Alberto MARCOALDI, LINARI Nanotech
Electrospinning of nanofibers for tissue engineering
### I.A  X-Ray Microscopy

**Chair:** Narciso GAMBACORTI, Cea-Leti & PAC-G, Grenoble, France  
*The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

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| I.A.1   | Lars-Oliver KAUTSHOR, *Carl Zeiss Microscopy*  
Extending Synchrotron X-ray Microscopy to the Laboratory” (to be confirmed) |           |             |
| I.A.2   | Alessia CEDOLA, *CNR Nanotec, Roma*  
X-Ray Phase Contrast Tomography for Regenerative medicine |           |             |
| I.A.3   | Tevfik Onur MENTES, *Elettra-Sincrotrone Trieste*  
X-ray photoemission electron microscopy studies in ultrathin film magnetism |           |             |
| I.A.4   | Manuel DIERICK, *Tescan Orsay Holding*  
Exploring Materials Evolution with Laboratory-based Dynamic X-ray Tomography |           |             |

### I.B  Nano perspectives in the Agri-Food sector

**Chair:** Nelson MARMIROLI, University of Parma  
*The symposium is part of the workshop WS.II on "AgriNanoTechniques"

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| I.B.1   | Ana Maria RINCON, *European Food Safety Authority (EFSA)*  
A regulatory perspective on nanomaterials or engineering nanomaterials in food in the European Union |           |             |
| I.B.2   | Rossella BENGALLI, *University of Milano-Bicocca*  
Safe(r) nanomaterials for the Agri-Food sector: The Nano bioscience perspective |           |             |
| I.B.3   | Michele IAFISCO, *CNR ISTEC, Faenza*  
From food industry by-products to smart nano-fertilizers: towards a circular economy of phosphorus |           |             |
| I.B.4   | Giuseppe CIUFFREDA, *Fabbrica Coop Perfosfati Cerea*  
Market perspectives for smart fertilizers |           |             |

### I.C  Photocatalytic nanomaterials for water remediation

**Chair:** Roberto GIANNANTONIO, DHITECH  
*In collaboration with: DHITECH*

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| I.C.1   | Francesco MATTEUCCI, *DHITECH*  
The FONTANAPULIA project |           |             |
| I.C.2   | Roberto COMPARELLI, *CNR IPCF, Bari*  
Photocatalytic nanomaterials for water remediation |           |             |
| I.C.3   | Giuseppe MASCOLO, *CNR IRSA, Bari*  
Water treatments and nanotechnologies for water remediation |           |             |
| I.C.4   | Daniela SOTTOCORNOLA, *Biotec Srl, Bari*  
From water disinfection by UV to UV-based technologies for water remediation |           |             |
I.D  Synthesis and Microstructural properties I
Chair: Gaspare VARVARO, CNR ISM, Roma

The symposium is part of the Joint Event JE.I "Materiali Nanofasici"

I.D.1 Federico SCAGLIONE, University of Turin
Modified Nanoporous Gold for Hydrogen Evolution Reaction

I.D.2 Leonardo GIORGI, ENEA Casaccia, Rome
Self-organized TiO$_2$ anatase nanotube direct fabricated by anodization without annealing

I.D.3 Ahmad KHODADADI, NTU, Singapore
A new route to develop nanocomposite composite based on sepiolite and Mg Al layered double hydroxide

I.D.4 Antonio RUBINO, Sapienza University of Rome
Ti/TiO$_2$/Cu$_2$O electrodes for photocatalytic applications: synthesis and characterization

I.E  Nanotechnology for bio-medical applications
Chair: Eugenio AMENDOLA, CNR IPCB, Portici, Napoli

I.E.1 Sabato D’AURIA, CNR ISA, Napoli
Robust biomolecules as advanced tools for biotech applications

I.E.2 Cristiano DE MICHELE, Sapienza University of Rome
Liquid Crystals of DNA-based Nanoparticles

I.E.3 Barbara CORTESE, CNR NANOEC, Roma
Role of Mechanical cues in the control and guidance of Glioma Progression

I.E.4 Giacinto SCOLES, CNR NANOEC, Lecce
Cytofind Dx: a company that has the ambition to innovate cancer diagnostics
I.F  Electrochemical Energy Storage: use of nanomaterials as components of batteries  
Chair: Pierpaolo PROSINI, ENEA Casaccia  
In collaboration with: ENEA

I.F.1 Francesco NOBILI, University of Camerino  
High-capacity Si-based nanocomposite anodes for Li-ion batteries

I.F.2 Sergio BRUTTI, University of Basilicata  
Synergistic electro-catalysis of core/shell Pd/PdO nanoparticles and Cr(III)-doped NiCo2O4 nanofibers in aprotic Li-O2 batteries

I.F.3 Claudio GERBALDI, Polytechnic of Turin  
Towards Solid Batteries Operating at Ambient Temperature Exploiting Highly-Crosslinked (Composite) PEO-based Polymer Electrolytes

I.F.4 Catia ARBIZZANI, University of Bologna  
Nanomaterials for new separators in lithium/sulfur batteries

I.F.5 Marisole DI CARLI, ENEA Casaccia  
Electrospinning nanofibers as separators for lithium-ion batteries

I.G  Innovative nano-materials and methods for fuel cell electrodes implementation  
Chair: Marcello ROMAGNOLI, University of Modena & Reggio Emilia  
In collaboration with: University of Modena & Reggio Emilia

I.G.1 Paola LUCHES, CNR Istituto Nanoscienze, Modena  
Nano structured reducible oxides for PGM-free fuel cell anodes

I.G.2 Gianluca MALAVASI, University of Modena and Reggio Emilia  
Development of new ceria-based catalysts: modelling, synthesis and characterization

I.G.3 Marcello ROMAGNOLI, University of Modena and Reggio Emilia  
Innovative deposition methods to prepare test electrodes

I.G.4 Maria CANNIO, University of Modena and Reggio Emilia  
Nanofluids for thermal exchange
II.A  Advances in Microscopy-based Nanocharacterization Methodologies  
Chair: Elvio CARLINO, CNR-IMM, Lecce (to be confirmed)  
In collaboration with: ZEISS  
The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

II.A.1 Matteo FERRONI, University of Brescia  
The implementation of the STEM imaging mode in the SEM for electron tomography

II.A.2 Giulio LAMEDICA, Carl Zeiss Italia  
Latest Advances in Electron and Ion Microscopy

II.A.3 Joerg LINDENAU, Carl Zeiss Microscopy  
Large Volume and Correlative Scanning Electron Microscopy

II.A.4 Umberto CELANO, IMEC, Belgium  
Site-specific analysis for nanoelectronics using hybrid SPM-TEM metrology

II.B  Nanomaterials and Plant Nutrition  
Chair: Zeno VARANINI, University of Verona  
The symposium is part of the workshop WS.II on "AgriNanoTechniques"

II.B.1 Luca MARCHIOL, University of Udine  
Smart fertilizers: Nano-options towards an improvement of Nutrient Use Efficiency

II.B.2 Marta MARMIROLI, University of Parma  
Possible applications of engineered nanomaterials in agriculture: the issue of interaction

II.B.3 Davide SEGA, University of Verona  
FePO4 nanoparticles as a source of nutrients for plants

II.B.4 Ilaria CLEMENTE, University of Florence  
Contributions of nanoscience in designing innovative vectors for agrochemical delivery

II.C  European nanotechnology research infrastructures: their support to innovation 1  
Chair: Lorenza FERRARIO, FBK, Trento  
In collaboration with: FBK

II.C.1 Mariam DEBS, International Iberian Nanotechnology Laboratory, Portugal  
Presentation INL

II.C.2 Onofrio Antonino CACIOPPO, LFoundry, Avezzano  
LFoundry network in support of innovation

II.C.3 Giovanni ISELLA, Polytechnic of Milan  
Laboratory for Nanostructures Epitaxy and Spintronics on Silicon LNESS, semiconductor deposition, characterization and modeling.

II.C.4 Vittorio MORANDI, CNR IMM, Bologna  
It-fab and EuroNanolab: Italian and European networks of micro and nano-fabrication facilities

II.C.4 Pierluigi BELLUTTI, FBK, Trento  
The Key enabling technologies Facility in Trento FBK FESR Project
II.D Sustainable (bio-)technologies for CO₂ capture and usage

Chair: Angela RE, IIT, Torino & Sergio BOCCHINI, IIT, Torino
In collaboration with: Polytechnic of Turin & IIT

II.D.1 Klaas HELINGWERF, Swammerdam Institute for Life Sciences, University of Amsterdam, The Netherlands
On the use of oxygenic photosynthesis for the sustainable production of commodity chemicals

II.D.2 Tomas MOROSINOTTO, University of Padova
Unicellular algae for sustainable production of bio-commodities and nanoparticles

II.D.3 Simelys HERNANDEZ, CREST Group, Polytechnic of Turin & IIT@Polito
Current Status and Challenges for the Implementation of Electrocatalytic CO₂ Reduction

II.D.4 Valentina CROCELLÀ, University of Turin
Bio-inspired materials for CO₂ capture and utilization

II.D.5 Stefano SANTABARBARA, CNR, Biophysical Institute, Milano
Photosynthesis on the red edge

II.E Nanotechnology in medicine

Chair: Donatella PAOLINO, University “Magna Graecia” of Catanzaro
In collaboration with: University “Magna Graecia” of Catanzaro

II.E.1 Lorenzo PRADELLA, GreenBone Ortho srl
Nanotechnology commercialisation: from research to successful development

II.E.2 Adriele PRINA-MELLO, Trinity College Dublin & AMBER Centre and CRANN Institute, Dublin, Ireland
Next generation Nanomedicine development. The importance of Size and Concentration characterisation as key quality attributes

II.E.3 Adriana TRAPANI, University of Bari “Aldo Moro”
Solid Lipid Nanoparticles made of gelucire® 50/13: a suitable delivery system for hydrophobic or hydrophilic active substances

II.E.4 Ilenia VIOLA, CNR NANOTEC
Membrane-based microfluidic devices for real-time sensing and autonomous pumping
II.G Nanomaterials fabrication and characterization advances

Chair: Francesco MARRA, Sapienza University of Rome

II.G.1 Giacinto SCOLES, CNR NANOTEC, Lecce
Cellular materials for organ on chip research

II.G.2 Dmitry MURATOV, National University of Science and Technology MISiS, Moscow, Russia
2D crystals of transition metal trichalcogenides for nanoelectronics and photovoltaics

II.G.3 Eugenio AMENDOLA, CNR IPCB, Portici, Napoli
In definition

II.G.4 Maria CENSABELLA, University of Catania
Fabrication of Metal Nanoparticles-Graphene Nanocomposites and Study of the Charge Transfer Effect

II.G.5 Federica BERTOLOTTI, Aarhus University, Denmark & To.Sca.Lab, Como, Italy
Advanced X-ray Total Scattering Methods based on the Debye Scattering Equation for characterizing nanomaterials
III.A Cryo Electron Microscopy: the resolution revolution

Chair: Beatrice VALLONE, Sapienza University of Rome

In collaboration with: JEOL, THERMO FISHER SCIENTIFIC & ZEISS

The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

III.A.1 Giuseppe ZANOTTI, University of Padova
Cryo-electron microscopy: a crystallographer view

III.A.2 Ludovic RENAUT, Leiden University, Leiden, The Netherlands
Running an International service facility for cryoEM

III.A.3 Massimiliano MALETTA, Thermo Fisher Scientific
The role of Cryo-electron microscopy in structural biology after the "resolution revolution"

III.A.4 Guillaume BRUNETTI, JEOL EUROPE
New JEOL TEM developments for cryo biology

III.A.5 Joerg LINDENAU, Carl Zeiss Microscopy
Workflow for Correlative Cryo-Imaging

III.B Research Pathways

Chair: Luca MARCHIOL, University of Udine

The symposium is part of the workshop WS.II on "AgriNanoTechniques"

III.B.1 Ilaria COLZI, University of Florence
Copper nanoparticles from agricultural wastes: a case study on blueberry local processing

III.B.2 Enrico BRAIDOT, University of Udine
Impact of Hydroxyapatite NPs on tomato plantlet metabolism and seed germination

III.B.3 Alessandra ZAMBONELLI, University of Bologna
Iron exopolysaccharide nanoparticles to improve the production of truffle mycorrhized plants

III.B.4 Federica TRAMER, University of Trieste
Chitosan nanoparticles as vectors for the release of bioactive plant substances: application in the medical and agri-food fields

III.C Physical Characterizations on semiconductor devices

Chair: Onofrio Antonino CACIOPPO, LFoundry

In collaboration with: LFoundry, Renishaw

III.C.1 Marco RENZELLI, LFoundry
UV emission from Silicon; evidences for possible physical explanations

III.C.2 Giuseppe MOCCIA, LFoundry
Study of Raman Spectroscopy capability on SRP beveled samples for implant and anneal characterization

III.C.3 Riccardo TAGLIAPETRA, Renishaw
Accurate Raman imaging of rough samples and/or those with complex surface topographies

III.C.4 Narciso GAMBACORTI, PAC-G/CEA Leti, Grenoble, France
Atomic Probe Tomography of elements diffused by poly gate in to gate-oxide- to be confirmed
### III.D Synthesis and Microstructural Properties II

Chair: Amelia MONTONE, CNR ISM, Roma

The symposium is part of the Joint Event JE.I "Materiali Nanofasici"

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<td>National Research University of Electronic Technology (MIET), Russia</td>
<td>Electrochemical routes for functional nanostructures synthesis for energy and heterogeneous catalysis applications</td>
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<td>University of Applied Science and Technology, Shirvan Center, Iran</td>
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### III.E From Nanotherapeutics to NanoBiomaterials

Chair: Giovanni TOSI, University of Modena & Reggio Emilia

In collaboration with: University of Modena & Reggio Emilia

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<td>University of Modena and Reggio Emilia</td>
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<td>Marcello BERTO</td>
<td>University of Modena and Reggio Emilia</td>
<td>Biosensing with organic electronic transistors</td>
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III.F Nanostructures and Spectroscopy for Quantum confined Systems, Photonics, Biosystems and Cultural Heritage

Chair: Carlo MARIANI, Sapienza University of Rome
In collaboration with: Sapienza University of Rome

III.F.1 Stefania PANERO, Sapienza University of Rome
Down to Nanoscale: Observations of archaeological copper based artifacts from the Late Pre-dynastic site of Maadi

III.F.2 Sergei ARAKELIAN, Vladimir State University, Russia
Femto- nanophotonics as a new basis in modern Hi-Tech industry

III.F.3 Francesco BASSO BASSET, Sapienza University of Rome
Epitaxial Quantum Dots: Nanostructures for Quantum Communication

III.F.4 Ilaria RAGO, Sapienza University of Rome
Tuning cellular functionality and development via carbon nanotubes directly grown on supporting surfaces

III.G European nanotechnology research infrastructures: their support to innovation 2

Chair: Riccardo BERTACCO, Polytechnic of Milan - PoliLAB
In collaboration with: FBK

III.G.1 Ida NODDELAND, Norwegian University of Science and Technology (NTNU), Gløshaugen, Norway
Presentation NTNU

III.G.2 Laura BOSCHIS, Trustech
Presentation Trustech

III.G.3 Alessandro NOTTOLA, Inphotec
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III.G.4 Alina SUSLOVA, Venture Club, Russia
New areas of technology transfer in Eastern Europe and Middle East countries: Specificity of technology transfer, risks and obstacles in «bridging» corporations and entrepreneurs
II.A Keynote Session: Scanning Ion Microscopy: Nanocharacterization and Nanofabrication

Chair: Marco VITTORI ANTISARI, Asssociazione Nanoitaly
In collaboration with: ASSING/Tescan

The symposium is part of the workshop WS.I on ”Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

II.A.1 Petr KLIMEK, Tescan Orsay Holding
Preparation of Aluminum Specimen with Gallium and Xenon Plasma Focused Ion Beam for Further Nano-characterization

II.A.2 Gian Carlo GAZZADI, CNR - Nano, Modena
Focused Ion Beam (FIB) and Focused Electron Beam Induced Deposition (FEBID) for advanced nanocharacterization and nanofabrication

II.B Keynote Session: Scanning Probe Microscopy: Touching and Probing Matter at the Nanoscale

Chair: Daniele PASSERI, Sapienza University of Rome
In collaboration with: ASSING/Brucker

The symposium is part of the workshop WS.III on ”Advanced Scanning Probe Microscopies"

II.B.1 Jason KILLGORE, NIST, USA
Exploring Nanoscale Viscoelasticity with a Surface Coupled Scanning Probe Microscope

II.B.2 Emmanuel PARIS, Bruker Europe
Advance measurement in Atomic Force Microscopy. What’s the latest in mechanical and electrical AFM characterization?

II.C Keynote Session: Nanotechnologies for innovative medicine

Chair: Sabrina CONOCI, STMicroelectronics
In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi

The symposium is part of the workshop WS.V on ”Nanotechnologies for innovative medicine"

II.C.1 Luca PRODI, University of Bologna
Dye Doped Silica Nanoparticles as Luminescent Organized Systems for Nanomedicine

II.C.2 Francesco TRAINA, University of Messina
Nanomedicine in the field of Orthopedic surgery

II.D Keynote Session: Nanotechnology and advances in electronic devices

Chair: Guglielmo FORTUNATO, CNR IMM, Roma

II.D.1 Francesco ROSSELLA, Scuola Normale Superiore/NEST
Iontronics or controlling electronics via ionic motion and arrangement: fundamentals and applications

II.D.2 Fabrizio ROCCAFORTE, CNR-IMM, Catania
Physics and technology of gallium nitride materials for power electronics
IV.A Advance in FIB/SEM Technology and its Contribution to Scientific Problem Solving

Chair: Daniele DE FELICIS, University of Roma Tre  
In collaboration with: TESCAN & ASSING

The symposium is part of the workshop WS.1 on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

IV.A.1 Petr KLIMEK, Tescan Orsay Holding  
Advanced FIB/SEM techniques and applications

IV.A.2 Enrico SALVATI, University of Oxford, UK  
Nanostructural aspects of human dental enamel and their evolution due to dental caries

IV.A.3 Alessandro LAVACCHI, CNR ICCOM, Firenze  
2D materials imaging and nanofabrication in the FIB/SEM

IV.A.4 Audrey GARNIER, STMicroelectronics  
Plasma FIB: enlarge your field of view and your field of applications

IV.B Advanced SPM techniques: methods and applications 1

Chair: Marco RENZELLI, LFoundry  
In collaboration with: LFoundry

The symposium is part of the workshop WS.III on "Advanced Scanning Probe Microscopies"

IV.B.1 Livia ANGELONI, University of Delf, Delft, The Netherlands  
Use of Scanning Capacitance Microscopy as a tool for detecting damage to Lightly Doped Drain (LDD) implants in SRAM

IV.B.2 Stefano VERONESI, CNR, Istituto Nanoscienze, Pisa  
An atomically flat gold film thermometer on mica to study energy (heat) exchange at the nano-scale

IV.B.3 Francesco MARINELLO, University of Padua, Italy  
NSOM limits and potential in nano-optical characterization

IV.B.4 Cristiano ALBONETTI, CNR-ISMN, Bologna  
The growth of organic ultra-thin films on silicon oxides with variable vacancy states: a Scanning Force Microscopy approach

IV.C New Materials and Nanotechnologies for Innovative therapeutic Approaches

Chair: Rosalba PARENTI, University of Catania  
In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi

The symposium is part of the workshop WS.V on "Nanotechnologies for innovative medicine"

IV.C.1 Emanuela ESPOSITO, University of Messina  
Laser-produced Au nanoparticles as X-ray contrast agents for diagnostic imaging

IV.C.2 Gianfranco PASUT, University of Padova  
Monoclonal antibody for drug delivery and targeting

IV.C.3 Gennara CAVALLARO, University of Palermo  
Nano into micro formulations based on functionalized polymers for pulmonary drug delivery

IV.C.4 Francesco GIULIANO, SIFI  
Nanostructured carriers for effective delivery of drugs to the back of the eye
IV.D Standardisation of nanomaterials in the VAMAS project (the Versailles project on Advanced Materials Standardisation)
Chair: Laura DEPERO, University of Brescia & VAMAS Italia and Luca BOARINO, INRIM
In collaboration with: INRIM

IV.D.1 Ian GILMORE, NATIONAL PHYSICAL LABORATORY, SURFACE AND NANOANALYSIS, UK
The activities of Technical Working Group 2 Surface Analysis

IV.D.2 Burkhard BECKHOFF, PHYSIKALISCH-TECHNISCHE BUNDESANSTALT (PTB), Germany
X-ray spectrometry for nanoscaled materials and systems

IV.D.3 Caterina MINELLI, NPL MATERIALS GROUP, NATIONAL PHYSICAL LABORATORY, UK
Advancements in nanoparticle standardisation through VAMAS inter-laboratory comparisons

IV.D.4 Andrea GIOVANNOZZI, INRIM
Recognition and Quantification of Anatase, Rutile and Brookite in Binary Mixtures: a Raman Spectroscopy and Chemometric Study

IV.E Nanomaterials for next generation of electric motors
Chair: Pietro TAGLIATESTA, University of Rome Tor Vergata
The symposium is part of the Joint Event JE.I "Materiali Nanofasici"

IV.E.1 Enzo CHIRICOZZI, University of L’Aquila
Nanotechnology and Innovation in electric motors development

IV.E.2 Alessandro TALONE, ISM CNR, Roma
Design of Magnetic nanoarchitecture with tunable properties

IV.E.3 Sara LAURETI, ISM CNR, Roma
Low temperature synthesis of L10 MPt (M = Fe, Co, Ni) nanoparticles by salt layered precursors

IV.E.4 Rocco CARCIONE, NanoShare srl, Roma
Carbon nanotubes for electric motors: fibers, composites and metal decorated systems
IV.F Advanced science and surfaces engineering on the multi-scale

Chair: Sergio VALERI, University of Modena & Reggio Emilia
In collaboration with: University of Modena & Reggio Emilia

IV.F.1 Alberto ROTA, FIM-Intermach & University of Modena and Reggio Emilia
Coupling different strategies for surface functionalization

IV.F.2 Giovanni BOLELLI, University of Modena and Reggio Emilia
Finely structured coatings by thermal spraying: case studies

IV.F.3 Francesco BOZZA, Turbocoating Spa
Industrialization of nanostructured thermal barrier coatings

IV.F.4 Leonardo ORAZI, University of Modena and Reggio Emilia
Ultrashort Laser Micro and Nanotexturing: advances and applications

IV.G NanoInnovation’s Got Talent

Chair: Fulvio UGGERI, Bracco Imaging
In collaboration with: Fondazione Bracco

IV.G.1 Francesca TRUFFA GIACHET, CNR ISMAC, Biella
Antibacterial keratin nanofibers on titanium surfaces for fibroblast adhesion and prevention of biofilm formation

IV.G.2 Ilaria PECORARI, University of Trieste
Biomechanical characterization of cardiac fibroblasts in an in vitro progeria model

IV.G.3 Matteo AVOLIO, University of Pavia & INSTM
Magnetic Nanoparticles for Magnetic Fluid Hyperthermia and Nuclear Magnetic Resonance: influence of key physical parameters

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   In collaboration with: ZEISS & JEOL

   The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

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   The symposium is part of the workshop WS.III on "Advanced Scanning Probe Microscopies"

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   V.B.2  Giuseppe BARILLARO, University of Pisa
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   V.B.3  Antonietta LA STORIA, University of Naples Federico II
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   V.B.4  Leonetta BALDASSARRE, Sapienza University of Rome
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   V.C.1  Mojtaba ALIDOOST, Polytechnic of Turin
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   V.C.3  Pietro ZACCAGNINI, IIT@Polito
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Chair: Salvo PETRALIA, STMicroelectronics  
*In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi*

*The symposium is part of the workshop WS.V on "Nanotechnologies for innovative medicine***

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Chairs: Maria CARAFA & Carlotta MARIANECCHI, Sapienza University of Rome  
*In collaboration with: Sapienza University of Rome*

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Chair: Gaspare VARVARO, ISM CNR, Roma

The symposium is part of the Joint Event JE.I "Materiali Nanofasici"

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V.F.3 Mateusz WEIS, University of Silesia in Katowice, Poland
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Chair: Guglielmo FORTUNATO, CNR IMM, Roma
In collaboration with: CNR-DSFTM

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Chair: Andrea PARISINI, CNR-IMM, Bologna

The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

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Chair: Emanuela PROIETTI, CNR IMM, Roma

In collaboration with:
CNR IMM - Ministry of Foreign Affairs and International Cooperation - National Institute of Standards and Technology (NIST)

The symposium is part of the workshop WS.III on "Advanced Scanning Probe Microscopies"

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VI.B.2 Marco FARINA, Marche Polytechnic University
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VI.B.3 Giovanni Maria SARDI, CNR IMM, Roma
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VI.B.4 Venkatachalam SUBRAMANIAN, Indian Institute of Technology Madras, Chennai, India
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Chair: Filippo D’ARPA, Distretto Tecnologico Sicilia Micro e Nano Sistemi

In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi

The symposium is part of the workshop WS.V on "Nanotechnologies for innovative medicine"

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In collaboration with: Polytechnic of Turin

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In collaboration with: AIRI/PRISMA PROJECT

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The symposium is part of the Joint Event JE.I “Materiali Nanofasici”

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In collaboration with: Warrant Group

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Chair: Regina CIANCIO, CNR-IOM, Trieste
The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

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In collaboration with: FBK
The symposium is part of the workshop WS.IV on "Microfluidics and Biosystems for personalized medicine"

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Chair: Alberto CIGADA, Polytechnic of Milan & President Comitato Scientifico Cluster Made in Italy

The symposium is part of the Joint Event "Open innovation and Open Science"

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The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

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In collaboration with: Italian Space Agency (ASI)

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In collaboration with: Polytechnic of Turin & CNR IMM

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The symposium is part of the Joint Event "Materiali Nanofasici"

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Chair: Leandro LORENZELLI, FBK, Trento
In collaboration with: FBK & Polytechnic of Turin

The symposium is part of the workshop WS.IV on "Microfluidics and Biosystems for personalized medicine"

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Chairs: Roderico GIORGI, CSGI and Isella VICINI, Warrant Group
In collaboration with: CSGI & WARRANT GROUP

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Chair: Alberto CIGADA, Polytechnic of Milan & President Comitato Scientifico Cluster Made in Italy

The symposium is part of the Joint Event “Open innovation and Open Science”

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Chair: Marco LEONETTI, IIT@SAPIENZA

The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

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Chair: in definition (by Regione lazio)

The symposium is part of the Joint Event JE.II "Open innovation and Open Science"

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VIII.B.2 Alfonso MARRA, Amministratore Delegato di Klopman International, Frosinone
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Chair: Davide PEDDIS, CNR ISM, Roma

The symposium is part of the Joint Event JE.I "Materiali Nanofasici"

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**Chair:** Mario TUCCI, ENEA Casaccia  
*In collaboration with: ENEA*

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**Chair:** Fabrizio PIRRI, Polytechnic of Turin & Pietro SICILIANO, CNR IMM, Lecce  
*In collaboration with: FBK & Polytechnic of Turin*

*The symposium is part of the workshop WS.IV on "Microfluidics and Biosystems for personalized medicine”*

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<td>Electrolyte-Gated Organic Field Effect Transitors (EGOFETs) integrating microfluidics and electronic transduction for label-free, ultra-sensitive biosensing</td>
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<td>VIII.E.4</td>
<td>Georg PUCKER, FBK, Trento</td>
<td>Photonic integrated sensors for life science</td>
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VIII.F Multifunctional Nanocomposites for Energy and Sensing applications

Chair: Giovanni DEBELLIS, Sapienza University of Rome
In collaboration with: Sapienza University of Rome

VIII.F.1 Antonella D’ALESSANDRO, University of Perugia
Multifunctional RC structures using self-sensing nano-modified cementitious composites

VIII.F.2 Paolo CIAMBELLI, University of Salerno
Towards the development of nanocomposite based supercapacitor

VIII.F.3 Domenico CAVALINI, Sapienza University of Rome
PFM Characterization of Piezoelectric PVDF/ZnO-Nanorod thin films

VIII.F.4 Marco FORTUNATO, Sapienza University of Rome
Graphene-Gold Electrodes for Flexible Nanogenerators Based on Porous Piezoelectric PVDF

VIII.G Nanochemistry meets heritage science for the creation, analysis and conservation of artworks

Chair: Alessandra SANSON, CNR ISTEC, Faenza
In collaboration with: CNR DSTCM

VIII.G.1 Costanza MILANINI, CNR ISTM, Perugia
Nanochemistry of artists’ materials

VIII.G.2 Rosa PONTERIO, CNR IPCF, Messina
Novel nanostructured substrates for SERS analysis of dyes

VIII.G.3 Gabriella DI CARLO, CNR ISMN, Roma
Innovative strategies for the corrosion inhibition in metal artefacts and concrete monuments

VIII.G.4 Luca NODARI, CNR ICMATE, Padova
Atmospheric plasma: an innovative tool in Cultural Heritage cleaning procedures

VIII.G.5 Sabrina GUALTIERI, CNR ISTEC, Faenza
Geopolymers: smart materials for the sustainable protection of artworks
IX.A Microscopy techniques for industrial needs 2
Chair: Onofrio Antonino CACIOPPO, LFoundry
In collaboration with: Leonardo

The symposium is part of the workshop WS.I on "Advanced Characterization Techniques for Nanotechnologies and Nanosciences"

IX.A.1 Massimo VANZI, University of Cagliari
Combined techniques for advanced failure analysis of Photonic Devices

IX.A.2 Luca ORTOLANI, CNR IMM, Bologna
Transmission Electron Interferometric Methods for Materials Characterization

IX.A.3 Paolo MENGUCCI, Marche Polytechnic University
Advanced material characterization for additive manufacturing

IX.A.4 Tiziana DEL BUONO, Lfoundry
Optimization of FIB lamellas preparation for gate-oxide pinholes characterization

IX.B Carbon-based materials
Chair: Maria Letizia TERRANOVA, University of Rome Tor Vergata

The symposium is part of the Joint Event JE.I "Materiali Nanofasici"

IX.B.1 Silvia ORLANDUCCI, University of Rome Tor Vergata
From nanotube to nanodiamond: a world of opportunities for innovation and new applications

IX.B.2 Denise BELLISARIO, University of Rome Tor Vergata
Shape memory polymer composites with carbon nanotubes

IX.B.3 Michela OTTAVIANI, Sapienza University of Rome
Cu-catalyzed SiNW grown on carbon paper as anode for Li-ion cells

IX.B.4 Maria Cristina ROSSI, University of Roma Tre
Conduction mechanisms and microstructure of femtosecond laser induced nanographitic phases in single-crystal diamond

IX.C Applications in personalized medicine
Chair: Cecilia PEDERZOLLI, FBK & Pietro SICILIANO, CNR IMM, Lecce
In collaboration with: FBK & Polytechnic of Turin

The symposium is part of the workshop WS.IV on "Microfluidics and Biosystems for personalized medicine"

IX.C.1 Sabrina CONOCI CV, STMicroelectronics
Silicon Micro Devices and Systems for Healthcare Applications

IX.C.2 Giorgio SCORDO, Polytechnic of Turin
Lab-on-chip for precision medicine

IX.C.3 Luca FRANCIOSO, CNR IMM, Lecce
Sensors & MicroPhysiological Systems: the Organ-On-Chip case

IX.C.4 Francesca DEMICHELIS, University of Trento, Centre of Integrative Biology, Laboratory of Computational and Functional Oncology
Emerging opportunities in precision medicine
IX.D  Technological Integration of graphene and 2D materials
Chair: Rita RIZZOLI, CNR IMM, Bologna
In collaboration with: CNR-IMM

IX.D.1 Andrea GAMUCCI, BeDimensional S.r.l., Genova
Industrial-scale production of graphene and other 2D materials

IX.D.2 Emanuela SCHILIRO’, CNR IMM, Catania
Influence of substrate on the Atomic Layer Deposit on of Al2O3 onto Graphene

IX.D.3 Andrea LISCIO, CNR IMM, Roma
Understanding the exfoliation processes of Graphene and Related Materials: from a single piece to a standardized production

IX.D.4 Antonio AGRESTI, University of Rome Tor Vergata
The emerging role of 2D materials in perovskite solar cell technology

IX.E  Un approccio innovativo della Regione Lazio: Infrastrutture Aperte per la Ricerca
Chair: Marco ROSSI, Sapienza University of Rome
The symposium is part of the Joint Event JE.II "Open innovation and Open Science"

IX.E.1 Riccardo PANUNZIO, Lazio Innova
Strumenti regionali per l’Open Innovation

IX.E.2 Guglielmo FORTUNATO, CNR IMM & Leonardo, Rome
NanoMicroFab - Infrastruttura aperta di ricerca per il supporto di aziende operanti nell’ambito della micro-nanoelettronica

IX.E.3 Giuseppe BARBIERI, ENEA Casaccia, Rome
MAIA – Materiali Avanzati in una Infrastruttura Aperta

IX.E.4 Andrea GHIGO, INFN, Frascati
LATINO – Laboratory in Advanced Technologies for INnOvation

IX.E.5 Luca LEUZZI, Sapienza University of Rome & CNR Nanotec
ATOM - Advanced Tomography and Microscopies

IX.F  Smart Textiles
Chair: Giuseppe ROSACE, University of Bergamo

IX.F.1 Karen DE CLERCK, University of Ghent, Belgium
Dye-functionalized electrospun nanofibers for colorimetric sensors

IX.F.2 Maria Rosaria PLUTINO, CNR ISMN, Messina
Design and development of nanostructured functional materials for sensing applications on textiles

IX.F.3 Gianluca TRAVERSI, University of Bergamo
Microelectronic systems for signal processing from smart textiles sensors

IX.F.4 Ada FERRI, Polytechnic of Turin
Mitigating thermal strain in sports by smart textiles

IX.F.5 Matteo STOPPA, Polytechnic of Turin
An unobtrusive integration of electronics and smart materials into textiles for Space applications

IX.F.6 Andrea GAMUCCI, BeDimensional, S.r.l. Genova
Smart solutions for manufacturing industry based on graphene and 2D-crystals
Poster Sessions

Posters will be displayed in the Sangallo Cloister during the event:
Tuesday 11 September, 14.00 – 20.00
Wednesday 12, Thursday 13, and Friday 14 September, 08.30 – 20.00

PS.I - General Poster Session

01 Nazanin ABDI, Niroo Research Institute (NRI), Iran
Preparation of Nanostructured Al12Mg17 compound for hydrogen storage applications

02 Graziella AMENDOLA, ISS
Development of an analytical platform for the characterization of nanocapsules in products of agricultural interest

03 Fabio BOCCUNI, INAIL
Occupational exposure to amorphous silica nanoparticles: integrated approach to evaluate exposure and toxicity using laboratory

04 Giuseppina BOZZUTO, ISS
Functionalization of liposomes with glycolipids for targeted drug delivery to breast cancer cells

05 Andrea CALCATERA, University of Rome Tor Vergata
Graphene Oxide Nanosheets and Pristine Single Wall Carbon Nanotubes Biocompatibility in Different Human Cell Lines

06 Andrea CALCATERA, University of Rome Tor Vergata
In vitro biocompatibility study: a comparison between Graphene and Nanotubes

07 Giancarlo CAPPELLINI, University of Cagliari
Optical Properties of Different Eumelanin Protomolecules: The Effects of the Solvent

08 Elisabetta CARATA, University of Salento
Size and concentration of Nps influence the endoskeleton organization in larvae of paracentrotus lividus

09 Monica RUFINI CASTIGLIONE, University of Pisa
Mineral nutrients in soil and pea plants after exposition to TiO2 nanoparticles through a biosolid-amended soil

10 Enrico CATALANO, University of Oslo
Theranostic iron-oxide nanoparticles for highly efficient targeted delivery of doxorubicin by photothermal bimodal treatment

11 Delia CAVALLO, INAIL
Influence of production process and size on toxicological properties of amorphous Silica Nanoparticles on human bronchial cells

12 Gianfranco COLETTI, University of Genoa
Composite hydrogels of alginate and brushite cement for biomedical applications as drug release

13 Maria CONDELO, ISS
Liposome-encapsulated plant alkaloid voacamine improves the efficacy of chemotherapy on osteosarcoma resistant cells

14 Antonella D’ALESSANDRO, University of Perugia
Multifunctional RC structures using self-sensing nano-modified cementitious composites

15 Giuseppe D’AVENIO, ISS
Comparative nanocytotoxicity assessment of nano-engineered medical devices

16 Fabrizio DE CESARE, University of Tuscia & CNR IIA
Nanostrategies for iron nutrition to plant

17 Giovanni DI MUCCIO, University of Rome Tor Vergata
Computational assessment of peptide sequencing capability of a nanopore sensor

18 Josue FERRI, Asociación de Investigación de la Industria Textil
Smart Clothing Gamification to promote Energy-related Behaviours among Adolescents - SMARTLIFE

19 Celestino FONTANETO, I.T.I.G. OMAR, Novara
Answers from nature, from the pan to the laboratory: onions, garlic and potatoes for the green synthesis of AgNPs at the service

20 Sonia FREDDI, Università Cattolica Sacro Cuore
Development of a gas sensors array based on NPs-decorated SWCNTs to enhance the selectivity of gas molecules in breath analysis
21 Leonardo GIORGI, ENEA
Self-organized TiO2 anatase nanotube direct fabricated by anodization without annealing

22 Octavio GRANIEL, Institut Européen des Membranes IEM, Université de Montpellier, France
Atomic layer deposition for biosensing applications

23 Muhammad Usman KHAN, Jinnah Sindh Medical University
Probiotics; Treatment of Allergic Rhinitis

24 Mukesh KUMARI, ENEA
Catalytic effect of Ti-based additives on hydrogenation of MgH2

25 Iléana IÉLO, ISMN – CNR, Messina
Potential roles of fluorine-containing sol-gel coatings against adhesion to control microbial biofilm

26 Stefano LUPI, IIT@Sapienza
High Fidelity Sound Production with Three Dimensional Graphene

27 Antonella MACAGNANO, CNR IIA
Porphyrin and Graphene as smart nanofillers for eco-friendly, sustainable and selective polymer nanofibrous sensors for IAQ monitoring

28 Uldis MALINOVSKIS, Institute of Chemical Physics, University of Latvia, Latvia
Fabrication of nanostructured ZnO and metal nanoparticle arrays using porous anodic alumina templates

29 Rasoul SARRAF-MAMOORY, Tarbiat Modares University
In situ synthesis of three dimensional graphene- hydroxyapatite nano powders via hydrothermal process

30 Maria Rita MANCINI, ENEA
Use of Graphene oxide for the preparation of reinforced cement-based composites

31 Ivania MARKOVA, University of Chemical Technology and Metallurgy, Bulgaria
Intermetallic (Co-Sn, Ni-Sn, Co-Ni) nanoparticles and their carbon nanocomposites

32 Saeed MARDI, University of Rome Tor Vergata
Comparing different doping strategies and MW in the thermoelectric behavior of P3HT

33 Alfonso MARTONE, IPCB CNR
A comprehensive approach to induce self-healing feature in epoxy composites

34 Marco MILUCCI, INFN
Silicon Drift Detectors Acquisition System for Exotic Atoms Research, the SIDDHARTA 2 project

35 Marina MINOLI, National Biologists Order, Royal Society of Biology, Scientific High School Marconi
Elements of didactic innovation about Nanotechnology for High School: safety and social impact

36 Daniele MIRABILE GATTIA, ENEA
Nanostructured materials for energy storage applications based on Magnesium

37 Behrouz MOVAHEDI, University of Isfahan, Iran
Mechanical investigation approach to optimize the HVOF Fe-based amorphous coatings reinforced by B4C nanoparticles

38 Simona ORTELLI, CNR ISTEC, Faenza
Coatings based on TiO2 nanoparticles and biomacromolecules as a new flame retardant approach for cotton fabrics

39 Fabrizio PALMA, Sapienza University of Rome
Low Temperature growth of Silicon Nanowires by Microwave nano-susceptors

40 Elisa PANZARINI, University of Salento
Extracellular vesicles as natural nanoconstructs for modulating responses of immune cells in glioblastoma and hyperglycemia

41 Paolo PAPA, Sapienza University of Rome & CNR IIA
Nanostructured gold particles applied for ambient vapor mercury monitoring

42 Chiara PELLEGRINO, Aczon Srl
Synthetic optimization of core-shell silica nanoparticles with tunable fluorescent characteristic: a novel probe for flow-cytome

43 Roberto PIZZOFERRATO, University of Rome Tor Vergata
Detection and removal of heavy metal ions in water by unfolded-fullerene nanoparticles

44 Karlis PLEIKO, University of Latvia, Latvia
Selection of renal carcinoma specific aptamers for the development of the optical ZnO biosensor
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<td>Industrial materials: the challenges for smart coatings</td>
<td>Mariarosa RAIMONDO, ISTEC CNR</td>
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<td>Blade and slot-die coated PEDOT:PSS for thermoelectric application</td>
<td>Andrea REALE, University of Rome Tor Vergata</td>
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<td>Biocompatibility of Silicon NanoWires: a step towards IC detectors</td>
<td>Massimiliano RENZI, Sapienza University of Rome</td>
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<td>EC for SafeNano Project: European Centre for Risk Management and Safe Innovation in Nanomaterials &amp; Nanotechnologies</td>
<td>Simona SCALBI, ENEA</td>
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<td>Biocompatible nanoparticles with flavonoids in food products mission</td>
<td>Suzana SEGOTA, Ruđer Bošković Institute, Croatia</td>
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<td>In definition</td>
<td>Nikta SHAHCHERAGHI, Toosi University of Technology, Iran</td>
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<td>Liposome-cell interaction: morphological and ultrastructural studies</td>
<td>Annarita STRINGARO, ISS</td>
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<td>Impact of different Au nanoparticles on alveolar cell viability and viral respiratory infections</td>
<td>Fabiana SUPERTI, ISS</td>
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<td>Ginsenoside Rh2-, Lysine- and Arginine-treated highly porous graphene oxide nanosheets</td>
<td>Asghar TAHERI-KAFRANI, University of Isfahan</td>
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<td>The photoluminescent zinc oxide nanostructures are a new tool for detection of human B-cells</td>
<td>Alexander TAMASHEVSKI, Institute of Biophysics and Cell Engineering of National Academy of Sciences of Belarus, Minsk, Belarus</td>
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<td>Draw New Nanomaterials exclusively to restore archival and book Heritages</td>
<td>Federica VALENTINI, University of Rome Tor Vergata</td>
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<td>Preparation and Characterization of SnSe/CNT Nanocomposite Thermoelectric Materials for Waste Thermal Energy Harvesting</td>
<td>Ashkan ZOLRIASATEIN, Niroo Research Institute (NRI), Iran</td>
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**PS.II - Nanoinnovation’s Got Talent - Special Poster Session**

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<td>Thermophilic virus particles as scaffolds for enzymes immobilisation: the case of the Sulfolobus spindle-shaped virus 1</td>
<td>Martina AULITTO, University of Naples</td>
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<td>02</td>
<td>AFM metrology of shape controlled TiO2 nanoparticles</td>
<td>Luigi RIBOTTA, INRIM</td>
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<td>03</td>
<td>Modified Nanoporous Gold for Hydrogen Evolution Reaction</td>
<td>Federico SCAGLIONE, University of Turin</td>
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<td>04</td>
<td>Electrochemical synthesis of nanowires-structured electrodes and their application in energy storage devices</td>
<td>Pier Giorgio SCHIAVI, Sapienza University of Rome</td>
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<td>05</td>
<td>Single Particle Cryo-EM structure of human Ferritin and Transferrin Receptor complex</td>
<td>Claudia TESTI, Center for Life Nano Science@Sapienza &amp; IIT</td>
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01 Deepak BALAJI, Bio-solutions Global, China
Large scale production of Superparamagnetic Nanoparticle (SPMNP 1.0, SPMNP 2.0 and SPMNP 3.0) for cell biology applications

02 Mirko A. VACCA, University of Cagliari
Hexafluoroisilic acid: from waste to precious resource for MCM-41 synthesis

03 Gholamali KOJOURI, Shahrekord University, Iran
Cortisol responses to selenium nanoparticles (Se-NPs) and sodium selenite (Na-Se) supplementation

04 Behrooz MOVAHEDI, University of Isfahan, Iran
Mechanical investigation approach to optimize the HVOF Fe-based amorphous coatings reinforced by B4C nanoparticles

05 Federico SCAGLIONE, University of Turin
Solubility in nanostructured Borohydrides prepared by Mechanochemistry

06 Elisa TOTO, Sapienza University of Rome
Graphene-based nanocomposite materials for applications in space radiation environment
NANOINNOVATION’S GOT TALENT

Thursday 13 September, 11:00 - 12:30

Nanolnnovation 2018 has renewed the call for young researchers “Nanolnnovation’s Got Talent” supported by “Bracco Foundation”.

The Call is reserved to young nanotechnology researchers (<35 years old) who will have the possibility to present their research activity in an ad-hoc session dedicated to them. The Programme Committee of the conference selected the best proposals and the authors will illustrate their activity in front of a vast audience composed of industry representatives, scientists, experts, investors, entrepreneurs.

Research activities of interest:

- Construction, Building & Restoration
- Electronics, Micro and Nanosystems
- Energy & Environment
- Food and Agriculture
- Innovative and Smart Textiles
- Nano-Bio Related Products
- Health and Nanomedicine
- Nano-Materials Based Innovation
- ICT & Nanoelectronics
- Nanoscale Characterization and Measurements
- Safety and Social Impacts
- Smart Manufacturing
- Transport, Space & Aeronautics

Nanolnnovation offers you the opportunity to present your work to a high-profiled audience.

The Fondazione Bracco will cover all the participation costs of selected contributions.
Nanoinnovation’s Got Talent - Special Session - TT.IV.G
Chair: Fulvio UGGERI, R&S Director Bracco Imaging

Thursday 13 September, 11:00 - 12:30

Francesca TRUFFA GIACHET
CNR ISMAC, Biella
**Antibacterial keratin nanofibers on titanium surfaces for fibroblast adhesion and prevention of biofilm formation**

Ilaria PECORARI
University of Trieste
**Biomechanical characterization of cardiac fibroblasts in an in vitro progeria model**

Matteo AVOLIO
University of Pavia & INSTM
**Magnetic Nanoparticles for Magnetic Fluid Hyperthermia and Nuclear Magnetic Resonance: influence of key physical parameters**

Sara POLITI
University of Rome Tor Vergata
**From carbon-rich natural source to an innovative nanocomposites in the field of nanotechnology**

Nanoinnovation’s Got Talent - Special Poster Session - PS.II

Tuesday 11 September, 14:00 - 20:00
Wednesday 12, Thursday 13, and Friday 14 September, 08.30 – 20.00

01 Martina AULITTO, University of Naples
**Thermophilic virus particles as scaffolds for enzymes immobilisation: the case of the Sulfolobus spindle-shaped virus 1**

02 Luigi RIBOTTA, INRIM
**AFM metrology of shape controlled TiO2 nanoparticles**

03 Federico SCAGLIONE, University of Turin
**Modified Nanoporous Gold for Hydrogen Evolution Reaction**

04 Pier Giorgio SCHIAVI, Sapienza University of Rome
**Electrochemical synthesis of nanowires-structured electrodes and their application in energy storage devices**

05 Claudia TESTI, Center for Life Nano Science@Sapienza & IIT
**Single Particle Cryo-EM structure of human Ferritin and Transferrin Receptor complex**
Ten years ago, our friend, mentor and colleague, Pier Giorgio Merli passed away. He was a physicist, a Research Director of the CNR-IMM Institute, and a passionate scientist and electron microscopist.

Giorgio graduated at the Bologna University in 1967, he has devoted for 40 years all his energies to research, innovation and formation in the field of electron microscopy, gaining both national and international reputation. He was President of the Italian Society for Electron Microscopy from 1984 to 1987 and Director of the IMM (formerly LAMEL) Institute from 1992 to 1998. He published over 100 articles in international scientific journals and edited or co-edited the proceedings of several national and international schools on electron microscopy.

In 1974 Giorgio, together with two other physicists of the University of Bologna, GianFranco Missiroli and Giulio Pozzi, realized “The double-slit experiment with single electrons”, which was chosen in 2002 as the most beautiful experiment in Physics by the magazine Physics World (http://l-esperimento-piu-bello-della-fisica.bo.imm.cnr.it/english/index.html). Above all, this was the result of his passion for the investigation of the fundamental physical phenomena that always drove his scientific activity. He also had well clear the relevance of the transformation of an idea into an invention, which is testified by the various patents on electron guns or electron detectors that he obtained.

He was a scientist and, on top of that, a rigorous and passionate intellectual, one never completely satisfied of the acquired knowledge, aiming always at a deeper and more refined level of understanding. He was aware of his role as an intellectual, he was honest and disinterested, always trusting in coherence, and his professional as well as human relationships were inspired by the values of morality, equity and merit.

The workshop "Advanced Characterization Techniques for Nanotechnologies and Nanosciences" is dedicated to Giorgio’s memory, to continue his legacy in studying, developing and understanding microscopic methodologies as fundamental tools for the physical, chemical and life sciences, as well as to promote his professional, cultural and human values, in particular among the younger scientists to whom Giorgio has been dedicating most of his energies and whom he has always trusted and encouraged with all his great enthusiasm.
## Workshops

### 12 SEPTEMBER

**Advanced Characterization Techniques for Nanotechnologies and Nanosciences**

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<td>09:00 - 10:30</td>
<td>WS.I.1</td>
<td><strong>Keynote Session: Ultimate TEM characterization and imaging</strong></td>
<td>Chair: Vittorio MORANDI, CNR - IMM</td>
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<td>HT.I.A</td>
<td><strong>Beatrice VALLONE, Sapienza University of Rome</strong></td>
<td><em>Single Particle Cryo-EM structure of the complex between human Ferritin and Transferrin Receptor: a gateway for targeted delivery and theranostics</em></td>
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<td><strong>Elvio CARLINO, CNR-IMM, Lecce</strong></td>
<td><em>Atomic Resolution Transmission Electron Microscopy: On the way toward the ultimate spatial resolution and accuracy</em></td>
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<td>10:30 - 11:00</td>
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<td><strong>Coffee Break</strong></td>
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<td>11:00 - 12:30</td>
<td>WS.I.2</td>
<td><strong>X-Ray Microscopy</strong></td>
<td>Chair: Narciso GAMBACORTI, Cea-Leti &amp; PAC-G, Grenoble, France</td>
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<td>TT.I.A</td>
<td><strong>Lars-Oliver KAUTSHOR, Carl Zeiss Microscopy</strong></td>
<td><em>Extending Synchrotron X-ray Microscopy to the Laboratory</em></td>
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<td><strong>Alessia CEDOLA, CNR Nanotec</strong></td>
<td><em>X-Ray Phase Contrast Tomography for Regenerative medicine</em></td>
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<td><strong>Tevfik Onur MENTES, Elettra-Sincrotrone Trieste</strong></td>
<td><em>X-ray photoemission electron microscopy studies in ultrathin film magnetism</em></td>
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<td><strong>Manuel DIERICK, Tescan Orsay Holding</strong></td>
<td><em>Exploring Materials Evolution with Laboratory-based Dynamic X-ray Tomography</em></td>
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<tr>
<td>12:30 - 14:00</td>
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<td><strong>Light Lunch</strong></td>
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### Advances in Microscopy-based Nanocharacterization Methodologies

**Chair:** Elvio CARLINO, CNR-IMM, Lecce  
*In collaboration with: ZEISS*

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<th>WS.I.3.1</th>
<th>TT.II.A.1</th>
<th>Matteo FERRONI, University of Brescia</th>
<th><strong>The implementation of the STEM imaging mode in the SEM for electron tomography</strong></th>
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<td>WS.I.3.2</td>
<td>TT.II.A.2</td>
<td>Giulio LAMEDICA, Carl Zeiss Italia</td>
<td><strong>Latest Advances in Electron and Ion Microscopy</strong></td>
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<td>WS.I.3.3</td>
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<td><strong>Large Volume and Correlative Scanning Electron Microscopy</strong></td>
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<td>TT.II.A.4</td>
<td>Umberto CELANO, IMEC, Belgium</td>
<td><strong>Site-specific analysis for nanoelectronics using hybrid SPM-TEM metrology</strong></td>
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**15:30 - 16:00 Coffee Break**

### Cryo Electron Microscopy: the resolution revolution

**Chair:** Beatrice VALLONE, Sapienza University of Rome  
*In collaboration with: ZEISS, THERMO FISHER SCIENTIFIC & JEOL*

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<th>Giuseppe ZANOTTI, University of Padova</th>
<th><strong>Cryo-EM: a crystallographer view</strong></th>
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<td>Ludovic RENAUT, Leiden University, Leiden, The Netherlands</td>
<td><strong>Running an International service facility for cryoEM</strong></td>
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<td>WS.I.4.3</td>
<td>TT.III.A.3</td>
<td>Massimiliano MALETTA, Thermo Fisher Scientific</td>
<td><strong>The role of Cryo-electron microscopy in structural biology after the &quot;resolution revolution&quot;</strong></td>
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<td>WS.I.4.4</td>
<td>TT.III.A.4</td>
<td>Guillaume BRUNETTI, JEOL EUROPE</td>
<td><strong>New JEOL TEM developments for cryo biology</strong></td>
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<tr>
<td>WS.I.4.5</td>
<td>TT.III.A.5</td>
<td>Joerg LINDENAU, Carl Zeiss Microscopy</td>
<td><strong>Workflow for Correlative Cryo-Imaging</strong></td>
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### Keynote Session:

**Scanning Ion Microscopy: Nanocharacterization and Nanofabrication**

**Chair:** Marco VITTORI ANTISARI, Associazione Nanoitaly  
*In collaboration with: ASSING/Tescan*

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<tbody>
<tr>
<td>WS.I.5.1</td>
<td>Preparation of Aluminum Specimen with Gallium and Xenon Plasma Focused Ion Beam for Further Nano-characterization</td>
<td>Petr KLIMEK, Tescan Orsay Holding &amp; Brno University of Technology</td>
<td>Tescan Orsay Holding &amp; Brno University of Technology</td>
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<td>ASSING/Tescan</td>
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<tr>
<td>WS.I.5.2</td>
<td>Focused Ion Beam (FIB) and Focused Electron Beam Induced Deposition (FEBID) for advanced nanocharacterization and nanofabrication</td>
<td>Gian Carlo GAZZADI, CNR – Nano, Modena</td>
<td>CNR – Nano, Modena</td>
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<td>HT.II.A.2</td>
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#### 10:30 - 11:00 Coffee Break

### Advance in FIB/SEM Technology and its Contribution to Scientific Problem Solving

**Chair:** Daniele DE FELICIS, University of Roma Tre  
*In collaboration with: TESCAN & ASSING*

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<tr>
<td>WS.I.6.1</td>
<td>Advanced FIB/SEM techniques and applications</td>
<td>Petr KLIMEK, Tescan Orsay Holding &amp; Brno University of Technology</td>
<td>Tescan Orsay Holding &amp; Brno University of Technology</td>
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<td>TT.IV.A.1</td>
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<td>TESCAN &amp; ASSING</td>
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<tr>
<td>WS.I.6.3</td>
<td>2D materials imaging and nanofabrication in the FIB/SEM</td>
<td>Alessandro LAVACCHI, CNR ICCOM, Firenze</td>
<td>CNR ICCOM, Firenze</td>
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<td>TT.IV.A.3</td>
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<td>WS.I.6.4</td>
<td>Plasma FIB: enlarge your field of view and your field of applications</td>
<td>Audrey GARNIER, STMicroelectronics</td>
<td>STMicroelectronics</td>
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<tr>
<td>TT.IV.A.4</td>
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#### 12:30 - 14:00 Light Lunch
### Workshops

#### Innovation in Scanning Electron Microscopy

**Chair:** Luca ORTOLANI, CNR IMM, Bologna  
*In collaboration with:* JEOL, THERMO FISHER SCIENTIFIC & ZEISS

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<tr>
<td>WS.I.7.2</td>
<td>Guillaume BRUNETTI, <em>JEOL EUROPE</em></td>
<td>JSM-IT200: A versatile tungsten SEM</td>
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<tr>
<td>WS.I.7.3</td>
<td>Federico MECARINI, <em>ASSING</em></td>
<td>Triglav Lens: collection system and imaging modes</td>
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<tr>
<td>WS.I.7.4</td>
<td>Paolo DE NATALE, <em>Hitachi High-Technologies Europe GmbH</em></td>
<td>In definition</td>
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**15:30 - 16:00 Coffee Break**

#### Innovation in Transmission Electron Microscopy

**Chair:** Andrea PARISINI, CNR-IMM, Bologna

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<tr>
<th>Session</th>
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<tr>
<td>WS.I.8.1</td>
<td>Federico VENTURI, <em>CNR NANO &amp; University of Modena and Reggio Emilia</em></td>
<td>Improving the transmission electron microscope capabilities through holography and phase manipulation</td>
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<td>WS.I.8.2</td>
<td>Mauro GEMMI, <em>IIT, Pisa</em></td>
<td>3D electron diffraction on hard and soft matter</td>
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<tr>
<td>WS.I.8.3</td>
<td>Angelica CHIODONI, <em>Polytechnic of Turin &amp; IIT</em></td>
<td>Tin and copper - based catalysts for CO2 reduction</td>
</tr>
<tr>
<td>WS.I.8.4</td>
<td>Regina CIANCIO, <em>CNR IOM, Trieste</em></td>
<td>Multifunctional nanoreactors for combined in-operando STEM and synchrotron spectroscopy</td>
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### Keynote Session: Spectroscopic characterization and imaging

**Chair:** Regina CIANCIO, **CNR-IOM, Trieste**

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<td>WS.I.9.1</td>
<td>HT.III.A.1</td>
<td>Lars- Oliver KAUTSHOR, <em>Carl Zeiss Microscopy GmbH</em></td>
<td><strong>HIM with SIMS - High resolution Imaging and Nano-analytics with He and Ne ions</strong></td>
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<td>WS.I.9.2</td>
<td>HT.III.A.2</td>
<td>Giovanni BERTONI, <strong>CNR IMEM, Trento</strong></td>
<td><strong>Chemical and spectroscopic characterization from nm to sub-nm scale with EFTEM and STEM-EELS</strong></td>
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**10:30 - 11:00 Coffee Break**

### Microscopy techniques for industrial needs 1

**Chair:** Onofrio Antonino CACIOPPO, *LFoundry*

*In collaboration with: LFoundry*

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<tr>
<td>WS.I.10.1</td>
<td>TT.VII.A.1</td>
<td>Simona BONINELLI, <strong>CNR IMM</strong></td>
<td><strong>Defects, activation and morphological modification by out of equilibrium processes in Si and Ge-based materials</strong></td>
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<tr>
<td>WS.I.10.2</td>
<td>TT.VII.A.2</td>
<td>Domenico MELLO, <strong>STMicroelectronics</strong></td>
<td><strong>New approach in Auger elemental relative sensitive factor calculation by using TEM-EDS analysis based on bi-layers of pure elements</strong></td>
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<tr>
<td>WS.I.10.3</td>
<td>TT.VII.A.3</td>
<td>Andrea PARISINI, <strong>CNR IMM, Bologna</strong></td>
<td><strong>Scanning Transmission Electron Microscopy (STEM) Quantitative X-Ray Microanalysis methods for Application to Silicon Oxycarbides Thin Films</strong></td>
</tr>
<tr>
<td>WS.I.10.4</td>
<td>TT.VII.A.4</td>
<td>Massimo VIGHI, <strong>ENI Versalis, Mantova</strong></td>
<td><strong>Repetita iuvant... Polymer Microscopy</strong></td>
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<tr>
<td>WS.I.10.5</td>
<td>TT.VII.A.5</td>
<td>Francesco ROSSELLA, <strong>Scuola Normale Superiore/NEST, Pisa</strong></td>
<td><strong>Electroluminescence and crystal phases in hybrid metal-GaAs nanowire devices</strong></td>
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**12:30 - 14:00 Light Lunch**
## Workshops

### WS.I.11 - TT.VIII.A

#### Innovation in Optical Microscopy

**Chair:** Marco LEONETTI, IIT@SAPIENZA

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<tr>
<td>WS.I.11.1</td>
<td>Marco LEONETTI, IIT, CLNS@SAPIENZA Roma</td>
<td><strong>Scattering Assisted Localization Fluorescence Imaging</strong></td>
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<tr>
<td>WS.I.11.2</td>
<td>Francesca CELLA ZANACCHI, IIT Genova</td>
<td><strong>Quantitative super-resolution microscopy using dna origami</strong></td>
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<tr>
<td>WS.I.11.3</td>
<td>Francesca INTONTI, University of Florence &amp; European Laboratory for Non-Linear spectroscopy - LENS</td>
<td><strong>Deep Sub-wavelength imaging of localized photonic modes</strong></td>
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<tr>
<td>WS.I.11.4</td>
<td>Hilton BARBOSA DE AGUIAR, Ecole Normale Supérieure de Paris, France</td>
<td><strong>Compressive Raman microspectroscopy</strong></td>
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**15:30 - 16:00 Coffee Break**

### WS.I.12 - TT.IX.A

#### Microscopy techniques for industrial needs 2

**Chair:** Onofrio Antonino CACIOPPO, LFoundry, Avezzano

*In collaboration with: Leonardo*

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<tr>
<td>WS.I.12.1</td>
<td>Massimo VANZI, University of Cagliari</td>
<td><strong>Combined techniques for advanced failure analysis of Photonic Devices</strong></td>
</tr>
<tr>
<td>WS.I.12.2</td>
<td>Luca ORTOLANI, CNR IMM, Bologna</td>
<td><strong>Transmission Electron Interferometric Methods for Materials Characterization</strong></td>
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<tr>
<td>WS.I.12.3</td>
<td>Paolo MENGUCCI, Università Politecnica delle Marche</td>
<td><strong>Advanced material characterization for additive manufacturing</strong></td>
</tr>
<tr>
<td>WS.I.12.4</td>
<td>Tiziana DEL BUONO, LFoundry</td>
<td><strong>Optimization of FIB lamellas preparation for gate-oxide pinholes characterization</strong></td>
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</tbody>
</table>
With the world’s population expected to exceed nine billion by 2050, scientists are working to develop new ways to meet rising global demand for food, energy and water without increasing the strain on natural resources. Organizations including the World Bank and the U.N. Food and Agriculture Organization are calling for more innovation to address the challenges of the agri-food sector.

Agriculture uses inefficiently the conventional inputs (water, energy, fertilizers, pesticides) and a significant fraction of them are lost or became unavailable to the crops. At the same time, agriculture (cultivation of crops, livestock and deforestation) is a major contributor to greenhouse gas emissions.

The developing Agri-Nanotechniques will be implemented within the evolving science of precision agriculture, in which farmers use technology to target their use of water, fertilizer, plant protection products and other inputs. A second, broad potential application concerns the issues of reduction and valorization of agri-food wastes. The introduction of nanotechnologies in agriculture still need deepen both basic and applied knowledge, however several promising results were achieved, so far. A huge development is taking place in this sector, therefore nanotech applications currently under development will soon be overtaken.

AgriNanotechniques 2018 hosts the 2nd edition of the workshop “AgriNanotechniques” co-organized by the Universities of Bologna, Parma, Verona and Udine. The workshop will be the forum for discussing the perspective of nanotechnologies in the primary sector among the stakeholders and scientific research.

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<tr>
<th>11:00 - 12:30</th>
<th>WS.II.1 - TT.I.B</th>
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<tr>
<td><strong>Nano perspectives in the Agri-Food sector</strong></td>
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<td><strong>Chair:</strong> Nelson MARMOLI, <em>University of Parma</em></td>
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</table>
| **WS.II.1.1 TT.I.B.1** | Ana Maria RINCON, *European Food Safety Authority (EFSA)*  
*Towards EU legislation on nanomaterials/ENMs in food* |
| **WS.II.1.2 TT.I.B.2** | Rossella BENGALLI, *University of Milano-Bicocca*  
*Safe(r) nanomaterials for the Agri-Food sector: The Nano bioscience perspective* |
| **WS.II.1.3 TT.I.B.3** | Michele IAFISCO, *CNR ISTEC*  
*From food industry by-products to smart nano-fertilizers: towards a circular economy of phosphorus* |
| **WS.II.1.4 TT.I.B.4** | Giuseppe CIUFFREDA, *Fabbrica Coop Perfosfati Cerea*  
*Market perspectives for smart fertilizers* |

12:30 - 14:00 Light Lunch
## Nanomaterials and Plant Nutrition

**Chair:** Zeno VARANINI, *University of Verona*

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<tr>
<td>WS.II.2.1</td>
<td>Smart fertilizers: Nano-options towards an improvement of Nutrient Use Efficiency</td>
<td>Luca MARCHIOL, <em>University of Udine</em></td>
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<tr>
<td>TT.II.B.1</td>
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<tr>
<td>WS.II.2.2</td>
<td>Possible applications of engineered nanomaterials in agriculture: the issue of interaction</td>
<td>Marta MARMIROLI, <em>University of Parma</em></td>
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<td>TT.II.B.2</td>
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<td>WS.II.2.3</td>
<td>FePO4 nanoparticles as a source of nutrients for plants</td>
<td>Davide SEGA, <em>University of Verona</em></td>
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<td>TT.II.B.3</td>
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<td>WS.II.2.4</td>
<td>Contributions of nanoscience in designing innovative vectors for agrochemical delivery</td>
<td>Ilaria CLEMENTE, <em>University of Florence</em></td>
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<td>TT.II.B.4</td>
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### 15:30 - 16:00 Coffee Break

## Research Pathways

**Chair:** Luca MARCHIOL, *University of Udine*

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<tr>
<td>WS.II.3.1</td>
<td>Copper nanoparticles from agricultural wastes: a case study on blueberry local processing</td>
<td>Ilaria COLZI, <em>University of Florence</em></td>
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<td>TT.III.B.1</td>
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<td>WS.II.3.2</td>
<td>Hydroxyapatite NPs impact on tomato plantlet metabolism and seed germination</td>
<td>Enrico BRAIDOT, <em>University of Udine</em></td>
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<td>TT.III.B.2</td>
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<tr>
<td>WS.II.3.3</td>
<td>Iron exopolysaccharide nanoparticles to improve the production of truffle mycorrhized plants</td>
<td>Alessandra ZAMBONELLI, <em>University of Bologna</em></td>
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<td>TT.III.B.3</td>
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<td>WS.II.3.4</td>
<td>Chitosan NPs as delivery system for plant bio-agents release: biomedical and agri-food applications</td>
<td>Federica TRAMER, <em>University of Trieste</em></td>
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LFoundry, a SMIC company, is a leading specialized foundry. From the heart of ancient Europe, with the Headquarter in Avezzano (Italy), LFoundry is focused on providing access to most advanced analogue manufacturing service with a capacity of >40,000 wafers/month, innovative technology extensions, including volume 90nm and copper manufacturing, a strong emphasis on flexibility and customer partnership. LFoundry is supporting own technology IP for 150nm and 110nm with a large portfolio of process-proven libraries, IP, design tools and reference flows. LFoundry’s key focus is primarily in automotive and industrial related applications including CIS, security, smart power, embedded memory, and others.

As a SMIC Company, LFoundry can leverage skills and capabilities of one of the leading semiconductor foundries in the world and the largest and most advanced foundry in mainland China.

In Avezzano (AQ), LFoundry is enabling innovation worldwide. We have a continuous commitment to guaranteeing a secure environment in which our customers can realise their ideas to the highest standard, relying on LFoundry as an indispensable partner to unleash their full potential.

DEDICATED FOUNDRY AT AVEZZANO

Since 2006, the 8” Avezzano site has been manufacturing imaging process technologies and products using 180nm to 90nm technologies, including a volume copper, Back End of Line (BEOL), Back Side Illumination processes (BSI) and extensive testing capabilities. The Fab provides automotive ISO-TS16949 certification as well as OHSAS 18001 and ISO 14001

SERVICE MODEL

Technology development and production partnership

CONTACT

Via Antonio Pacinotti 7, Avezzano AQ 67051
Home phone:+39 0863 4231
Fax:+39 0863 412763
Pec: lfoundry@pec.it
www.lfoundry.com
Invented about 40 years ago, scanning probe microscopy (SPM) refers nowadays to a family of techniques which allows the imaging of the sample surface with nanometer lateral resolution and sub-nanometer vertical resolution by combining accurate positioning and scanning systems with the use of a nanosized probe which interacts with the sample surface.

Beside the improvement of the quality of topographical reconstructions in terms, for instance, of resolution, stability, or scan rate, SPM has been used as a platform to develop several advanced methods for the characterization of many physical parameters of the sample. Thus, from the original use for topographical imaging, SPM is becoming an indispensable nanometrological tool for mechanical, electric, magnetic, thermal, optical, or chemical nanocharacterizations.

Recent efforts have been aimed at broadening the range of physical properties, investigable samples, imaging environments, as well as to enhance accuracy, sensitivity, and reliability of the analytical methods. Also, recent developments demonstrated the capability of SPM methods to investigate not only surface but also sub-surface properties.

This workshop aims at presenting an overview and a selection of some of the most recent improvements in SPM methods, e.g., atomic force microscopy (AFM) for mechanical, electric, magnetic nanocharacterizations, as well as optical or microwave near field methods. Emphasis will be given to both presenting the techniques and reviewing some of the most interesting fields of application, e.g., from microelectronics to agri-food or biomedicine and nano-bio-technologies.
## Workshops

**13 SEPTEMBER**

**Advanced Scanning Probe Microscopies**

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<td><strong>09:00 - 10:30</strong></td>
<td>WS.III.1 - HT.II.B</td>
<td>WS.III.1.1 HT.II.B.1</td>
<td>Jason KILLGORE, NIST, USA</td>
<td>Exploring Nanoscale Viscoelasticity with a Surface Coupled Scanning Probe Microscope</td>
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<td>WS.III.1.2 HT.II.B.2</td>
<td>Emmanuel PARIS, Bruker Europe</td>
<td>Advance measurement in Atomic Force Microscopy. What’s the latest in mechanical and electrical AFM characterization?</td>
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<td><strong>10:30 - 11:00 Coffe Break</strong></td>
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<td><strong>11:00 - 12:30</strong></td>
<td>WS.III.2 - TT.IV.B</td>
<td>WS.III.2.1 TT.IV.B.1</td>
<td>Livia ANGELONI, University of Delft</td>
<td>Use of Scanning Capacitance Microscopy as a tool for detecting damage to Lightly Doped Drain (LDD) implants in SRAM</td>
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<td>WS.III.2.2 TT.IV.B.2</td>
<td>Stefano VERONESI, CNR NANO</td>
<td>An atomically flat gold film thermometer on mica to study energy (heat) exchange at the nano-scale</td>
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<td>WS.III.2.3 TT.IV.B.3</td>
<td>Francesco MARINELLO, University of Padua, Italy</td>
<td>NSOM limits and potential in nano-optical characterization</td>
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<td>WS.III.2.4 TT.IV.B.4</td>
<td>Cristiano ALBONETTI, CNR-ISMN</td>
<td>The growth of organic ultra-thin films on silicon oxides with variable vacancy states: a Scanning Force Microscopy approach</td>
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<td><strong>12:30 - 14:00 Light Lunch</strong></td>
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Chair: Daniele PASSERI, Sapienza University of Rome  
In collaboration with: ASSING/Bruker
### Advanced SPM techniques: methods and applications 2

**Chair:** Daniele PASSERI, *Sapienza University of Rome*

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<tr>
<td>WS.III.3.1 TT.V.B.1</td>
<td><strong>Light-induced functional conformational changes of bacteriorhodopsin probed by mid-infrared nanospectroscopy</strong></td>
<td>Michele ORTOLANI</td>
<td><em>Sapienza University of Rome</em></td>
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<tr>
<td>WS.III.3.2 TT.V.B.2</td>
<td><strong>Advanced characterization of nanoporous materials for biosensing and nanomedicine</strong></td>
<td>Giuseppe BARILLARO</td>
<td><em>University of Pisa</em></td>
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<tr>
<td>WS.III.3.3 TT.V.B.3</td>
<td><strong>AFM in food characterization</strong></td>
<td>Antonietta LA STORIA</td>
<td><em>CNR Napoli</em></td>
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<tr>
<td>WS.III.3.4 TT.V.B.4</td>
<td><strong>Observation of phonon-polaritons on thin flakes of hBN on gold</strong></td>
<td>Leonetta BALDASSARRE</td>
<td><em>Sapienza University of Rome</em></td>
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15:30 - 16:00 Coffee Break

### Advance in Near Field Probe Microwave and mm-wave Microscopy for Surface and Subsurface Characterization of Materials

**Chair:** Emanuela PROIETTI, *CNR IMM*

*In collaboration with:* CNR IMM, Ministry of Foreign Affairs and International Cooperation, National Institute of Standards and Technology (NIST)

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<tr>
<td>WS.III.4.1 TT.VI.B.1</td>
<td><strong>Nanoelectronic Characterization using Microwave Near-Field Microscopy</strong></td>
<td>Sam BERWEGER</td>
<td><em>National Institute of Standards and Technology - NIST, Boulder, USA</em></td>
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<tr>
<td>WS.III.4.2 TT.VI.B.2</td>
<td><strong>Application of Scanning Microwave Microscopy to Biological Samples</strong></td>
<td>Marco FARINA</td>
<td><em>Università Politecnica delle Marche</em></td>
</tr>
<tr>
<td>WS.III.4.3 TT.VI.B.3</td>
<td><strong>Near-field Microwave Microscopy for Surface and Subsurface Characterization of Materials</strong></td>
<td>Giovanni Maria SARDI</td>
<td><em>CNR IMM, Roma</em></td>
</tr>
<tr>
<td>WS.III.4.4 TT.VI.B.4</td>
<td><strong>Feedback control for constant height mode operation in scanning near-field microwave microscopy</strong></td>
<td>Venkatachalam SUBRAMANIAN</td>
<td><em>Indian Institute of Technology Madras, Chennai, India</em></td>
</tr>
</tbody>
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Microfluidics and Biosystems for personalized medicine

Friday 14 September

WORKSHOP COMMITTEE

Leandro LORENZELLI, FBK
Fabrizio PIRRI, Polytechnic of Turin
Pietro SICILIANO, CNR IMM

organized by

Technologies for the fabrication of devices and systems at micro- and nano-scales continue to advance and diversify due to the rising demands for miniaturisation, cost reduction, functional integration and performance enhancement.

This workshop will provide a broad overview of microfluidics and biosystems technologies as an enabling technology for new product development in diagnostics and in the life sciences. The workshop, co-organized by FBK and the Polytechnic of Turin, is also a training action of the project CanBioSe (H2020-MSCA-RISE-2017) targeted to strengthen collaboration, sharing new ideas and knowledge transfer from research to market in the field of biosensors for cancer cells detection.

The objective of the workshop is twofold: a) to share the progress in the field and b) to identify the technological orientation and future challenges offered by the connection between innovative materials and micro/nanotechnologies.

The involvement of representatives of key research disciplines will offer a podium to enable community building and networking, the sharing of progress in both technology and application development, and the identification of common interests. Emphasis is put on the complete development process for microfluidics/biosystems devices, covering aspects of design, manufacturing technologies, and latest trends in the personalized medicine.

Application case examples will be presented as well as lessons learned during all stages of the development process of microfluidics and biosystems based devices.
### Workshops

#### 14 SEPTEMBER

**Microfluidics and Biosystems for personalized medicine**

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<tr>
<th>09:00 - 10:30</th>
<th>WS.IV.1 - HT.III.C</th>
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<tr>
<td><strong>Keynote Session:</strong> <em>Advanced approaches for investigating cells and neurons</em></td>
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<td><strong>Chair:</strong> Leandro LORENZELLI, FBK, Trento</td>
<td>In collaboration with: FBK</td>
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<tr>
<td><strong>WS.IV.1.1</strong> HT.III.C.1</td>
<td>Pietro FERRARO, CNR - ISASI, Pozzuoli (Napoli)</td>
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<tr>
<td></td>
<td><strong>Advanced Diagnosis at single cell level by Coherent Imaging in Lab on Chip Platforms</strong></td>
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<tr>
<td><strong>WS.IV.1.2</strong> HT.III.C.2</td>
<td>Stefano VASSANELLI, University of Padova</td>
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<td><strong>Networking brain and silicon spiking neurons with nanoscale memristors: first steps, next challenges and perspectives for brain-machine interfaces</strong></td>
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<td>10:30 - 11:00</td>
<td><strong>Coffee Break</strong></td>
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<tr>
<th>11:00 - 12:30</th>
<th>WS.IV.2 - TT.VII.E</th>
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<tbody>
<tr>
<td><strong>Microfluidics concepts, technologies and applications</strong></td>
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<td><strong>Chair:</strong> Leandro LORENZELLI, FBK, Trento</td>
<td>In collaboration with: FBK &amp; Polytechnic of Turin</td>
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<tr>
<td><strong>WS.IV.2.1</strong> TT.VII.E.1</td>
<td>Donats ERTS, University of Latvia, Riga, Latvia</td>
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<tr>
<td></td>
<td><strong>Welcome and general introduction</strong></td>
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<tr>
<td><strong>WS.IV.2.2</strong> TT.VII.E.2</td>
<td>Andrea ADAMI, FBK, Trento</td>
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<td></td>
<td><strong>Microfluidics for life science: an overview</strong></td>
</tr>
<tr>
<td><strong>WS.IV.2.3</strong> TT.VII.E.3</td>
<td>Tommaso SANTANIELLO, Centro Interdisciplinare Materiali e Interfacce Nanostrutturati (CIMaINa), University of Milan</td>
</tr>
<tr>
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<td><strong>Advanced functional polymeric materials for smart microfluidics</strong></td>
</tr>
<tr>
<td><strong>WS.IV.2.4</strong> TT.VII.E.4</td>
<td>Maria Lucia CURRI, CNR IPCF, Bari</td>
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<tr>
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<td><strong>Multifunctional nanomaterials based on colloidal nanoparticles for theranostic applications</strong></td>
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<tr>
<td><strong>WS.IV.2.5</strong> TT.VII.E.5</td>
<td>Flavio GIACOMOZZI, FBK, Trento</td>
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<td><strong>Silicon microtechnology for microfluidics</strong></td>
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<tr>
<td>12:30 - 14:00</td>
<td><strong>Light Lunch</strong></td>
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</table>
# Advances in biosensors and microfluidic devices in life science

Chair: Fabrizio PIRRI, Polytechnic of Turin & Pietro SICILIANO, CNR IMM  
*In collaboration with: FBK & Polytechnic of Turin*

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<tr>
<th>Session</th>
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<tr>
<td>WS.IV.3.1</td>
<td>TT.VIII.E.1</td>
<td>Giuseppe BARILLARO, University of Pisa</td>
<td>Enabling (Bio)Sensing And (Nano)Medicine Applications Through Electrochemical Structuring of Silicon at the Micro and Nanoscale</td>
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<tr>
<td>WS.IV.3.2</td>
<td>TT.VIII.E.2</td>
<td>Corrado DI NATALE, University of Rome Tor Vergata</td>
<td>In-vivo and in-vitro metabolomics with porphyrins based sensor array</td>
</tr>
<tr>
<td>WS.IV.3.3</td>
<td>TT.VIII.E.3</td>
<td>Carlo BORTOLOTTI, University of Modena and Reggio Emilia</td>
<td>Electrolyte-Gated Organic Field Effect Transitors (EGOFETs) integrating microfluidics and electronic transduction for label-free, ultra-sensitive biosensing</td>
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<tr>
<td>WS.IV.3.4</td>
<td>TT.VIII.E.4</td>
<td>Georg PUCKER, FBK, Trento</td>
<td>Photonic integrated sensors for life science</td>
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<tr>
<td>16:00 - 17:30</td>
<td>WS.IV.4 - TT.IX.C</td>
<td>Applications in personalized medicine</td>
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Chair: Cecilia PEDERZOLLI, FBK & Pietro SICILIANO, CNR IMM  
*In collaboration with: FBK & Polytechnic of Turin*

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<tr>
<th>Session</th>
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<tbody>
<tr>
<td>WS.IV.4.1</td>
<td>TT.IX.C.1</td>
<td>Sabrina CONOCI, STMicroelectronics</td>
<td>Silicon Micro Devices and Systems for Healthcare Applications</td>
</tr>
<tr>
<td>WS.IV.4.2</td>
<td>TT.IX.C.2</td>
<td>Giorgio SCORDO, Polytechnic of Turin</td>
<td>Lab-on-chip for precision medicine</td>
</tr>
<tr>
<td>WS.IV.4.3</td>
<td>TT.IX.C.3</td>
<td>Luca FRANCIOSO, CNR IMM, Lecce</td>
<td>Sensors &amp; MicroPhysiological Systems: the Organ-On-Chip case</td>
</tr>
<tr>
<td>WS.IV.4.4</td>
<td>TT.IX.C.4</td>
<td>Francesca DEMICHELIS, University of Trento, Centre of Integrative Biology, Laboratory of Computational and Functional Oncology</td>
<td>Emerging opportunities in precision medicine</td>
</tr>
</tbody>
</table>
Nanotechnologies are a key tool to create innovative materials and devices in the medical field. Thanks to the possibility to manipulate the matter at the nanometer scale, nanotechnologies offer several opportunities to generate fundamental revolution in many areas of medicine.

In this workshop three special sessions will gain insight on research topics relevant for medical applications in which nanotechnologies play a key role. More in details, the first session will deal with “New Materials and Nanotechnologies for Innovative therapeutic Approaches” presenting some of the most recent advances in the achievement of nanoarchitectures releasing bio-active compounds for therapeutic purposes.

The second session will focus on “Materials and Devices for Implants and Regenerative Medicine” where a survey of the most innovative approaches for implants and osteo-chondral regeneration based on nanomaterials will be illustrated. Finally, the third session will address “Molecular Biosensors: the next generation devices”, highlighting the most recent developments and emerging nanotechnologies on integrated nanobiosensors for early diagnosis and prevention of diseases.

Two key notes will open the workshop dedicated to “On Dye Doped Silica Nanoparticles as Luminescent Organized Systems for Nanomedicine” by Luca Prodi from University of Bologna and “Nanomedicine in the field of Ortopedic surgery” by Francesco Traina from University of Messina.
### Keynote Session: Nanotechnologies for innovative medicine

Chair: Sabrina CONOCI, STMicroelectronics  
*In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi*

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<tr>
<th>Time</th>
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<tr>
<td>09:00 - 10:30</td>
<td>WS.V.1 - HT.II.C</td>
<td>Luca PRODI, University of Bologna</td>
<td>Dye Doped Silica Nanoparticles as Luminescent Organized Systems for Nanomedicine</td>
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<tr>
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<td></td>
<td>Francesco TRAINGA, University of Messina</td>
<td>Nanomedicine in the field of Orthopedic surgery</td>
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**10:30 - 11:00 Coffee Break**

### New Materials and Nanotechnologies for Innovative therapeutic Approaches

Chair: Rosalba PARENTI, University of Catania  
*In collaboration with: Distretto Tecnologico Sicilia Micro e Nano Sistemi*

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<tr>
<td>11:00 - 12:30</td>
<td>WS.V.2 - TT.IV.C</td>
<td>Emanuela ESPOSITO, University of Messina</td>
<td>Laser-produced Au nanoparticles as X-ray contrast agents for diagnostic imaging</td>
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<td>Gianfranco PASUT, University of Padova</td>
<td>Monoclonal antibody for drug delivery and targeting</td>
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<td>Gennara CAVALLARO, University of Palermo</td>
<td>Nano into micro formulations based on functionalized polymers for pulmonary drug delivery</td>
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<td>Francesco GIULIANO, SIFI</td>
<td>Nanostructured carriers for effective delivery of drugs to the back of the eye</td>
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**12:30 - 14:00 Light Lunch**
### Materials and Devices for implants and regenerative medicine

**Chair:** Salvo PETRALIA, *STMicroelectronics*

*In collaboration with:* Distretto Tecnologico Sicilia Micro e Nano Sistemi

| WS.V.3.1 | TT.V.D.1 | Rodolfo QUARTO, *University of Genova*  
**Engineered bone-biomaterial interface** |
| WS.V.3.2 | TT.V.D.2 | Elisa FIGALLO, *Finceramica, Faenza*  
**Experimental design approach for engineering biomimetic osteochondral device** |
| WS.V.3.3 | TT.V.D.3 | Giovanna CALABRESE, *University of Catania*  
**Biomaterials and adipose-derived stem cells for osteo-chondral regeneration in vitro and in vivo** |
| WS.V.3.4 | TT.V.D.4 | Alberto RIMINUCCI, *CNR ISMN, Bologna*  
**Magnetic Assembling of 3D cellular architectures** |

#### 15:30 - 16:00 Coffee Break

#### 16:00 - 17:30

### Molecular Biosensors: the next generation devices

**Chair:** Filippo D’ARPA, *Distretto Tecnologico Sicilia Micro e Nano Sistemi*

*In collaboration with:* Distretto Tecnologico Sicilia Micro e Nano Sistemi

| WS.V.4.1 | TT.VI.C.1 | Maria Jose LO FARO, *CNR IPCF, Messina*  
**Biosensors based on the innovative optical properties of silicon nanowires** |
| WS.V.4.2 | TT.VI.C.2 | Salvatore PERNAGALLO, *DestiNA Genomics*  
**Chem-NAT bead-based assays for quantifying microRNAs directly from biological sources** |
| WS.V.4.3 | TT.VI.C.3 | Salvatore PETRALIA, *STMicroelectronics*  
**Molecular Surface-cooperative-hybridization: an innovative approaches for Nucleic Acids Detection** |
| WS.V.4.4 | TT.VI.C.4 | Roberta D’AGATA, *University of Catania*  
**Nanoparticle-enhanced surface plasmon resonance imaging for advanced clinical diagnostics** |
Materiali Nanofasici

Wednesday 12 - Friday 14 September

MATERIALI NANOFASICI is a bi-annual National Conference organized since 1994 under the patronage of CNR, ENEA, Università di Cagliari and Università di Bologna.

The national community interested in nanophase materials traditionally met at MATERIALI NANOFASICI to setup new contacts and to reinforce well established relationships, while discussing about the new scientific advancements at national and international levels. Several topics are traditionally treated with a multi-disciplinary approach. Recently a particular attention has been devoted to emerging issues related to metrology and toxicology. Scientific sessions generally include innovative synthetic techniques, structural, microstructural and morphological characterization by advanced techniques, and the study of chemical and physical properties.

A focus point has been traditionally dedicated at the application aspects of nanomaterials, accounting for the revealed amount of promising, and sometimes unpredictable properties, at the basis of many novel applications, in electronics, magnetism, photonics, energy and biology, to name just a few.

The Organizing Committee is pleased to announce a permanent agreement between MATERIALI NANOFASICI and NANOINNOVATION, Conference and Exhibition, on the basis of which, MATERIALI NANOFASICI becomes one of the organizing bodies of NANOINNOVATION.

Consequently, starting from this year edition, the MATERIALI NANOFASICI Conference will be organized in the frame of NANOINNOVATION, sharing the same venue and the same local organization.

The Organizing Committee of MATERIALI NANOFASICI remains fully in charge for the organization of the Congress Section in agreement with the traditional NANOINNOVATION organizing scheme. The Committee will organize, in agreement with NANOINNOVATION bodies, a three full days conference, dedicated to the traditional topics and will be also in charge also for the selection of Chairman who will manage the sessions according to the traditional format comprising scientific sessions with invited talks and oral/poster contributions.

The purpose of this agreement is to give a new impetus and a well defined organizing fame to the future of our Conference, making it an integral and significant part of the vibrant and active NANOINNOVATION initiative.

The synergies between the two events can widen, in fact, the participation, opening the doors of our communities to new adepts coming from the broad community interested in different aspects of nanotechnology. On the other hand, this approach will support our members in the important activities of technology transfer, bringing the traditional deep scientific knowledge of our community in the wider frame where industrial applications plays the main role.

Among the benefits for the MATERIALI NANOFASICI participants is the integration into a wider initiative, which attracts many active operators, including relevant industrial stakeholders interested in the nanoscience and in the related devices and applications.

In the tradition of NANOINNOVATION, a free access to all aspects of NANOINNOVATION Conference and Exhibition, thus including MATERIALI NANOFASICI, the technical sessions and the commercial exhibition, will be granted to all participants, upon on line registration before the event. A contribution will be requested only to speakers and poster exhibitors according to the general NANOINNOVATION rules.

We are convinced that this organization frame will ensure a solid and long lasting development of our Conference, contributing effectively to the national general effort required for a full and safe development of nanotechnology in all the relevant industrial fields.
La capacità di identificare e sfruttare competenze e conoscenze di rete, e di gestire processi cooperativi rapidi e complessi, sono fattori determinanti per il successo della ricerca ed innovazione. Sono richiesti nuovi e più efficaci modelli per l’incontro tra domanda e offerta di tecnologia, che rispondano alle richieste di multi-disciplinarietà e multi-settorialità dell’innovazione, anche mediante piattaforme digitali innovative, in un’ottica di open science ed open innovation.

E’ necessario un cambiamento culturale che coinvolga il management della R&I, oltre a figure professionali dedicate, per affrontare i processi sempre più rapidi e complessi connessi lo sviluppo delle tecnologie abilitanti ed emergenti. Durante il seminario, alcuni tra i principali Enti di ricerca, Università e Grandi imprese nazionali, PMI ed associazioni professionali nazionali si confronteranno su esigenze, linguaggi, buone pratiche e modelli per favorire lo scambio cooperativo tra ricerca industria e pubblica in un’ottica di innovazione di medio-breve periodo.

09:00 - 10:30

**Il rapporto tra Innovazione e Conoscenza in Italia**

**Il sistema della ricerca privata**

Chair: Alberto CIGADA, Polytechnic of Milan & President Comitato Scientifico Cluster Made in Italy

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<td>09:00</td>
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<td></td>
<td>Teodoro VALENTE, Pro-Rettore alla Ricerca, Innovazione e Trasferimento Tecnologico, Sapienza University of Rome</td>
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<tr>
<td>09:15</td>
<td>JE.II.1.2 HT.III.D.2</td>
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<tr>
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<td>Sergio D’ALBERTO, LFoundry, General Affairs Senior Manager</td>
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<td>Innovation in a Semiconductor Industry and .... Opportunities</td>
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<td>09:30</td>
<td>JE.II.1.3 HT.III.D.3</td>
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<td>Sergio JESI, CEO Office Vice President Institutional Relations Italy &amp; Public Financing, ELETTRONICA</td>
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<td>La crescente importanza della collaborazione pubblico/privato sui temi strategici della ricerca e dell’innovazione</td>
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<td>09:45</td>
<td>JE.II.1.4 HT.III.D.4</td>
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<td></td>
<td>Giuseppe CARUSO, Capo Area Ricerca, FARMINDUSTRIA</td>
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<td>Ricerca, sviluppo e innovazione: l’impegno delle imprese del farmaco</td>
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<td>10:00</td>
<td>JE.II.1.5 HT.III.D.5</td>
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<td>Francesca BRACA, Research Project Manager, ARCHA</td>
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<td>Creare valore dalla ricerca responsabile e sostenibile</td>
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<td>10:15</td>
<td>JE.II.1.6 HT.III.D.6</td>
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<td>Pier Francesco MORGANTI, Direttore R&amp;D Nanoscience Center MAVI</td>
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<td>Progetto EU PolyBioSkin: Polimeri naturali e tessuti biodegradabili a salvaguardia dell’ambiente</td>
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<td>10:30</td>
<td>JE.II.1.7 HT.III.D.7</td>
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<td>Giuseppe SALONIA, Responsabile Servizio Innovazione e Proprietà Industriale, UNIONCAMERE</td>
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<td>La politica di Unioncamere per l’innovazione</td>
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<td>10:45</td>
<td>JE.II.1.8 HT.III.D.8</td>
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<td>Cesarina BONFANTI, R&amp;D Financing Manager, ENI</td>
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<td>L’innovazione collaborativa: ampliare l’accesso all’energia</td>
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10:30 - 11:00 Coffe Break
## Il rapporto tra Innovazione e Conoscenza in Italia
Il sistema della ricerca pubblica

**Chair:** Alberto CIGADA, Polytechnic of Milan & President Comitato Scientifico Cluster Made in Italy

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<td>JE.II.2.1</td>
<td>Ricerca e innovazione in INSTM</td>
<td>Andrea CANESCHI, Direttore Consorzio Interuniversitario INSTM</td>
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<tr>
<td>JE.II.2.2</td>
<td>Università e Impresa 4.0: la sfida dei Competence Center</td>
<td>Luigi MANCINI, Sapienza University of Rome</td>
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<tr>
<td>JE.II.2.3</td>
<td>Ricerca e innovazione all’Università di Pisa</td>
<td>Marco RAUGI, Prorettore per la ricerca applicata e il trasferimento tecnologico, University of Pisa</td>
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<td>JE.II.2.4</td>
<td>ENEA Knowledge Exchange Strategy: moving towards an ecosystem approach to innovation and technology transfer</td>
<td>Oscar AMERIGHI, Industry and Business Associations Unit, ENEA</td>
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<tr>
<td>JE.II.2.5</td>
<td>Colloidi, Nanoscienze e Formulazioni: Sfide ed Opportunità</td>
<td>Massimo BONINI, consorzio interuniversitario CSGI</td>
</tr>
<tr>
<td>JE.II.2.6</td>
<td>Ricerca e innovazione nel CNR</td>
<td>Corrado SPINELLA, Direttore DSFTM-CNR</td>
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**12:30 - 14:00 Light Lunch**
### Promozione e sviluppo del trasferimento tecnologico e dell’innovazione a livello territoriale

**Chair:** Lorenzo LO CASCIO, Regione Lazio, Sviluppo economico

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<td>JE.II.3.1</td>
<td>TT.VIII.B.1</td>
<td>Guido FABIANI, Presidente del Comitato Direttivo del Centro Ricerche Economiche e Sociali Manlio Rossi-Doria</td>
<td>Opening</td>
</tr>
<tr>
<td>JE.II.3.2</td>
<td>TT.VIII.B.2</td>
<td>Alfonso MARRA, Amministratore Delegato di Klopman International, Frosinone</td>
<td>Internet of Textile</td>
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<tr>
<td>JE.II.3.3</td>
<td>TT.VIII.B.3</td>
<td>Marina SILVERII, Direttore ASTER, Bologna</td>
<td>Strategie e strumenti per sistemi d’innovazione territoriali</td>
</tr>
<tr>
<td>JE.II.3.4</td>
<td>TT.VIII.B.4</td>
<td>Roberto ZAMBONI, Direttore di CNR-ISOF e Presidente Area della Ricerca CNR di Bologna</td>
<td>Ricerca, Innovazione, Impresa: strategie e risultati dell’AdR del CNR di Bologna</td>
</tr>
<tr>
<td>JE.II.3.5</td>
<td>TT.VIII.B.5</td>
<td>Roberto GIANNANTONIO, Dhitech, Lecce</td>
<td>Innovazione e Trasferimento Tecnologico in Regione Puglia: problemi e opportunità</td>
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15:30 - 16:00 Coffe Break
Un approccio innovativo della Regione Lazio: Infrastrutture Aperte per la Ricerca

Chair: Marco ROSSI, Sapienza University of Rome

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<th>Session</th>
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| JE.II.4.1 | Riccardo PANUNZIO, Lazio Innova  
Strumenti regionali per l’Open Innovation |
| JE.II.4.2 | Guglielmo FORTUNATO, CNR IMM & Leonardo  
NanoMicroFab - Infrastruttura aperta di ricerca per il supporto di aziende operanti nell’ambito della micro-nanoelettronica |
| JE.II.4.3 | Giuseppe BARBIERI, ENEA  
MAIA – Materiali Avanzati in una Infrastruttura Aperta |
| JE.II.4.4 | Andrea GHIGO, INFN, Frascati  
LATINO – Laboratory in Advanced Technologies for INnOvation |
| JE.II.4.5 | Luca LEUZZI, Sapienza University of Rome & CNR Nanotec  
ATOM - Advanced Tomography and Microscopies |
Satellite Events

New Zetasizer ULTRA featuring MADLS®: the ultimate technology for nanoparticle size and number concentration analysis

Wednesday 12 September, 09:00 - 12:30

ABSTRACT

Characterizing size and concentration is a key step in the study and development of dispersed nanosystems and for the control of the final product properties and quality.

Light scattering is a primary technique for this purpose, and Malvern Panalytical is the leader provider of light scattering instruments for nanoparticle characterization. The workshop will be dedicated to the brand new and revolutionary Adaptive correlation and multi-angle Dynamic Light scattering MADLS® techniques for more complete particle size distributions and calibration-free concentration analysis.

The brand new Zetasizer ULTRA from Malvern Panalytical featuring these 2 techniques will be officially presented for the first time in Italy during this workshop. The workshop will be dedicated both to measurement principle and applicative examples to illustrate the benefits of Adaptive correlation and MADLS® respect to classical DLS.

The new Zetasizer ULTRA will be presented on site during a live demonstration.

PROGRAMME: 2 replicate sessions at 9:15 and 11:00

09:00 Welcome
09:15 Reliable DLS size data quicker with Adaptive Correlation
09:30 See the whole nanoparticle sample with MADLS®: particle characterization you can trust and easy, calibration-free number concentration measurements
10:00 New Zetasizer ULTRA live demonstration
10:30 Coffee Break
11:00 Reliable DLS size data quicker with Adaptive Correlation (replicate)
11:15 See the whole nanoparticle sample with MADLS®: particle characterization you can trust and easy, calibration-free number concentration measurements (replicate)
11:45 New Zetasizer ULTRA live demonstration (replicate)
12:15 Open discussion until 13.00

SPEAKER INFORMATION:

Andrea Pigozzo - Alfatest srl – Distributore Malvern Panalytical per l’Italia

Dr. Andrea Pigozzo is graduated in Environmental Sciences at University Ca’ Foscari of Venice. He works for Alfatest since 2015, focusing on the molecular interactions and nanoparticle/protein characterization instrumentation. He is Product Manager for Malvern Panalytical light scattering and micro-calorimetry platforms and Pall Fortébio product lines.
Advances in Atomic Force Microscopy
PinPoint Piezo Force Microscope – frictionless imaging technique
(Seminar and Life Demo)

Wednesday 12 - Thursday 13 September, 14:30 - 16:00

ABSTRACT

Electromechanical coupling in materials is a key property that provides functionality to a variety of applications including: sensors, actuators, IR detectors, energy harvesting, and biology. Most materials exhibit electromechanical coupling in nanometer-sized domains. Therefore, to understand the relationships between structure and function of these materials, characterization on the nanoscale is required. This electromechanical coupling property can be directly measured in a non-destructive manner using piezoelectric force microscopy (PFM), a well-established method in atomic force microscopy (AFM).

The conventional PFM is usually performed in contact mode. Contact mode, however, has challenges for a great variety of samples, e.g. the characterization of an annealed phenanthrene thin film on top of an ITO surface. The main difficulty in imaging these samples is due to the phenanthrene thin film forming rod-shaped nanostructures that are very susceptible to displacement by a scanning AFM probe. This is the reason for the newly developed PinPoint™ PFM mode by Park Systems. As opposed to standard contact mode, in PinPointTM mode the AFM probe monitors its feedback signal, approaches towards the sample surface until a predefined force threshold is reached, and measures the Z scanner’s height. The AFM probe is then rapidly retracted away from the surface to a user-defined height. During the data acquisition the XY scanner stops movement completely and therefore no AFM probe movement takes place on the sample surface at any time. This allows for a more accurate representation of the surface as the nanorods are not moved from their original position.

Join the seminar and live demo to learn more about advantages of PinPointTM PFM over a conventional PFM mode.

PROGRAMME:

14:30 Welcome and Introduction
14:40 Talk: “PinPoint Piezo Force Microscope – frictionless imaging technique”
15:30 Instrument Demonstration on Park NX10 AFM
16:00 Discussion und Summary

SPEAKER INFORMATION:

Victor Bergmann – Application Scientist at Park Systems
pse@parksystems.com | www.parksystems.com
### ALPHABETICAL ORDER

| 6  | 2M STRUMENTI |
| 9  | AIRI |
| 8  | ALFATEST MALVERN PANALYTICAL |
| 12 | ASSING |
| 7  | BRUKER |
| 2  | DISTRETTO TECNOLOGICO SICILIA MICRO E NANO SISTEMI |
| 14 | FONDAZIONE BRUNO KESSLER |
| 10 | GAMBETTI KENOLOGIA |
| 22 | GRAPHENE FACTORY |
| 18 | ITALIAN TRADE AGENCY |
| 13 | LABOZETA |
| 16 | LFOUNDRY |
| 4  | LOT QUANTUMDESIGN |
| 17 | NANO TECH 2019 |
| 20 | NANOSHARE |
| 3  | PLATINUM |
| 21 | PROGETTO Fit4RRI |
| 11 | PROXIMA |
| 1  | RENISHAW |
| 15 | SCUOLA NORMALE SUPERIORE CENTRO DI COMPETENZE SULLE NANOTECNOLOGIE – CCNEST LABORATORIO SMART |
| 5  | STREM CHEMICALS |
| 23 | WARRANT GROUP |
| 9  | ZEISS |

### BOOTHS ORDER

| 1  | RENISHAW |
| 2  | DISTRETTO TECNOLOGICO SICILIA MICRO E NANO SISTEMI |
| 3  | PLATINUM |
| 4  | LOT-QUANTUMDESIGN |
| 5  | STREM CHEMICALS |
| 6  | 2M STRUMENTI |
| 7  | BRUKER |
| 8  | ALFATEST MALVERN PANALYTICAL |
| 9  | ZEISS |
| 10 | GAMBETTI KENOLOGIA |
| 11 | PROXIMA |
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| 13 | LABOZETA |
| 14 | FONDAZIONE BRUNO KESSLER |
| 15 | SCUOLA NORMALE SUPERIORE |
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| 17 | NANO TECH 2019 |
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| 21 | PROGETTO Fit4RRI |
| 22 | GRAPHENE FACTORY |
| 23 | WARRANT GROUP |
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2M STRUMENTI is active in the materials science, biophysics and nanotechnology fields, representing and producing scientific instruments and high quality components for the creation and characterization of inorganic, organic and biological, from micro to nano structure. The main activities of 2M STRUMENTI are the commercialization, installation and technical support of scientific instrumentation, exclusively on the national territory. The core areas of the company are:

Nanoscopy:  AFM, STM, probes and several accessories.


Deposition: Deposition systems by Metallorganic MO-CVD / LPE / PVD / VPE. Deposition systems Plasma and Reactive Etching Assisted PE-CVD / ICP-RIE. Sputter and evaporators; CVD, PVD. Graphene growing systems up to 300 mm diameters Nanoimprinting thermal and UV. Inkjet printing and microdispensing.


The company can also provide the "design, construction, distribution, repair, transformation of scientific equipment." Some instruments have been made both in the industrial (process control) and science.

Airi is a private, not-for profit Association, funded in 1974 to promote industrial Research and Innovation in Italy and to enhance co-operation between the private and public sector. Airi is the focal point for about 100 members, representing private industrial enterprises, large and SMEs and public research organizations. Airi/Nanotec IT is a division dedicated to promote nanotechnologies and their integration with the other Key Enabling Technologies. Researchers of Airi members constitute about the 45% of the researchers in the Country. Airi monitors scientific R&D trends and their applications, disseminates information, facilitates technology transfer and promotes Responsible Research and Innovation (RRI), and has a long experience in participation in co-operative European projects, often as co-ordinator.

Information on activities of Airi will be available at the stand, including the following publications and projects:

- Verso un manifatturiero italiano 4.0. Ricerca, tecnologia e non solo, dic 2017, Airi
- Le innovazioni del prossimo futuro: tecnologie prioritarie per l’industria, mag 2016, Airi
- NanoRestArt project: Nanomaterials for the Restoration of works of Art
- Prisma project: Piloting Responsible Research and Innovation in Industry
- GoNano: Governing Nanotechnologies through societal engagement
- CalIBRAt: Risk Governance Framework for nanomaterials
- NanoLab: risk management of nanomaterials in R&D labs
- RinnovareNano: National platform on the safety of nanomaterials
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Alfatest is distributing scientific equipment dedicated to Materials science and Bio-sciences, providing its customers with leading technologies and high-level technical and applicative support based on a 30 years’ experience. In addition, the contract analysis laboratory Alfatestlab is available to anyone for training, demonstrations, method development, and general scientific support on all our technologies.

Alfatest is also the exclusive distributor in Italy for Malvern Panalytical products dedicated to particle size and shape analysis, rheology, GPC/SEC and microcalorimetry.

Alfatest is also the exclusive distributor in Italy for Phenom-world, Formulaction, Postnova Analytics, Haver & Boecker, Microfluidics, Freeman Technologies, Pall ForteBio, Alpha-MOS, Armfield, Applied Photophysics, and ONI.

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PANalytical provides solutions for highly reliable and robust chemical and structural analysis of a wide variety of materials. The combination of our software and instrumentation, based on X-ray diffraction (XRD), X-ray scattering, X-ray fluorescence (XRF), near-infrared (NIR) and pulsed fast thermal neutron activation (PFTNA), provides our customers with elemental and structural information on their materials.

With our global presence, expertise and unmatched support organization we help customers characterize materials in every industry segment, applications and materials research areas.

Our systems range from laboratory instruments and on-line analyzers to completely automated laboratories for the metals and mining industries. Currently we are the only analytical X-ray equipment supplier with own in-house development and manufacture of the X-ray tubes, basis of the best performance.

We have over 1000 dedicated employees, are present in all countries of the world, hold more than 250 patents and have research centers in Almelo and Eindhoven, the Netherlands and on the campus of the University of Sussex (UK).

Our fully equipped application laboratories are established also in Japan, China, the United States, Brazil. Since 1 January 2017 PANalytical has merged its activities with Malvern Instruments. We continue to be coitied to leadership and innovation, customer satisfaction, safety, environmental health, ethical standards, integrity, fairness, trust and mutual respect.
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Assing S.p.A is a leader in Italy in delivering high technology solutions and products for Industry and Research. Competences range from design to high technology infrastructure; from the identification of the appropriate analytical techniques to the provision of related systems; from technical-scientific consulting to the organization of training courses.

Special attention has always been given to the nanotechnology. Assing can propose observation, analysis and process instruments such as: electronic microscopes, X-ray microscopes, dual beam systems (Tescan - Orsay), a wide range of diffraction and X-ray fluorescence equipment (Rigaku), systems from Plasma Therm (RIE, PECVD, ICP), , Electronic lithography systems (Crestec), atomic force microscopies, optical and stylus profilometers (BRUKER Nano Surfaces), XPS, TOF SIMS, AUGER (PHI), nanomanipulators (Imina)

Assing, designs, realizes and validates clean rooms for research laboratories and production areas and cell-factories.

Thanks to its know-how, is able to offer a Global Solution to the various customer requests, as a partner, providing all means and services necessary to carry out its activities.

The Company also plays an active role in Research, participating in several projects, both nationally and internationally, aimed at developing new technologies.

BRUKER SURFACE & DIMENSIONAL ANALYSIS
7 rue de la Croix Martre
91120 Palaiseau, France
email: sales@assing.it

Bruker Nano Surfaces provides industry-leading surface analysis instruments for the research and production environment. Our broad range of 2D and 3D surface profiler solutions supply the specific information needed to answer R&D, QA/QC, and surface measurement questions with speed, accuracy, and ease. Bruker’s AFMs are enabling scientists around the world to make discoveries and advance their understanding of materials and biological systems. Our tribometers and mechanical testers deliver practical data used to help improve development of materials and tribological systems.

CRESTEC CORPORATION
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Tokyo 192-0045, JAPAN
website: www.crestec8.co.jp
email: sales@crestec8.co.jp

Crestec Corporation provides Dedicated electron beam lithography systems, tailored to deliver extremely high currents in a minimal diameter beam spot.
**IMINA TECHNOLOGIES SA**

Imina Technologies is the maker of the miBot™, an extremely versatile and intuitive to use piezo-based sample manipulator.

These innovative robotic solutions for positioning, handling and electrical sensing at micro and nano scales in combination with various third party instruments are used to position with precision probe tips on electronic devices, sensors, semiconductors, MEMS, etc or to handle and characterize electric properties of nanoparticles, nano wires & fibers in material science.

These techniques can be used in combination with the SEM, Optical Microscope, X-Ray, AFM, Raman, etc or at an electrical probing workbench.

**PHYSICAL ELECTRONICS INC. (PHI)**

Physical Electronics (PHI) the world’s leading supplier of UHV surface analysis instrumentation used for research and development of advanced materials in a number of high technology fields including: nanotechnology, microelectronics, storage media, bio-medical, and basic materials such as metals, polymers, and coatings.

PHI’s innovative XPS, AES, and SIMS technologies provide our customers with unique tools to solve challenging materials problems and accelerate the development of new materials and products.

**PLASMA-THERM**

Plasma-Therm is, since 1974, an innovator in plasma-processing technologies and manufactures plasma etch, deposition, and advanced packaging equipment for specialty semiconductor and nanotechnology markets.
PVA TEPLA ANALYTICAL SYSTEMS GMBH
Deutschordenstrasse, 38
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email: sales@assing.it

PVA TePla Analytical Systems develops, produces and delivers scanning acoustic microscopes (whose unique characteristic is the ability to non-destructively examine the interior of opaque materials with resolution comparable to optical light microscopy) providing innovative, advanced solutions for non-destructive imaging.

RIGAKU CORPORATION
4-14-4, Sendagaya, Shibuya-ku
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email: sales@assing.it

Rigaku Corporation is an international leader in manufacturing and distribution of analytical instruments for X-ray diffraction (XRD), X-ray crystallography (SC-XRD) and X-ray fluorescence (XRF) for research and industrial applications.

Rigaku is based in Tokyo (Japan) with additional production and laboratory facilities in both Japan and the United States.

European facilities are located in United Kingdom, Germany, Czech Republic and Poland.

Rigaku products are worldwide well known for the top level design, the high performance and the unequalled reliability.
Bruker enables scientists to make breakthrough discoveries and develop new applications that improve the quality of human life. Bruker’s high-performance scientific instruments and high-value analytical and diagnostic solutions enable scientists to explore life and materials at molecular, cellular and microscopic levels. In close cooperation with our customers, Bruker is enabling innovation, productivity and customer success in life science molecular research, in applied and pharma applications, and in microscopy, nano-analysis and industrial applications. In recent years, Bruker has also become a provider of high-performance systems for cell biology, preclinical imaging, clinical phenomics and proteomics research, clinical microbiology, and for molecular pathology research.

Today, worldwide more than 6,000 employees are working on this permanent challenge at over 90 locations on all continents. Bruker continues to build upon its extensive range of products and solutions, its broad base of installed systems and a strong reputation among its customers. Being one of the world’s leading analytical instrumentation companies, Bruker is strongly committed to further fully meet its customers’ needs as well as to continue to develop state-of-the-art technologies and innovative solutions for today’s analytical questions.

Bruker’s unique range of analytical tools for SEM includes EDS, WDS, EBSD and Micro-XRF.

TESCAN
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TESCAN is a global suppliers of scientific instruments. The company is building its reputation and brand name in the field of designing and manufacturing scanning electron microscopes and system solutions for different applications.

The company is focused on research, development and manufacturing of scientific instruments and laboratory equipment such as:

- scanning electron microscopes
- dual beam
- supplementary accessories for SEMs
- light optical microscopy accessories and image processing
- special vacuum chambers and custom systems
- detection systems
- scientific hardware and software development
The “Distretto Tecnologico Sicilia Micro e Nano Sistemi” is a cluster founded in August the 1st 2008 in form of limited liability consortium, based on a National agreement between the Italian Government and the Sicily Region. The “Distretto” counts on the aggregation of 22 different research and development enterprises (both private firms and public companies) that work on micro-nano technologies in the fields of Life Science, Energy, Mobility, Agricultural & Food, Environment and Security. The “Distretto” is also part of several National Technological Cluster named by the MIUR, the Italian Ministry of Education & Research. In particular, Cluster “Alisei” focused on Life Science, Cluster “Smile” on Ambient Assisted Living, Cluster Energy, and Cluster Smart Communities. The Consortium owns really strong competencies due to the fact that among its parties it includes several national and “global” firms dedicated to research, development and experimentation of micro-nano industrial systems. Just to mention some of these private firms:

- STMicroelectronics, IBM Italia, SIFI, ISMETT (Istituto Mediterraneo per i Trapianti e Terapie ad Alta Specializzazione), ITALTEL, Corvallis, and Engineering.
- Furthermore, referring to the National public system of research as parties of the Consortium, is important to mention: CNR, that - with about 8,000 employees - is a public organization with the duty to carry out, promote, spread, transfer and improve research activities in the main sectors of knowledge and scientific technological development and the 3 Sicilian Universities (Palermo, Catania and Messina) and its branches and departments that provides specific technical and scientific support.
- Starting from 2012, and till the 2015, the District Consortium is involved in several ambitious research projects (partially funded for about 50M€ by the Italian Ministry of Education & Research) in the fields of Health & Biotechnology, Energy Efficiency, and Electronic & New Materials.
Gambetti Kenologia has chosen NanoInnovation to promote together with Park Systems the most innovative solutions in atomic force microscopy.

Park Systems is a world-leading manufacturer of atomic force microscopy (AFM) systems with a complete range of products for researchers and industry engineers in chemistry, materials, physics, life sciences, and semiconductor and data storage industries. Park’s products are used by over a thousand of institutions and corporations worldwide. Our comprehensive line of AFMs, with revolutionary features like True Non-Contact™ mode or Park SmartScan OS, offers users unparalleled accuracy and ease of use. With AFMs designed specifically to be used in materials and life science, electronics, nanotechnology, and other areas of research and industry, our tools are trusted to deliver ultra-high resolution with extremely precise measurements quickly and easily.

An NX10 will be available at our booth, and during satellite events with real demos.

Gambetti Kenologia since 1974 provides solutions for R&D and industrial companies in the following fields of activities:


Our brand includes also bench top plasma systems fully developed and produced at GK

For more info: www.gambetti.it  www.plasmi.eu

Extending the boundary of Process control

KLA-Tencor is among the largest semiconductor equipment companies in the world. We are an industry leader with the financial strength to support growth and development, the technical innovation needed in a fast-paced industry environment, and the critical mass to serve a global customer base.

KLA-Tencor has been a leader in process control for the semiconductor and related industries for 40 years, developing and manufacturing inspection, metrology and data analysis systems that rely on innovative optics, sensors and high performance computing technologies.
**Exhibitors**

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**Oxford Instruments Plasma Technology**

Oxford Instruments Plasma Technology (OIP) provide etch and deposition process solutions for nanometre sized features, nanolayers and the controlled growth of nanostructures.

These solutions are based on core technologies in plasma, ion beam and atomic layer deposition and etch. Products range from clustered cassette-to-cassette platforms for high-throughput production processing to compact stand-alone systems for R&D.

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**Park Systems**

Gambetti Kenologia has chosen NanoInnovation to promote together with Park Systems the most innovative solutions in atomic force microscopy.

Park Systems is a world-leading manufacturer of atomic force microscopy (AFM) systems with a complete range of products for researchers and industry engineers in chemistry, materials, physics, life sciences, and semiconductor and data storage industries. Park’s products are used by over a thousand of institutions and corporations worldwide. Our comprehensive line of AFMs, with revolutionary features like True Non-Contact™ mode or Park SmartScan OS, offers users unparalleled accuracy and ease of use. With AFMs designed specifically to be used in materials and life science, electronics, nanotechnology, and other areas of research and industry, our tools are trusted to deliver ultra-high resolution with extremely precise measurements quickly and easily.

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For more info: www.gambetti.it  www.plasmi.eu
Thermo Scientific – a commitment to analytical precision

Thermo Scientific instruments, equipment, software, services and consumables empower scientists to solve for complex analytical challenges in pharmaceutical, biotechnology, academic, government, environmental and industrial research, as well as the clinical laboratory. Our products address a range of needs from sample, material characterization and chemical analysis to clinical diagnoses and biological-based therapeutics manufacturing.

Arrive at a confident answer

Tackle the most challenging surface, thin film and interface questions with Thermo Scientific™ XPS spectrometers. Our analytical innovations allow scientists on the forefront of materials science to drive bold progress in the fields of ultra thin film and nanotechnology development. Unparalleled ease-of-use, best-in-class software and high sample throughput provide superior results for production and analytical laboratories. Whenever new questions rise to the surface, our comprehensive offering of XPS spectrometers deliver the performance and flexibility to arrive at a confident answer.
The Italian Trade Agency - ICE is the government organization which promotes the internationalisation of Italian companies. ICE provides information, support and advice to Italian and foreign companies.

ICE operates worldwide through a network of Trade Promotion Offices linked to Italian embassies and consulates and working closely with local authorities and businesses.

ICE provides tailored services to help Italian businesses expand overseas and connect with prospective partners: one-on-one business meetings, targeted partner searches, trade delegations to Italy, official participation in international trade events, forums and seminars with Italian experts.

www.ice.gov.it | www.italtrade.com | tecnologia.industriale@ice.it

Labozeta operates in the field of design and construction of scientific laboratories and is partner and distributor of Kottermann.

EN ISO 9001:2008 (Vision 2000) certified, Labozeta is a specialized company with certification awarded by the Society of Certification Bodies (SOA).

Operating on an international level, it is constantly involved in the study of technological innovations and advanced production processes to ensure the maximum level of prevention and protection of the personnel of scientific laboratories, pursuant to international quality standards.

Labozeta combines variable geometries for personalized services from planning, definition and management of a project to implementation, testing and delivery of the work in sectors as Industry, Health, Forensics, Research, Control and Education.

Educational workshops for Universities, Technical and Professional Schools, Education and Training Institutions. The interaction of professionals from different fields reflects the multidisciplinary aspect of innovative projects that mix appearance, ergonomics, communication, psychology, usability and functionality for the management and simplification of complexity with competence and reliability.

The philosophy of Labozeta is expressed in its attention to detail and to the quality of its products with the aim of creating sensitivity, developing original, concrete and innovative ideas, mixing different concepts and skills to be used in a complementary manner.

Since 1983, Labozeta has been cooperating with qualified companies building a strong experience by carrying out several projects for the most prestigious institutions and private clients. Nowadays, Labozeta represents an original multidisciplinary reality that uses an international language to explore strategic and coherent forms, to develop new concepts, to carry out projects that inspire a new way of living the laboratory.

Great attention to people, the enhancement of highly potential resources and the development of a culture of knowledge represent for Labozeta the privilege of participating in life.
From the heart of ancient Europe, LFoundry, a SMIC majority-owned company, provides innovative solutions that reach all around the world, breathing life into our customers’ visions. Fully committed to finding the best solutions to satisfy every specific necessity, LFoundry creates innovation to bring our partners’ projects to life. When it comes to transforming innovation into reality, this is what makes LFoundry a world-class player. Our leading and highly specialised foundry has an advanced 200mm manufacturing fab and proprietary technologies at 150 and 110 nm nodes, with MPW and MLM services available. We provide special capabilities and know-how for CMOS Image Sensors through CIS optimised processes down to 90nm, as well as Back Side Illumination technology. We also provide excellent technology support for Optoelectronics such as SiPM, SPAD, X-Ray, as well as for DBI Bonding (3D-Stacking) and Smart Power and a vast range of applications for the automotive, industrial, medical, security, science and space imaging industries. As a SMIC Company, LFoundry can leverage skills and capabilities of one of the leading semiconductor foundries in the world and the largest and most advanced foundry in mainland China.

OUR PLACE
In Avezzano (AQ - Italy), LFoundry is enabling innovation worldwide. We have a continuous commitment to guaranteeing a secure environment in which our customers can realise their ideas to the highest standard, relying on LFoundry as an indispensable partner to unleash their full potential.

DEDICATED FOUNDRY AT AVEZZANO
Since 2006, Avezzano site (former Micron Technology) has been manufacturing customer imaging process technologies and products using 180nm to 90nm technologies at the 200mm, including a volume copper Back End of Line (BEOL), Back Side Illumination processes (BSI) and extensive testing capabilities. The Company provides automotive ISO-TS16949, telecom TL9000 and ISO9001 quality management system certifications as well as OHSAS 18001 certification for health and safety management system and ISO 14001 certification for environmental management system.

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For over 45 years, we have been one of the leading European distributors of high-tech instrumentation and consumables for scientific, academic and industrial research.

Our product range comprises optics, components and systems for the life sciences, material characterization, cryotechnology, spectroscopy, imaging and electron microscopy.

We employ more than highly-qualified 140 staff across Europe. The headquarters are located in Darmstadt, Germany, further offices are in France, England, Italy, Scandinavia, Poland, Czech Republic, Hungary, Romania, Spain, Russia, Turkey, Switzerland and the BeNeLux. Together with our parent company Quantum Design International, Inc. and affiliated companies in the U.S., Asia and South America, we form the only world-wide distribution network for high-technology instrumentation.
**nano tech Japan** is the world’s largest and one of the most comprehensive event for nanotechnologies. It will be held in Tokyo for the 18th time from Jan. 30 - Feb. 1, 2019.

In the industry focused exhibition, 600 companies, research institutes and universities show the latest Materials, Fabrication and Measurement Technologies at the nano level.

The attendee list of more than 50,000 people reads like the Who-is-who of the Japanese and Asian Industry and includes Electronics manufacturers, as well as Chemical, Pharmaceutical, Automotive and Construction companies.

Together with other high-tech events such as Printable Electronics, 3D Printing, or Smart Energy Japan, nanotech creates a huge marketplace for next generation technologies.

A joint Business Matching, which is shared by all co-located events, provides the opportunity for one-to-one business meetings with more than 1200 registered innovators and technology users and creates synergies between different fields.

An accompanying seminar and conference program covers a variety of nanotechnology related topics and provides information about latest research results and developments.

More information about nanotech is available at www.nanotechexpo.jp/index.html

NanoShare Srl is a SME company legally based on the Polo Tecnologico Tiburtino (Rome. NanoShare is an academic spin-off of Tor Vergata University: our laboratories, facilities, professors and researchers are spread out the Tor Vergata University, Sapienza University and in the Polo Tecnologico Tiburtino Invent plant. NanoShare mission is to create job & opportunities through innovation and technological transfer in the field of nanotechnology.

The starting date of our activity was in 2011, when MIUR, (through the Art 11 D.M. 08.08.2000) financially supported the implementation of the “STORAGE” project, devoted to the development innovative nanocomposites for Hydrogen storage at RT and at low pressure. Our revenue model is in the framework of the general category of the commerce. We prepare customized physical goods based on nanotechnology (nanomaterials, nanodevices, nanosensors and other nanosystems) and we offer R&D services on the large field of nanotechnology and nanocharacterizations.

For what concerns the manufacturing of nanoparticles, nanostructures and nanocomposites, contracts and R&D projects are mainly related to the following applications:

- Thermal management;
- Sensing (gas/vapour, stress/strain, electrochemical, bio-);
- Energy storage (H-storage, supercapacitors, electrodes for cells);
- Coatings (mechanical, conductive, antistatic, fluorescent) on rigid and flexible substrates (including textiles);
- Electron sources (cold cathodes, micro-propulsion systems, miniaturized X-sources);
- Biomedical applications (drug delivery, imaging, biocide, antifungal, bio-adhesives layers).
PLATINUM "Aziende&Protagonisti" è la rivista a colori diretta da “Gruppo 24 ORE” che illustra il panorama economico italiano attraverso i suoi principali interlocutori.

Una comunicazione autorevole e qualificata ad un target di nominativi nel panorama imprenditoriale (grandi imprese e PMI), istituzionale ed economico-finanziario nonché dei liberi professionisti. PLATINUM “Aziende & Protagonisti” è distribuita in Italia in edicola e direct mailing con “Il Sole 24 ORE”, in Europa, in lingua inglese, in sei paesi della CE a maggior capitalizzazione, tramite le C.C.I.E. La tiratura prevista è di 140.000 copie senza reso distribuite in tutta Italia e, in EUROPA, in lingua inglese.

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FIT4RRI - Fostering improved training tools for RRI- is intended to help mainstream role of Responsible Research and innovation (RRI) and Open Science (OS) in Research Funding and Performing Organisations (RFPOs).

FIT4RRI moves from the assumption that there is a serious gap between the potential role RRI and OS could play in helping RFPOs to manage the rapid transformation processes affecting science (especially the science-in-society aspects) and the actual impact RRI and OS are currently having on RFPOs. FIT4RRI act on two key factors: • Enhancing competences and skills related to RRI and OS • Institutionally embedding RRI/OS practices in RFPOs.

The FIT4RRI overall methodology is based on three main steps: • Analysing RRI and OS practices: trends, barriers and drivers, interests and values, experiences • Testing RRI/OS practices in 4 co-creation experiments with RFPOs, with a focus on Energy Efficiency, Photonics (optical monitoring), Material Science, Text & Data Mining • Developing easy-accessible training tools and evidence-based guidelines for RRI and OS.

At the FIT4RRI stand delegates will get insights on training tools and testing activities and explore opportunities to contribute and benefit from project activities.

Project funded by the EU’s Horizon 2020 R&I Programme under Grant Agreement No 741477.

To learn more about FIT4RRI and to sign-up for the project’s newsletter, visit www.fit4rri.eu/
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Renishaw is one of the world’s leading engineering and scientific technology companies, with expertise in precision measurement and healthcare. The company supplies products and services used in applications as diverse as jet engine and wind turbine manufacture, through to dentistry and brain surgery.

It is also a world leader in the field of additive manufacturing (also referred to as metal 3D printing), where it is the only UK business that designs and makes industrial machines which ‘print’ parts from metal powder.

The Renishaw Group currently has more than 70 offices in 35 countries, with around 4,000 employees worldwide. Around 2,600 people are employed within the UK where the company carries out the majority of its research and development and its manufacturing.
The NEST Competence Centre on nanotechnologies (CCNEST) was funded in 2010 by the local government of the Tuscan region on a Scuola Normale Superiore proposal, as a service centre for local small and medium enterprises (SME).

It uses state-of-the-art instrumentation within a class ISO 6 clean room and it is located within the NEST laboratory of the Scuola Normale Superiore.

The NEST laboratory, the National Enterprise for nanoscience and Nanotechnology, is an interdisciplinary research and training centre for nanoscience where physicists, chemists and biologists (about 150 people) investigate scientific issues at the nanoscale.

This knowledge is exploited to develop innovative nanobiotechnological tools, nanoelectronic and photonic devices and architectures.

The NEST initiative comprises four distinct institutions: Scuola Normale Superiore, Istituto Italiano di Tecnologia, Consiglio Nazionale delle Ricerche and Scuola Superiore Sant’Anna. Although each institution has its own staff and administration (Laboratorio NEST of SNS, Centre for Nanotechnology Innovation of IIT, the Istituto Nanoscienze of CNR, and Nanoplant of SSSA) facilities and activities are closely coordinated and scientists team up for specific scientific objectives regardless of their affiliation.

Collaboration with SME at the NEST Competence Centre (CCNEST) is obtained through research contracts on nanoscience and nanotechnology topics. The synergy of the CCNEST with the NEST laboratory allows for the exploitation of both the skills of their technical-scientific staff and the equipment and tools available, and to put them at the service of the enterprise that wants to innovate.

The Scuola Normale Superiore (SNS) is a public institute for higher education that in its two centuries of life has earned itself a special place, both in Italy and abroad, a place characterized by merit, talent and scientific rigour.

Within the SNS there are two laboratories involved in nanoscience, computational chemistry and augmented reality, Laboratorio NEST and Laboratorio SMART respectively, where the institutional scientific activity is also exploited for technology transfer.

These two labs of the SNS will be present at NanoInnovation 2018 in order to show their research activity and to offer collaboration on projects related to technology transfer for small and medium enterprises (SME) and research institutes.
The SMART (Space-time Multiscale Applications for Research and Technology) Laboratory at Scuola Normale Superiore was established in 2016. SMART focuses on the development of simulation and number crunching methods. The models developed at SMART are used by many researchers around the world, both in academia and in industry. In 2017 the Competence Centre in Simulation and Virtual Methods for Science and Technology was established within SMART as a service centre for local small and medium enterprises (SME).

The nexus of scientific research at SMART is the development, validation and application of algorithms and software to model molecular systems and forecast their properties under different environmental conditions, with particular emphasis on spectroscopic properties across the entire electromagnetic spectrum. Theoretical developments are implemented in widely available software for use by other researchers. This is of great scientific and technological impact, for example, in the development of Smart Materials, substances whose properties can be controlled or changed with accuracy by means of external stimuli (e.g. temperature, light).

Modern numerical simulations are able to generate huge amounts of complex, non-structured data, which can change in nature and whose size can grow rather quickly, which forces one to resort to Big Data technologies to handle them. Therefore, the development and application of algorithms for the automatic analysis of data and application of Machine Learning methods to pre- and post-processing steps are important lines of research.

SMART is also highly involved in the development of Immersive Virtual Reality to Scientific Visualization. The possibility of natural interaction with the visualized objects and the use of proprioception for a quick and intuitive grasp of complex structures should allow for a further evolution in interactive data visualization. This is particularly true when dealing with complex objects far from our usual perception scale.

The SMART staff is formed of about 30 people including senior staff (professors and researchers), post Docs, Ph. D. and undergraduate students and technical staff.

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In fiscal year 2016/17, the company generated revenue approximating 5.3 billion euros with around 27,000 employees. Founded in 1846 in Jena, the company is headquartered in Oberkochen, Germany. Carl Zeiss AG is the strategic management holding company that manages the ZEISS Group. The company is wholly owned by the Carl Zeiss Stiftung (Carl Zeiss Foundation).
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