EUROSENSORS 2023

EUROSENSORS

XXXV CONFERENCE

10-13 SEPTEMBER LECCE 2023

PROGRAM

TABLE OF CONTENTS

EUROSENSORS XXXV CONFERENCE

10-13 SEPTEMBER LECCE 2023

REGIONE PUGLIA

PROVINCIA DI LECCE

CITTÀ DI LECCE

POLO BIBLIO · MUSEALE DI LECCE

MAIN PARTNERS

WELCOME MESSAGE

Dear Colleagues and Friends,
it is a pleasure for me to welcome you to Lecce!

I would like to deliver my warm greetings and heartfelt welcome to all Participants of the XXXV EUROSENSORS Conference.

The Conference will provide an opportunity for the presentation of updated results related to both theoretical and applied research in the field of Sensors, Micro-Nanosystems, etc., bringing together scientists from academic institutions and industry and promoting professional interactions between them. Furthermore, the Conference has also included a one day Tutorial Course on emerging and key arguments on correlation between Environment and Health and the role of Sensors technologies.

In this XXXV edition of the EUROSENSORS Conference we have reached a considerable number of abstracts and participants, as usual in all Eurosensors editions. The TPC did the best for selecting high quality paper in order to guarantee a high quality technical program.

The Organising Committee would be very happy like to express to the participants deep appreciation for the scientific response which would demonstrates how strong is the interest in the field of Sensors and related technologies. It is hoped that during the Conference fruitful interactions among participants and new cultural proposals can grow up for the positive development of the Conference and for the intellectual growth of all the participants.

A very attractive and stimulating social program has been also set up which will start with a welcome reception and registration party on Sunday evening at the "Convitto Palmieri and San France-

sco della Porta" and it will continue on Monday evening with the Concert at "Apollo Theatre"; for this concert you will have a very nice surprise because for the first time we will have the so called "Eurosensors Music Ensemble". On Tuesday evening the Conference Gala Dinner will take place at "Augustus Resort", a beautiful place facing on the Adriatic sea in Santa Cesare Terme.

Many thanks go out to the Technical Program Chair, Luca Francioso, and all the members of the Technical Program Committe, the Organising Committee and related sector Chairs, the National Committee, the Local Organising Committee, the Eurosensors Steering Committee for their input and support. Particular thanks to the Puglia Region, the Province Government and the Major of Lecce for the local support and the great interest demonstrated in hosting the event. Only those who have experienced the organisation of such an important event and its related actions will understand how much human effort goes in to the preparation for these four days of intense activity. I hope you will take this opportunity to visit one of the most attractive Italian territory and town

Welcome to Lecce and Salento area and enjoy the Conference!

The General Conference Chair: Pietro Siciliano

PROGRAM COMMITTEE

General Conference Chair: Pietro Siciliano
Technical Programme Chair: Luca Francioso
Local Scientific Chair: Fabio Quaranta
Local Organisation Chair: Annarosa Florio
Exhibition Chair: Antonietta Taurino
Eurosensors School Chair: Simonetta Capone
Eurosensors School Advisors: Pasqualina M. Sarro
Pubblication Chair: Bruno Andò

Conference Organisation Committee

Mauro Epifani, Assunta Signore, Angiola Forleo, Antonietta Taurino, Anna Persano, Alessandra Aloisi, Silvia Rizzo, Antonella De Giorgi, Laura Blasi, Isabella Farella, Alessandro Leone, Giovanni Diraco, Andrea Caroppo, Riccardo Di Corato, Antonio Della Torre, Enrico Binetti, Luciano Velardi, Samuele Vincenti, Elisa Sciurti, Stefano Zampolli, Sebania Libertino, Gianni Podo

International Steering Committee

Co-Chairs

Stefan Raible, Jean-Paul Viricelle

Voting members

Marina Cole, Elisabetta Comini, Christofer Hierold, Anton Köck, Mikael Kraft, Santiago Marco, Ralf Moos, Donatella Puglisi, Peter Furjes, Philippe Robert, Pietro Siciliano, Alexey A. Vasiliev, Rafal Walczak

Honorary Members

Istvan Barsony, Maximilian Fleischer, Danick Briand, Jürgen Brugger, Jan Dziuban, Julian Gardner, Ryszard Jachowicz, Bernhard Jakoby, Corrado di Natale, Christophe Pijolat, Robert Puers, Pavel Ripka, Chavdar Roumenin, Lina Sarro, Giorgio Sberveglieri, Anita Lloyd Spetz, Christos Tsamis, Gerald Urban, Michiel Vellekoop

National Scientific Committee

Paolo Dario, Corrado Di Natale, Francesco Baldini, Girolamo Di Francia, Sabrina Conoci, Elisabetta Comini, Giovanni Neri, Vittorio Ferrari, Giovanna Marrazza, Dario Compagnone, Bruno Andò, Giovanni Betta, Leandro Lorenzelli, Anna Grazia Mignani, Marco Rossi

WebMaster

Andrea Caroppo, Antonio Carbone

PREVIOUS CONFERENCES

2022 – Leuven, BELGIUM

2019 – Berlin, GERMANY

2018 – Graz, AUSTRIA

2017 – Paris, FRANCE

2016 – Budapest, HUNGARY

2015 – Freiburg, GERMANY

2014 – Brescia, ITALY

2013 – Barcelona, SPAIN
(with Transducers)

2012 – Krakow, POLAND

2011 – Athens, GREECE

2010 – Linz, AUSTRIA

2009 – Lausanne, SWITZERLAND

2008 – Dresden, GERMANY

2007 – Lyon, FRANCE
(with Transducers)

2006 – Gothenburg, SWEDEN

2005 – Barcelona, SPAIN

2004 – Roma, ITALY

2003 – Guimaraes, PORTUGAL

2002 – Prague, CZECH REP

2001 – Munich, GERMANY
(with Transducers)

2000 – Copenhagen, DENMARK

1999 – The Hague, THE NETHERLANDS

1998 – Southampton, UNITED KINGDOM

1997 – Warsaw, POLAND

1996 – Leuven, BELGIUM

1995 – Stockholm, SWEDEN
(with Transducers)

1994 – Toulouse, FRANCE

1993 – Budapest, HUNGARY

1992 – San Sebastian, SPAIN

1991 – Rome, ITALY

1990 – Karlsruhe, GERMANY

1989 – Montreux, SWITZERLAND
(with Transducers)

1988 – Enschede, THE NETHERLANDS

1987 – Cambridge, UNITED KINGDOM

EUROSENSORS School 2023

EUROSENSORS School 2023 on "Environment and Health"
Satellite event of EUROSENSORS 2023 Conference
Sunday, September 10th, Lecce, Italy
at Grand Hotel Tiziano e dei Congressi

History

The basic idea of this initiative, promoted during the **EUROSENSORS XII Conference** in Southampton and successfully implemented at following EUROSENSORS Conferences has its roots in the necessity of keeping alive the deep cultural aspects of sensors, sensor systems, transducers, actuators and microsystems. The increasing interest in the field and the fast technological developments could cause us to forget important aspects of the sensor science domain and possibly to overlook important theoretical achievements. A sound balance between technology and sensor theory that includes of course, sensor science, interface electronics, etc, should always be sought in order to optimize a healthy growth of the knowledge in both sensor science and technology.

Eurosensors School organization and responsibility lies on the local organizing committee, while **Prof. Dr. Lina** (Pasqualina M.) **Sarro** (Delft University of Technology, The Netherlands) has an advisory role.

Until his death in 2020, **Prof. Dr. Arnaldo D'Amico** (Un. of Rome Tor Vergata, Italy) supported Prof. Dr. Sarro as advisor, strongly stimulating young people to participate in Eurosensors schools.

Eurosensors School 2023

Eurosensors School 2023 addresses the Exposome, a new paradigm to study the impact of Environment on Health, that encompasses the totality of human environmental (meaning all non-genetic) exposures from conception onwards, complementing the genome. The modern holistic vision integrates three exposome domains: a) **general external** (e.g. bro-

ader social, economic, psychological factors and climate); b) **specific external** (e.g. air/water/soil pollution, chemical exposures, occupation, diet, physical activity, tobacco, infections, drugs); c) **internal** (endogenous factors such as metabolism, gut microflora, inflammation, oxidative stress).

Exposome paradigm stimulate more comprehensive exposure assessment in epidemiology studies and offers a new and exciting challenge for Sensors field. Sensors are needed for the measurement of many exposures in the external environment (climate change and environmental monitoring) and a wide range of biological responses in the internal environment. **New sensors** include geographical mapping and remote sensing technologies, smartphone applications and personal exposure sensors, and high-throughput molecular 'omics' techniques, etc…

During **Eurosensors School 2023** a survey of studies on the complex link between environment and health as well as examples of new sensors and sensor networks for environment monitoring will be provided.

The lectures will be given at a graduate level and they are intended for (but obviously not limited to) PhD students and young researchers in the field, researchers who have recently entered the interdisciplinary field of Sensors and Environmental Epidemiology and for colleagues who want to update their knowledge in these topics.

Eurosensors School 2023 Chair

Dr. Simonetta Capone
(Institute for Microelectronics and Microsystems,
National Research Council (CNR-IMM), Lecce, Italy

EUROSENSORS SCHOOL 2023 PROGRAM

September 10th, Grand Hotel Tiziano e dei Congressi, Lecce, Italy

9:00 - **Registration**

9:30 - **Welcome Eurosensors School 2023 Chair**

Prof.dr. P.M. Sarro
Electronic Components, Technology and Materials Laboratory, Department of Microelectronics, at TU Delft, Delft, Netherlands
Eurosensors School Advisor

Dr. Simonetta Capone
Institute for Microelectronics and Microsystems,
National Research Council (CNR-IMM), Lecce, Italy
Eurosensors School 2023 chair

9:45 - **Environment and Health: from human exposure to health impact assessment**

Dr. Fabrizio Bianchi
Unit of Environmental Epidemiology, CNR Institute of Clinical Physiology (IFC-CNR), Pisa, Italy

10:45 - **Coffee break**

11:00 - **Applications of the exposome concept to study the relationships between individual behaviour, the environment and health**

Dr. Gianluca Severi
Inserm, Exposome and Heredity Team, CESP U1018, Gustave Roussy, Villejuif, France;Department of Statistics, Computer Science, Applications "G. Parenti", University of Florence, Italy

12:00 - **Title: Challenges and Solutions for Volatile Sensing Approaches for Environment and Health monitoring**

Prof. Dr. Krishna Persaud
Un. of Manchester, School of Chemical Engineering & Analytical Science,-Manchester(UK)

13:00 - **Lunch Break**

14:30 - **Machine Learning-enabled Carbon Nanomaterials-based Electronic Olfaction for Gases Identification**

Prof. Dr. Gianaurelio Cuniberti
Technische Universität Dresden (TU Dresden), GermanyChair of Materials Science and Nanotechnology

15:30 - **Sensors and Sensor Networks for Air Quality Monitoring**

Dr. Stefano Zampolli
Institute for Microelectronics and Microsystems, National Research Council (CNR-IMM), Bologna, Italy

16:30 - **End of Eurosensors School 2023**

Lectures will be held by top leading experts on the topic for each perspective.

VISIT LECCE

Located at the furthest edge of the boot between the stunning scenery of the Adriatic and Ionian Sea, Lecce is characterized by the typical Mediterranean climate, with warm summers that can reach an average temperature above 25 degrees.

Considered a beautiful city of art, Lecce will surprise you with its beauty, churches, both the archaeological sites and the natural parks. A charming city in southern Italy, capital of the province of Lecce, in the Apulia region. Founded in the Messapian era, Lecce is the easternmost province of Italy, between the Adriatic and Ionian seas.

Lecce has been the only Italian city included in the list of "Best in Travel 2010" by Lonely Planet as a "CITY TO VISIT IN 2010"; in 2015 and 2016 Puglia has been considered the "BEST DESTINATION IN THE WORLD" by National Geographic and in 2018 received the FOOD and TRAVEL ITALIA READER AWARDS as "REGION OF THE YEAR 2018".

Lecce proclaimed "DESTINATION OF THE YEAR 2018"; in 2019 the Puglia region has been awarded at the "Travel Show" in New York with the "2019 AWARD OF EXCELLENCE", in the "Best New Exhibitor" category.

Lecce's captivating beauty extends beyond its architectural wonders: de facto the vibrant cultural scene along with its rich gastronomy

contribute to the city's allure. Explore the local cuisine, enjoy traditional delicacies like pasticciotto or a "caffè leccese", and experience the lively festivals showing Lecce's lively spirit, while strolling through its picturesque alleys. Lecce promises an unforgettable journey into the heart of Southern Italy.

In the core of Salento

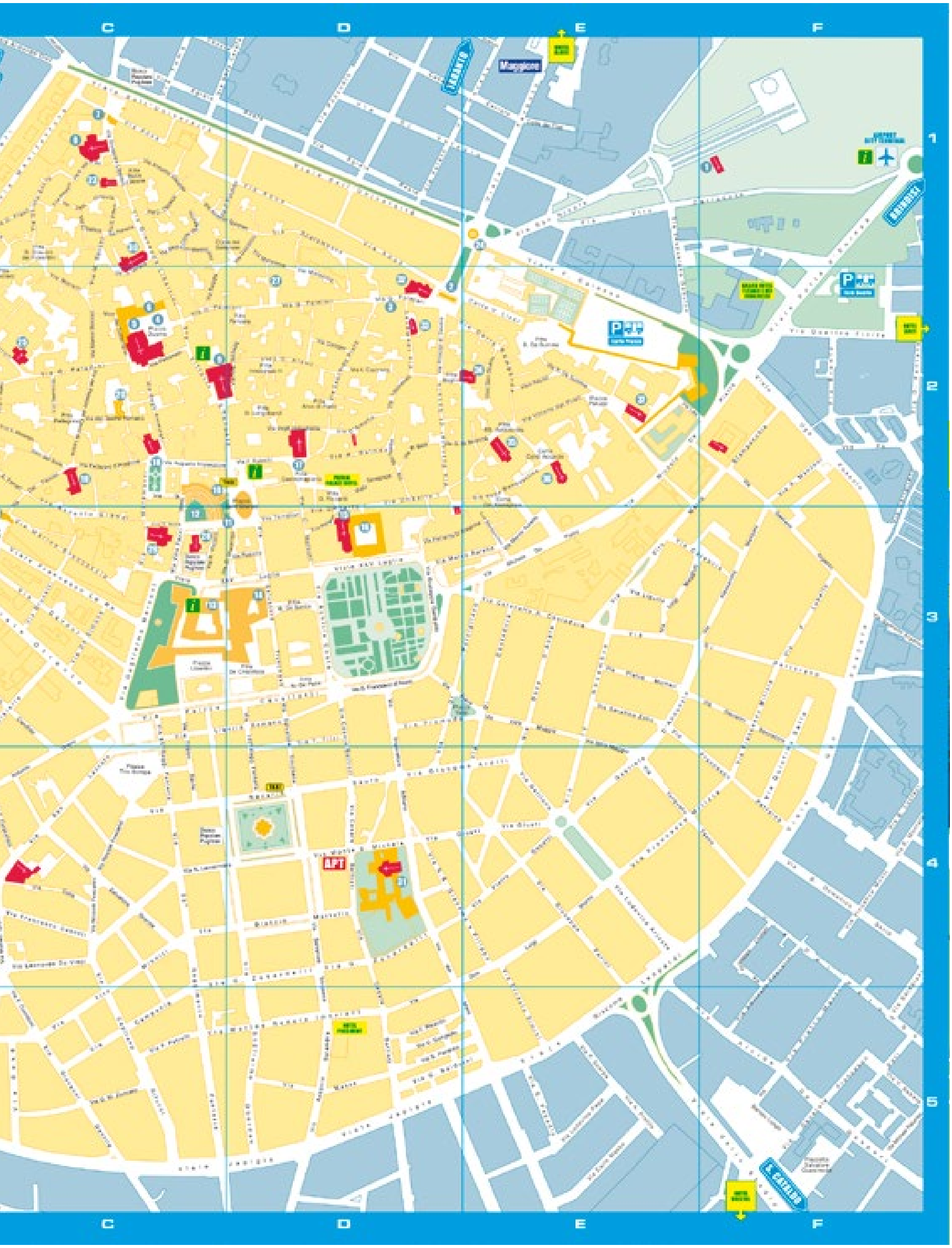
Lecce is the core of Salento, the sub peninsula often defined as the "heel" of the boot-shaped Italy. Within Salento, you can find some of Italy's most beautiful towns and cities: Gallipoli the "Città Bella" with its beautiful coast, the sea-front fortified gem of Otranto, the creamy baroque sophistication of Lecce and the luxurious seaside Liberty pleasures of Leuca.

Apulian inhabitants still take vibrant enthusiasm for their traditions and local celebrations. They keep alive traditions, such as the 'pizzica', a popular folk dance. Its great climate, the breathtaking beaches, beautiful historic towns, delicious food, wine and music, make Salento a magic holiday destination.

The historic centre is hemmed in walls dating back the XVI century, now largely destroyed. The city had originally four access gates: Arc de Triomphe (Porta Napoli), Porta Rudiae, Porta San Biagio and Porta San Martino. The last is no longer visible because it collapsed in the XIX century.

MAP of LECCE

source:
https://www.comune.lecce.it


C
D
E
F
1
2
3
4
5
APT

CONFERENCE VENUE

Conference Venue will take place on Sun. 10- Wed. 13 September at Grand Hotel Tiziano e dei Congressi, in Lecce.

With its strategic and central position, at Grand Hotel Tiziano e dei Congressi the excellence of services joins the uniqueness of the main town in Salento, of Baroque artworks and wonders.

WELCOME PARTY

Welcome Party will take place on Sun. 10 September at Convitto Palmieri e Chiesa di San Francesco della Scarpa, in Lecce.

CONCERT

Concert (Eurosensors Music Ensemble) will take place on Mon. 11 September at Teatro Apollo, in Lecce. For the first time in the history of Eurosensors, surprisingly, a "Musical Ensemble" has been specially formed, consisting of musicians coming from the academic and research world and also from the organising committee. Most of them come also from "Euterpe Salento Music Centre", where they study music, and Volunteering Social Associations. It will be a very exciting musical program and concert. Enjoy and Good fun! In collaboration with Euterpe Salento Music Center and Volunteering Social Associations of Scorrano Municipality

GALA DINNER & AWARDS

Gala Dinner will take place on Tue. 12 September at Augustus Resort in Santa Cesarea Terme. Augustus Resort is located on one of the most evocative stretches of cliff in Salento, the bay of Torre Miggiano in Santa Cesarea Terme, close to the sea, surrounded by a park with tall palm trees and an English lawn. An elegant reception room – with large windows overlooking the sea, the panoramic swimming pool and Piazza dei Cesari offer a breathtaking view of the Adriatic cliff and are the ideal stage for an unforgettable event with attention to every detail.

INSTRUCTIONS FOR ORAL PRESENTATIONS

1) Plenary speakers presentation: 45 minutes

2) Invited/Keynote speakers presentation: 25 minutes

3) Contributed talk presentations: 15 minutes (12 min talk + 3 min Q&A)

4) Preferred 16:9 aspect ratio MS Powerpoint presentation; presenting authors are invited to try the presentation in advance and load it in the laptop available at session room. YOU MUST BRING A MEMORY STICK WITH YOUR PRESENTATION FILE (Powerpoint + backup PDF version).

5) Please EMBED ALL FONTS in your Powerpoint file.

INSTRUCTIONS FOR POSTER PRESENTATIONS

1) Each poster is officially assigned to one session (POSTER SESSION DAY 1,2 or 3) and the presenter author attendance is required near the assigned board. For a better visibility and scientific networking, the poster room will be available during the whole conference.

2) Poster size: max 120cm high X 84cm wide.

3) Posters will be hanged using double sided tapes, available at the registration desk.

4) Authors are required to hanging up the poster before the start of the first poster session on September 11, 2023.

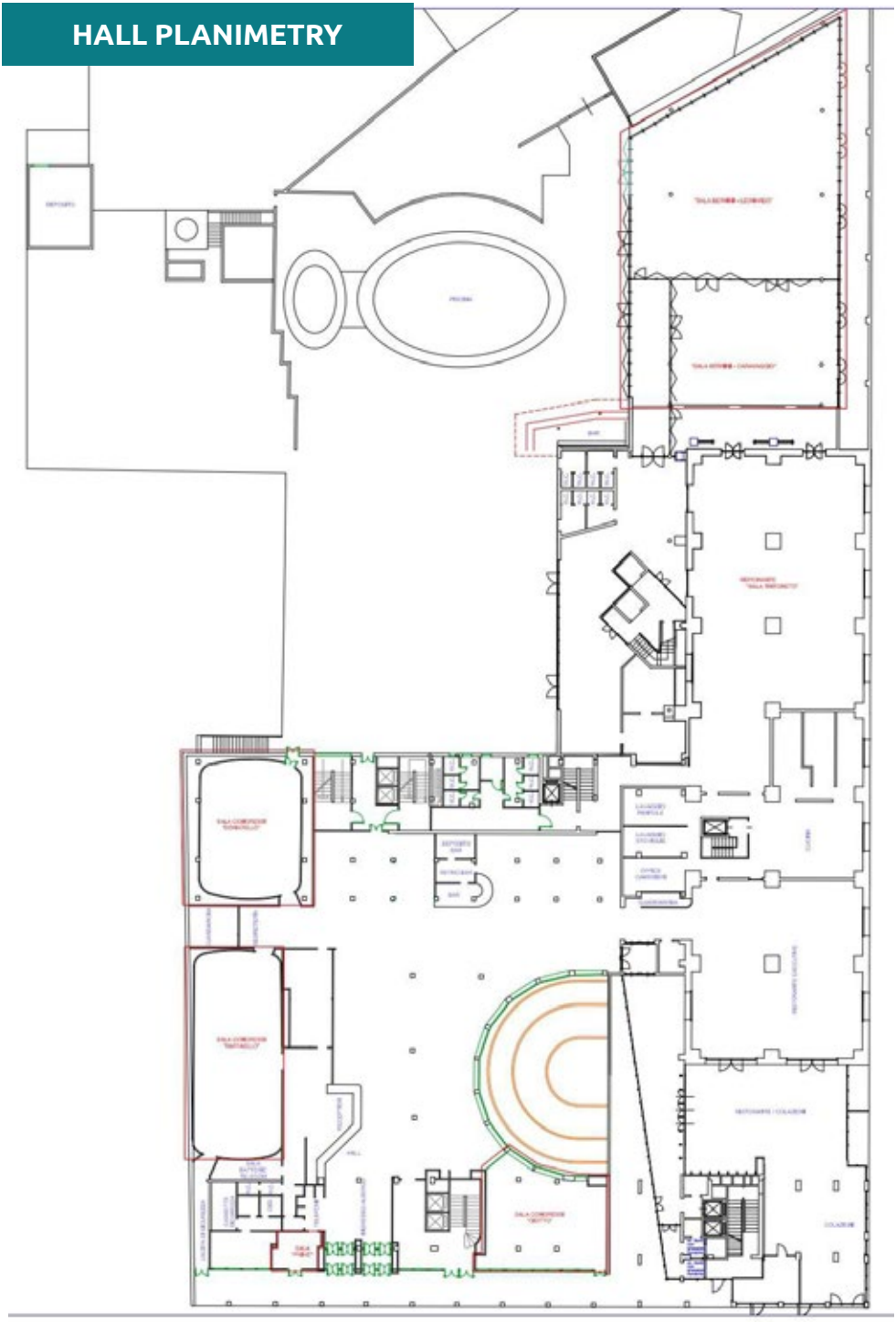
*****PLEASE NOTE*****

** For the accepted paper to be presented and, following presentation, be included in the MDPI proceedings at least one author must be registered.*

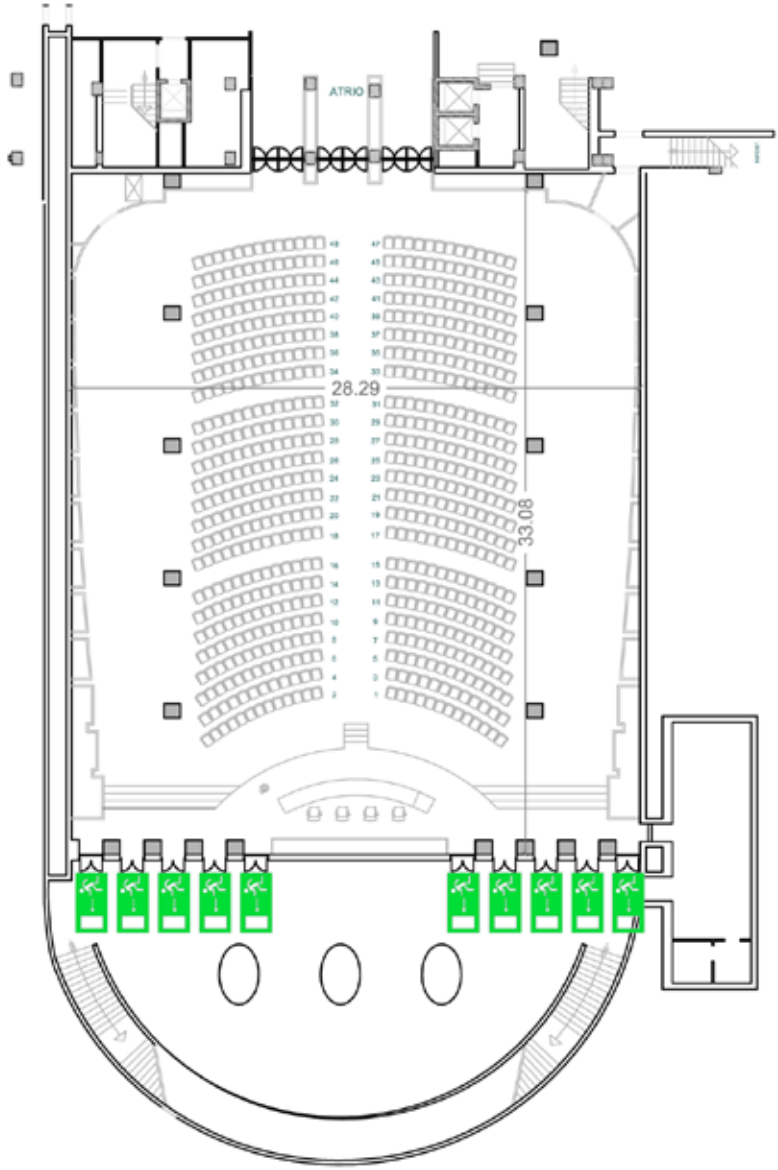
** Each paper must be covered by a registration fee.*

** Each registration fee can cover up to 2 papers for author with multiple submissions.*

HALL PLANIMETRY



TIZIANO ROOM PLANIMETRY
Floor: - 2



PLENARY SPEAKERS

Monday, September 11 / 9:30 - 10:15

PLENARY SESSION 1

Technological Challenges in Organ-On-Chips

PROF. LOES SEGERINK
(University of Twente, The Netherlands)

Organ on chip systems have the promise to generate more fundamental insight in diseases and can also serve as a platform for drug testing. Instead of using cell lines, more and more focus is on the use of induced pluripotent stem cells to retrieve more realistic data. Besides that, also the focus is on technological advancements of the microfluidic chips, by integrating electrodes, sensors, valves and new membranes. In this talk, we will show some of out latest results in this field.

Tuesday, September 12 / 9:00 - 9:45

PLENARY SESSION 2

Short History and Prospects of Sensors and Sensory Systems in Robotics

PROF. PAOLO DARIO
(Scuola Superiore Sant'Anna, Italy)

This talk illustrates how sensors and sensory systems are key enablers to make robots capable of performing the above functions and tasks. A short history of how robots have evolved in the last decades in parallel, and thanks to the progress of sensors science and techno-

logy will be presented, referring to three cases: the sense of touch, active vision and chemical sensing. Concrete examples will demonstrate that a great challenge, but also a great opportunity for the sensors research community is to work together with the robotics community to allow the development of complex, high performance robot systems for applications in manufacturing, surgery, rehabilitation, prosthetics, services, underwater, agriculture, waste management, and many more.microfluidic chips, by integrating electrodes, sensors, valves and new membranes. In this talk, we will show some of out latest results in this field.

Tuesday, September 12 / 14:30 - 15:15

PLENARY SESSION 3

The Digital Twin and Its Kin: Designing the Sensor Systems of the Future

PROF. GABRIELE SCHRAG
(Technische Universität München, Germany)
Eurosensors Fellow Award in 2019

Over a trillion sensors world-wide are predicted within the next decade due to the growing number of sensor applications and the continuously growing Internet of Things (IoT). Today's mature fabrication processes enable a very high integration of components leading to systems with enhanced functionality and complexity that cannot be designed by simply considering the sum of their single constituent parts. Thus, optimum performance can be achieved only by properly adjusting all cooperative subsystems to each other, i.e. carrying out a proper system design. The talk focuses on advanced virtual prototyping methodologies of microsystems, and shows their application to exemplary devices and systems. Additionally, important aspects tightly associated with sensor system design and optimization will be addressed, such as model validation and verification, novel transducer concepts, and reliability and robustness of micromechatronical systems.

PLENARY SESSION 4

Advances in Odorant Binding Protein Biosensors

PROF. KRISHNA C PERSAUD

(The University of Manchester, United Kingdom (Great Britain)

The principle of combinatorial selectivity has been the main paradigm for the development of electronic noses. This concept is taken from the biological system where generally individual olfactory receptors are not highly selective for a given odorant thus odorants and responses across large numbers of receptors are encoded in combinatorial patterns whose interpretation leads to the odorant identification.

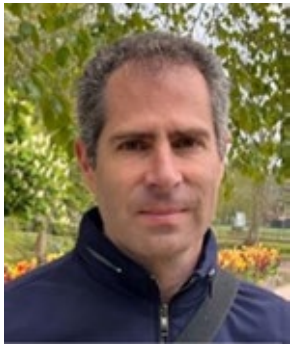
We demonstrate that the combinatorial concepts can be applied to these bioelectronic “noses”, and the odorant proteins can be modified by single point mutations of the binding pocket to give affinity to non-native ligands. Hence it is possible to produce systems that can be dedicated to detection of diverse chemicals such as explosives and drugs for security applications, volatile decomposition products for bio-composting applications or pheromone detection for agricultural applications.

INVITED / KEYNOTE SPEAKERS

Monday, September 11 / 10:15 – 10:40

CHEMICAL SENSORS I

Room: Raffaello



EMMANUEL SCORSONE

KEYNOTE SPEAKER

Senior scientist and head of diamond research activities at CEA-LIST

Highly Sensitive and Selective Detection of L-Tryptophan by ECL Using Boron-Doped Diamond Electrode

Synthetic diamond can be grown in the laboratory by Plasma-Enhanced Chemical Vapor Deposition (MP-CVD) as both single crystals, and polycrystalline thin films. These materials exhibit outstanding physical and chemical properties that are of high interest for chemical sensing applications. In particular, boron doped diamond electrodes offer high promises in many electroanalytical applications. This is due in particular to their corrosion resilience, low intrinsic double layer capacitance, and high potential window in aqueous media, offering opportunities to detect chemical species that would be otherwise difficult to detect because of their high oxidation or reduction potentials. The high overpotential in diamond allows also the efficient production of radicals such as OH• or O2•–, which may be used advantageously for instance in some coreactant-less electrochemiluminescence (ECL) reactions. We will focus on this latter aspect of diamond through practical examples including e.g. the highly sensitive and selective detection of 3-methylindole (“skatole”) in pork’s fat, responsible for boar taint, or of L-tryptophan, an amino-acid that is essential to the metabolism of humans but can also be harmful to the central nervous system.

CURRICULUM VITAE

Dr. Emmanuel Scorsone studied chemistry at the Glasgow Caledonian University in Scotland and graduated with a PhD in Instrumentation and Analytical Science from UMIST, Manchester, UK (2002). He gained expertise in gas sensors and artificial olfaction while working as an academic researcher at the University of Manchester (2002-2004) and then as R&D Scientist at Alphasense Ltd (2004-2006), UK. He integrated the French Commission for Atomic Energy and Alternative Energies (CEA) in 2006 where he leads applied research activities related to synthetic diamond based chemical sensors, analytical micro/nano-systems and implantable devices. In 2015 he received the Wolfgang Göpel memorial award for his work on a bio-electronic nose combining olfactory proteins and synthetic diamond transducers, and he was awarded the Fellowship of Eurosensors 2018. He is inventor/co-inventor of 16 patents and co-author of more than 60 peer-reviewed articles in the field of chemical sensors, implantable medical devices, and energy storage.

Monday, September 11 / 14:30 – 14:55

SPECIAL SESSION
Eclipse: ECL-based Infectious Pathogen (bio)Sensor

Room: Bernini

WOLFGANG KNOLL

INVITED SPEAKER

Scientific Managing Director, AIT Austrian Institute of Technology, Vienna, Austria

Merging Surface-Plasmon Optical With Electronic Sensing

In one of the „classical" configurations of electrolyte-gated field-effect transi-

stors (EGOFETs) for biosensing, the planar gate electrode is functionalized by (a monolayer of) receptors, to which the analyte molecules of interest bind from the analyte solution, thereby modifying the gate potential which in turn modifies the source-drain current as the sensor output signal. This format inspired us to attach a prism to this Au gate electrode, mounting this to a surface plasmon spectrometer in the Kretschmann configuration coupled to a flow cell, thus allowing for simultaneous optical and electronic sensing of the identical affinity reaction, happening in real time at the sensor Au surface. As a test sample we investigated the build-up of multilayer assemblies, deposited by the layer-by-layer protocol of polyelectrolytes from solution at the gate electrode/ Kretschmann SPR substrate. When monitoring the formation protocol of the multilayer architecture by surface-plasmon optics in real time one can see the monotonous build-up of the assembly with every alternate deposition of a monolayer of the polyanionic poly (diallyl-dimethylammonium chloride) (PDADMAC)) and the polycationic poly(styrene-sulfonate) (PSS)) . However, by contrast the electronic signal monitored simultaneously with the graphene channel actually demonstrates that a lot more is happening! And not only during the deposition, rather significant current changes are seen also during the rinsing steps. Up to now, this was never observed because it was never possible to record this. It can be expected that in other interfacial binding reactions, e.g., during DNA hybridization or for aptamer- ligand interactions more details than known so far will become evident.

CURRICULUM VITAE

Wolfgang Knoll earned a PhD degree in Biophysics from the University of Konstanz in 1976. From 1991-1999 he was the laboratory director for Exotic Nanomaterials in Wako, Japan, at the Institute of Physical and Chemical Research (RIKEN). From 1993 to 2008, he was furthermore Director of the Materials Science Department at the Max Planck Institute for Polymer Research in Mainz, Germany. From 2008 to 2023, he was the Scientific Managing Director of the AIT Austrian Institute of Technology. Since 2010 he is a Regular Member of the Austrian Academy of Sciences, received an Honorary Doctorate from the University of Twente, the Netherlands, in 2011, and became a member of the Academia Europaea in 2017.

BIOSENSORS & LAB-ON-CHIP III

Room: Donatello

CLÉMENTINE LIPP
KEYNOTE SPEAKER
Postdoctoral researcher at LMIS1 – EPFL

Controlled Contact Between Beads and Cells for the Characterization of Receptor-Ligand Bonds

It is currently a difficult and laborious task to place two micro-sized objects in contact for a controlled amount of time and to then probe their state of adhesion. Cell-based therapies would highly benefit from a system capable to do so for the identification of T-cells with potent receptors towards cancer-specific antigens.

We present a microfluidic chip capable of placing two cells in contact for a given duration and to assess their adhesion by leveraging the combination of two types of trapping methods in flow conditions. A novel type of hydrodynamic traps holding the cells from below against the fluid flow is used in combination with dielectrophoretic traps to ensure independent control over the two types of cells.

The system is first compared to the state-of-the-art methods and validated by an adhesion assay between fibronectin-coated beads and fibroblasts. Following this, the application of the device to the field of immunotherapy is demonstrated by placing T-cell clones in contact with antigen presenting cells showing that the binding of TCR-pMHC complexes increases the pair lifetime. We present a microfluidic chip capable of placing two cells in contact for a given duration and to assess their adhesion

by leveraging the combination of two types of trapping methods in flow conditions. A novel type of hydrodynamic traps holding the cells from below against the fluid flow is used in combination with dielectrophoretic traps to ensure independent control over the two types of cells.

The system is first compared to the state-of-the-art methods and validated by an adhesion assay between fibronectin-coated beads and fibroblasts. Following this, the application of the device to the field of immunotherapy is demonstrated by placing T-cell clones in contact with antigen presenting cells showing that the binding of TCR-pMHC complexes increases the pair lifetime.

CURRICULUM VITAE

Dr. Clémentine Lipp obtained a M.S. Degree in Microengineering from EPFL in Switzerland. The microfabrication know-how she gained during her master thesis at CERN on the fabrication of buried microchannels for cooling of particle detectors raised her interest for applying these microfabrication methods to the biomedical domain. To bring this to reality, she joined the laboratory of Professor Philippe Renaud (LMIS4) at EPFL for her PhD thesis (co-funded by ANR and SNSF) where she developed a microfluidic chip using novel fabrication processes for the controlled contact between beads and cells.

Tuesday, September 12 / 15:15 – 15:40

BIOSENSORS & LAB-ON-CHIP IV

Room: Raffaello

JUDITH SCHLANDERER
Hahn-Schickard Research Institute in Freiburg, Germany
KEYNOTE SPEAKER

Sample preparation and qPCR detection of tuberculosis on a centrifugal microfluidic cartridge enabling molecular downstream resistance profiling by tNGS.

Tuberculosis (TB) is still one of the world's deadliest infections. Fast detection of the pathogen M. tuberculosis complex (MTBC) and its genetic resistance markers substantially improves treatment success and outcome. The key to rapid genetic diagnostics is efficient extraction of DNA from sputum for qPCR detection at the point-of-care, with subsequent resistance profiling by targeted next generation sequencing (tNGS).

We present the fully automated sample preparation of MTBC DNA from 3 ml liquefied sputum and qPCR detection of MTBC on a centrifugal microfluidic cartridge with simultaneous provision of the purified MTBC DNA for subsequent analyses. Coupled tNGS successfully provided resistance profiles, demonstrated for 17 patient samples.

This proof-of-principle study is the first to demonstrate the technical implementation of a two-stage TB diagnostic workflow for fast and comprehensive diagnosis of TB.

CURRICULUM VITAE

Judith Schlanderer earned her Master of Science in Mechanical Engineering from KIT in Karlsruhe, Germany.

There she focused on classical fluid mechanics and microsystem engineering, which encouraged her to combine these two subjects in the field of biomedical microfluidics. Thus, she started a PhD at the Hahn-Schickard Research Institute in Freiburg, Germany. There she developed a point-of-care qPCR test for tuberculosis.

Her work included the design and system integration of a centrifugal microfluidic automation solution, the development of new microfluidic operations, and establishing and optimizing manufacturing processes for microfluidic test chips.

SPECIAL SESSION: MICROSYSTEMS TECHNOLOGIES IN ITALY

GIORGIO ALLEGATO
INVITED SPEAKER

MEMS Technology Development Director
at STMicroelectronics

The ST MEMS Journey: Exploring innovative technologies for a smarter future

STMicroelectronics is a global semiconductor company offering one of the largest range of MEMS products within the full spectrum of applications. This covers low-power devices for IoT to high-end devices for accurate navigation, industry 4.0, augmented virtual reality components and smartphones.

ST has a long and proven expertise in MEMS technology with micromachining processes coupled with continuous design innovation. As the first major manufacturer It has built partnerships with customers, research institutes and universities both locally in Italy and worldwide.

This presentation will guide you through the ST 20-years long journey in MEMS technology, with inertial and environmental sensors, acoustic and optical actuators. It will show you how ST is building upon continuous technology and material innovation to deliver the next leading-edge MEMS products for a smarter and sustainable future.

CURRICULUM VITAE

After earning an M.S. Degree in Physics at the University of Bari and a post-graduate degree in Materials Science from the University of Pavia, Giorgio joined ST in 2004 as a MEMS technology development engineer.

He led new technology development and industrialization activities for several MEMS products, including accelerometers, gyroscopes, magnetic, pressure sensors and inkjet, optical and acoustic actuators.

Always enthusiastic about helping developers effectively find the best solution for their applications, today Giorgio is R&D Director for MEMS technologies where he defines ST's roadmap for the development of advanced and innovative semiconductor technologies. He has also published papers and patents in the field of micromachining technology, characterization, and design.

SPECIAL SESSIONS

September 11 / 14:30 – 16:15 - Room: BERNINI
Special Session – Eclipse Project: ECL-based Infectious Pathogen (bio)SEnsor
Chairs: S. Conoci / L. Prodi / L. De Cola

Abstract:
The ECLIPSE project (https://eclipse-project.eu, funded by EU Pathfinder) developed a new platform exploiting innovative ultrasensitive protocols for the detection of pathogens. The project builds on the combination of interdisciplinary elements to facilitate the transfer to industry, including (i) ElectroChemiLuminescence (ECL) as a very sensitive and simple transduction mechanism, (ii) bio-, nano-, and supramolecular-based signal amplification structures for high sensitivity, and (iii) recognition strategies affording high affinity and selectivity based on the Phage-Sandwich and the Surface Cooperative Hybridization technologies.

September 12 / 11:45 – 13:00 - Room: BERNINI
Special Session – Microphysiological platforms: in-situ and real-time monitoring advances
Chairs: E.Martinelli / E. Sciurti

Abstract:
The scope of this special session is to highlight the latest results on the in-situ and real time monitoring advances for the Microphysiological Systems (MPS) and complex Organ-On-Chip, devices considered a mature translational tool for precision medicine research and drug development. A special focus will be encouraged on chemical and physical parameters monitoring with embedded and contactless sensing principles.

September 13 / 11:45 – 13:00 - Room: BERNINI
Special Session – Sustainable Sensors
Chairs: M. De Vittorio / V. Ferrari

Abstract:
The session pivots on the term sustainable that can broadly target quite diverse yet important and timely aspects in sensors, including energy harvesting for self sufficiency, ultra-low power consumption electronic techniques and systems, disposable/minimal-impact devices based on paper, fabrics or biodegradable materials, sensors that enable advanced functionalities to provide environmental monitoring/protection/preservation or energy/resource savings in industry, agriculture, domotics and smart city scenarios, and more.

September 13 / 14:30 – 16:10 - Room: BERNINI
Special Session – Microsystems technologies in Italy
Chair: L. Lorenzelli

Abstract:
The scope of this special session is to illustrate the research, the technological orientations in Italy and the future challenges offered by the connection between design, modelling, and innovative micro/nanotechnologies for MEMS. The involvement of key research and industrial representatives will offer a podium for sharing the progress in the MEMS sector in distinct sectors such as biomedical, automotive, space and telecommunications. In Italy, these technologies and trends are an important part of the strategy of many national research and industrial actors.

PROGRAM AT A GLANCE

EUROSENSORS XXXV CONFERENCE LECCE 2023

10-13 SEPTEMBER

	September 10, 2023
	Eurosensors School Hotel Tiziano
9:00-9:30	Eurosensors School Registration
09:30-9:45	Eurosensors School Welcome
09:45-10:45T	utorials
10:45-11:00	Coffee break
11:00-13:00	Tutorials
13:00-14:30	Conference Lunch
14:30-16:30	Tutorials
16:30	End of Eurosensors School 2023
19:00-21:00	Registration to Eurosensors Conference 2023 & Welcome party (Convitto Palmieri)

	Monday September 11, 2023					Tuesday September 12, 2023					Wednesday September 13, 2023				
8:00-09:00	Registration					Registration					Registration				
9:00-9:30	Conference Welcome & Opening					Invited Plenary 2					Invited Plenary 4				
9:30-9:45	Invited Plenary 1														
9:45-10:15						PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION		PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	
10:15-11:30	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION											
11.30-11.45	Coffee Break					Coffee Break					Coffee Break				
11:45-13:00	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION		SPECIAL SESSION 2	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION		SPECIAL SESSION 3	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	
13:00-14:30	Conference Lunch					Conference Lunch					Conference Lunch				
14:30-16:15	SPECIAL SESSION 1	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION		Invited Plenary 3					SPECIAL SESSION 4	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	Posters session DAY 3
						PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION						
16:15-16:30	Coffee Break					Coffee Break					Coffee Break				
16:30-18:00	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	Posters session DAY 1	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	Posters session DAY 2	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	PARALLEL SESSION	
											Eurosensors Award and Conclusions				
19:00						Transfer from Lecce to S. Cesarea Terme for the Gala Dinner									
19:30-23:00	Concert Apollo Theatre					Gala Dinner Augustus Resort									

Eurosensors 2023 Conference Program

MONDAY, SEPTEMBER 11

Time	BERNINI	POSTERS ROOM	RAFFAELLO	GIOTTO	DONATELLO	TIZIANO PLENARY
09:00 - 9:30	Conference Welcome & Opening					
09:30 - 10:15						PLENARY SESSION 1 Prof. Loes Segerink
10:15 - 11:25	ADVANCED MATERIALS FOR SENSORS I		CHEMICAL SENSORS I	BIOMEDICAL SENSORS AND DIAGNOSTICS I	MEMS AND NEMS I	
11:25 - 11:30						
11:30 - 11:45	Coffee Break					
11:45 - 13:00	ADVANCED MATERIALS FOR SENSORS II		GAS SENSORS I	BIOSENSORS & LABON-CHIP I	EMBEDDED SYSTEMS I	
13:00 - 14:30	Conference Lunch					
14:30 - 16:15	SPECIAL SESSION Eclipse: ECL-based Infectious Pathogen (bio)SEnsor		GAS SENSORS II	BIOMEDICAL SENSORS & DIAGNOSTICS II	BIOSENSORS & LAB-ON-CHIP II	
16:15 - 16:30	Coffee Break					
16:30 - 17:30	ADVANCED MATERIALS FOR SENSORS III	POSTER SESSION DAY 1	GAS SENSORS III	MEMS & NEMS II	MICRO- AND NANOFABRICATION TECHNOLOGIES I	
17:30 - 17:45						

Eurosensors 2023 Conference Program

TUESDAY, SEPTEMBER 12

Time	BERNINI	POSTERS ROOM	RAFFAELLO	GIOTTO	DONATELLO	TIZIANO PLENARY
09:00 - 9:45						PLENARY SESSION 2 Prof. Paolo Dario
09:45 - 11:30	ADVANCED MATERIALS FOR SENSORS IV		CHEMICAL SENSORS II	BIOMEDICAL SENSORS AND DIAGNOSTICS III	BIOSENSORS & LAB-ON-CHIP III	
11:30 - 11:45	**Coffee Break**					
11:45 - 13:00	SPECIAL SESSION Microphysiological platforms: in-situ and real-time monitoring advances		GAS SENSORS IV	MEMS & NEMS III	MICRO- AND NANOFABRICATION TECHNOLOGIES II	
13:00 - 14:30	**Conference Lunch**					
14:30 - 15:15						PLENARY SESSION 2 Prof. Gabriele Schrag (Eurosensors Fellow 2019)
15:15 - 16:15	GAS SENSORS V		BIOSENSORS & LAB-ON-CHIP IV	ADVANCED MATERIALS FOR ACTUATORS	BIOMEDICAL SENSORS & DIAGNOSTICS IV	
16:15 - 16:30	**Coffee Break**					
16:30 - 17:30						
17:30 - 17:45	ADVANCED MATERIALS FOR SENSORS V	POSTER SESSION DAY 2	GAS SENSORS VI	BIOMEDICAL SENSORS AND DIAGNOSTICS V	PHOTONIC SENSORS	
17:30 - 18:00						

Eurosensors 2023 Conference Program

WEDNESDAY, SEPTEMBER 13

Time	BERNINI	POSTERS ROOM	RAFFAELLO	GIOTTO	DONATELLO	TIZIANO PLENARY
09:00 - 9:45						PLENARY SESSION 4 Prof. Krishna Persaud
09:45 - 11:15	ADVANCED MATERIALS FOR SENSORS VI			PHISICAL SENSORS AND ACTUATORS I	THEORY & MODELLING I	
11:30 - 11:45		**Coffee Break**				
11:45 - 13:00	SPECIAL SESSION Sustainable Sensors		SYSTEMS INTEGRATION & PACKAGING	PHISICAL SENSORS AND ACTUATORS II	THEORY & MODELLING II	
13:00 - 14:30		**Conference Lunch**				
14:30 - 16:10	SPECIAL SESSION Microsystems technologies in Italy	POSTER SESSION DAY 3	MICRO- AND NANOFABRICATION TECHNOLOGIES III, MICRO- AND NANOFABRICATION TECHNOLOGIES IV	PHYSICAL SENSORS AND ACTUATORS III	MEMS & NEMS IV	
16:10 - 16:15						
16:15 - 16:30		**Coffee Break**				
16:30 - 17:30	WSN AND AUTOMOTIVE SENSORS		EMBEDDED SYSTEM II	ENERGY HARVESTING	OPTICAL MICROSYSTEMS	
17:30 - 17:45						
17:45 - 18:00	**AWARDS CEREMONY & CLOSING REMARKS**					

MONDAY, SEPTEMBER 11 2023

CONFERENCE WELCOME & OPENING

9:00 - 9:30

PLENARY SESSION 1 - Prof. Loes Segerink

9:30 - 10:15 / Room: Tiziano Plenary

9:30

Technological Challenges in Organ-On-Chips
Loes Segerink (University of Twente, The Netherlands)

ADVANCED MATERIALS FOR SENSORS I

10:15 - 11:30 / Room: BERNINI

Chair: Donatella Puglisi (Linköping University, Sweden)

10:15

2D-Layered Amorphous Metal Oxide Gas Sensors (LAMOS) Perspectives and Gas Sensing Properties
Valentina Paolucci, Jessica De Santis and Vittorio Ricci (University of L'Aquila, Italy); Giacomo Giorgi (University of Perugia, Italy); Carlo Cantalini (University of L'Aquila - Italy, Italy)

10:30

Preparation of Antibody Conjugated Gold Nanotriangles for Immunochromatographic Test
Asahi Kimura, Mao Hamamoto and Hiromasa Yagyu (Kanto Gakuin University, Japan)

10:45

SiO2/Platinum Monolith Aerogels Realized in Closed Microfluidic Channels

Ana Luiza S Fiates, Oliver Thüringer, Thorsten M Gesing and Michael J. Vellekoop (University of Bremen, Germany)

11:00

UV-Light Designed Stereoselective Limonene Sensor Using Electrospun PVP-Composite Nanofibers

Antonella Macagnano (CNR-IIA, Italy); Fabricio N Molinari (Istituto Sull'Inquinamento Atmosferico CNR, Italy); Tiziana Mancini (Università La Sapienza di Roma, Italy); Stefano Lupi (Università Degli Studi "La Sapienza" di Roma, Italy); Fabrizio De Cesare (Università Della Tuscia, Italy)

11:15

Operando DRIFT-Spectroscopy on a Three-Metallic Solid Solution Based Chemoresistive Gas Sensor

Elena Spagnoli and Barbara Fabbri (University of Ferrara, Italy); Matteo Valt (Fondazione Bruno Kessler, Italy); Arianna Rossi (University of Ferrara, Italy); Andrea Gaiardo (Fondazione Bruno Kessler, Italy); Vincenzo Guidi (University of Ferrara, Italy)

CHEMICAL SENSORS I

10:15 – 11:25 / Room: RAFFAELLO

10:15

Highly Sensitive and Selective Detection of L-Tryptophan by ECL Using Boron-Doped Diamond Electrode

Emmanuel Scorsone **Keynote Speaker** (Université Paris Saclay CEA LIST, France); Samuel Stewart (Université Paris-Saclay CEA List, France); Matthieu Hamel (Université Paris Saclay CEA LIST, France)

10:40

Development of a Fluorescent Sensor Based on Resazurin and Hydrotalcite for the Determination of Ethanol in Alcoholic Beverages

Jong Il Rhee (Chonnam National University, Korea (South))

10:55

Increasing Safe Water Availability via a Multisensor System for Water Monitoring and Filtration

Anna Sabatini (Campus Bio-Medico University of Rome, Italy); Alessandro Zompanti (University Campus Bio-Medico di Roma & Unit of Electronics for Sensor Systems, Italy); Simone Grasso (Campus Bio-Medico University of Rome, Italy); Marco Santonico (Università Campus Bio-Medico di Roma, Italy); Giorgio Pennazza (Campus Biomedico, Italy)

11:10

Photoluminescence ZnO-Imine Composite Nanofibers for Detection of Metal Ions

Roman Viter (19, Raina blvd & Roman Viter, University of Latvia, Institute of Atomic Physics and Spectroscopy, Latvia)

BIOMEDICAL SENSORS & DIAGNOSTICS I

10:15 - 11:30 / Room: GIOTTO

10:15

A Low Power Wearable Sensing System for REM Sleep Analysis in Domestic Environment

Fernanda Irrera (University of Roma La Sapienza, Italy); Alessandro Zampogna (Sapienza University of Rome, Italy); Alessandro Gumiero and Luigi Della Torre (STMicroelectronics, Italy); Antonio Suppa (Sapienza University of Rome, Italy)

10:30

Electrochemical Sensors for Animal Welfare

Yohann Thomas (French Atomic Energy and Alternative Energy Commission, France); Ilaria Sorrentino (CEA-LETI, France); Claire Verplanck (CEA, France)

10:45

Adoption of a Social Robot in a Sub Intensive Care Unit for the Autonomous Computation of Criticality Scores

Giovanni Piccininno (H AT H Srl, Italy); Nicola Laurieri (ITEM-OXYGEN, Italy); Alessandro Anselmo (H AT H Srl, Italy); Sergio Russo (Fondazione Casa Sollievo Della Sofferenza IRCCS, Italy); Alessandra Sorrentino (University of Florence, Italy); Daniele Sancarlo and Grazia D'Onofrio (Fondazione Casa Sollievo Della Sofferenza IRCCS, Italy); Letizia Lorusso (Fondazione Casa Sollievo Della Sofferenza IRCCS, Italy & University of Bari Aldo Moro, Italy); Laura Fiorini and Filippo Cavallo (University of Florence, Italy); Antonio Greco (Fondazione Casa Sollievo Della Sofferenza, Italy); Francesco Giuliani (IRCCS Casa Sollievo della Sofferenza, Italy)

11:00

In Vitro L-Glutamate Detection in Different Brain Regions by GluOxR-GO/Pt Biosensor

Julija Razumiene (Vilnius University, Lithuania); Damiana Leo (University of Mons, Belgium); Vidute Gureviciene and Ieva Sakinyte-Urbikiene (Vilnius University, Lithuania)

11:15

Electrochemical Detection of MMP-2 Using Graphene-Based Aptasensor

Stefan Jarić (University of Novi Sad, Serbia); Silvia Schobesberger and Peter Ertl (Vienna University of Technology, Austria); Nikola Knežević and Ivan Bobrinetskiy (University of Novi Sad, Serbia)

MEMS & NEMS I

10:15 - 11:30 / Room: DONATELLO

10:15

MEMS Valves With Molecular Flow Regime Orifices

Alvise Bagolini (Italy); Antonino Picciotto (Fondazione Bruno Kessler, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy); Raffaele Correale (Nanotech Analysis, Italy)

10:30

Piezoelectric Layer Transfer Process for MEMS

Gwenael Le Rhun (CEA-Leti, France)

10:45

Tilted Triangular Springs With Constant Force Reaction

Gwenael Le Rhun (CEA-Leti, France)

11:00

Low Voltage Tri-Electrode Electrostatic Actuator Using Solid Gap-Spacing Materials

Mehdi Allameh (University of Manitoba, Canada); Byoungyoul Park (National Research Council of Canada, Canada); Cyrus Shafai (University of Manitoba, Canada)

COFFEE BREAK

11:30 - 11:45

ADVANCED MATERIALS FOR SENSORS II

11:45 - 13:00 / Room: BERNINI
Chair: Antonella Macagnano (CNR-IIA, Italy)

11:45

Cu Ferrospinel Thin Films for Sub-Ppm NO2 Sensing

Sabah Zahaf (University of Toulouse & LAAS-CNRS & CIRIMAT, France); Lionel Presmanes (CIRIMAT, France); Philippe Menini (LAAS-CNRS, France); Antoine Barnabe (CIRIMAT, France); Thierry Camps (LAAS-CNRS, France)

12:00

Electrochemical Performance of WS2-CNT Core-Shell Heterostructures for Detection of Vitamin B2

Rayhane Zribi (University of Messina, Italy); Muhammad Hamid Raza and Nicola Pinna (Humboldt-Universität, Germany); Giovanni Neri (University of Messina, Italy)

12:15

Label-Free Electroanalytical Detection of Dopamine by a Novel Au Nanoparticles Decorated Reduced Graphene Oxide Platform

Chiara Ingrosso (CNR-IPCF Bari, Italy)

12:30

Co3O4-Based Materials as Catalysts for Catalytic Gas Sensors

Olena Yurchenko (Fraunhofer Institute for Physical Measurement Techniques, Germany); Patrick Diehle (Fraunhofer Institute for Microstructure of Materials and Systems, Germany); Katrin Schmitt and Jürgen Wöllenstein (Fraunhofer IPM, Germany)

12:45

Electrochemical Diffusion Study in Hydrogels

Eva Melnik (AIT Austrian Institute of Technology GmbH, Austria); Steffen Kurzhals (AIT Austrian Institute of Technology, Austria); Valerio Beni (RISE Research Institutes of Sweden, France); Giorgio Mutinati, Rainer Hainberger and Vanessa Thoeny (AIT Austrian Institute of Technology GmbH, Austria)

GAS SENSORS I

11:45 - 13:00 / Room: RAFFAELLO

Chairs: Simonetta Capone
(Istituto per la Microelettronica ed i Microsistemi - Consiglio Nazionale delle Ricerche (IMM-CNR), Italy),
Jean-Paul Viricelle (ECOLE DES MINES, France)

11:45

Protection of NOx Sensors From Sulfur Poisoning in Glass Furnaces by the Optimization of "SO2 Trap"

Carole Naddour (Mines Saint-Etienne & Univérsité Claude Bernard Lyon 1, France); Mathilde Rieu (Mines Saint-Etienne, France); Antoinette Boreave, Sonia Gil and Philippe Vernoux (Université Claude Bernard Lyon 1, France); Jean-Paul Viricelle (ECOLE DES MINES, France)

12:00

Gas Sensor Performance of Porous ZnO Flowers Synthesized by Microwave-Assisted Hydrothermal Method

Amanda Akemy Komorizono (University of São Paulo & Institute of Physics of São Carlos, Brazil); Valmor Roberto Mastelaro (University of São Paulo, Brazil)

12:15

Enhancing Ammonia Sensors Sensitivity by CuBr Encapsulation in a Mesoporous Host

Lisa Weber, Virginie Martini, David Grosso, Stephane Burtey and Marc Bendahan (Aix-Marseille University, France)

12:30

Low-Cost Sensors Based on Nanoparticles of Tin Dioxide Decorated With Graphene to Detect Ultra-Low NO2 Concentrations at Room Temperature

José Pedro Santos (CSIC, Spain); Isabel Sayago and Carlos Sanchez-Vicente (Institute of Physics Technology and Information ITEFI-CSIC, Spain)

12:45

Non-Stationary Gas Sensors Based on WSe2 or MoS2 Calibrated Upon NH3 Exposure

Filiberto Ricciardella (VS Particle, Germany & Bundeswehr University Munich, Germany); Kangho Lee (Bundeswehr University Munich, Germany); Niall McEvoy and Mark McCrystall (Trinity College Dublin, Ireland); Georg Duesberg (Bundeswehr University Munich, Germany)

BIOSENSORS & LAB-ON-CHIP I

11:45 - 13:00 / Room: GIOTTO

Chair: Péter Fürjes (Centre for Energy Research - ELKH, Hungary)

11:45

Microfluidic Flowmeter Using a Single Hot-Wire

Rafael Ecker and Bernhard Jakoby (Johannes Kepler University Linz, Austria)

12:00

Surface-Enhanced Raman Spectroscopy on Ag-WO3/TiO2 Inverse Opal Film Substrates

Maria-Athina Apostolaki (National and Kapodistrian University of Athens, Greece); Elias Sakellis and Polychronis Tsipas (National Centre for Scientific Research Demokritos, Greece); Spiros Gardelis and Vlassis Likodimos (National and Kapodistrian University of Athens, Greece)

12:15

3D Bioprinted Hydrogel Sensor Towards Rapid Salivary Diagnostics Based on pH Colorimetric Detection

Magdalena Beata Łabowska (Wrocław University of Science and Technology, Poland); Agnieszka Podwin and Wojciech Kubicki (Wroclaw University of Science and Technology, Poland)

12:30

Polymer-Mediated Increase of Sensitivity and Stability of CNT-FET pH Sensor

Letícia Alves da Silva, Martin Hartmann and Sascha Hermann (Chemnitz University of Technology, Germany)

EMBEDDED SYSTEMS I

11:45 - 13:00 / Room: DONATELLO

Chair: Gabriele Schrag (Technische Universität München, Germany)

11:45

TinyML With Meta-Learning on Microcontrollers for Air Pollution Prediction

I Nyoman Kusuma Wardana (University of Warwick, United Kingdom (Great Britain) & Politeknik Negeri Bali, Indonesia); Suhaib A. Fahmy (King Abdullah University of Science and Technology, Saudi Arabia); Julian Gardner (University of Warwick, United Kingdom (Great Britain))

12:00

Enhancing Ozone Monitoring With Low-Cost Sensors and Deep Neural Network: A Novel Approach

Marco Magoni (University of Ferrara & FBK Foundation, Italy); Andrea Gaiardo and Matteo Valt (Fondazione Bruno Kessler, Italy); Barbara Fabbri and Vincenzo Guidi (University of Ferrara, Italy); Pietro Tosato (Fondazione Bruno Kessler, Italy)

12:15

Indoor Fire Prevention Based on Miniaturized Sensor Drones and Stationary Sensor Nodes

Roland Pohle and Oliver Freudenberg (Siemens AG, Germany)

12:30

Optimization of a Drone-Based System for Instrumental Odour Monitoring Using Feature Selection

Santiago Marco (Institute for Bioengineering of Catalonia & University of Barcelona, Spain); Alessandro Benegiamo (Insitute for Bioengineering of Catalonia, Spain); Javier Burgues (Institute for Bioengineering of Catalonia / University of Barcelona, Spain); Javier Alonso-Valdesueiro (Universitat de Barcelona, Spain); Beatrice Julia Lotesoriere (Politecnico di Milano, Italy); Lara Terren, Lidia Sauco, María Deseada Esclapez and Silvia Doñate (Depuración de Aguas del Mediterráneo, Spain); Agustín Gutiérrez-Gálvez (Universitat de Barcelona, Spain)

12:45

From Gas Sensors to Artificial Neural Network: A New Precision Farming Approach for Crop Coefficient Determination

Francesco Tralli and Barbara Fabbri (University of Ferrara, Italy); Matteo Valt (Fondazione Bruno Kessler, Italy); Alessandro Drago and Vincenzo Guidi (University of Ferrara, Italy)

CONFERENCE LUNCH

13:00 - 14:30

SPECIAL SESSION
Eclipse: ECL-based Infectious Pathogen (bio)SEnsor

14:30 - 16:15 / Room: BERNINI

Chairs: Sabrina Conoci (University of Messina, Italy)
Luca Prodi (University of Bologna, Italy)
Luisa De Cola (University of Milano, Italy)

14:30

Merging Surface-Plasmon Optical With Electronic Sensing

Wolfgang Knoll **Invited speaker** (AIT Austrian Institute of Technology, Austria)

14:55

The Detection of Infection Pathogens: The Approach of Eclipse Project

Luca Prodi (University of Bologna, Italy)

15:08

A Compact Microfluidic Platform for Swab-To-Answer Genomic Analysis

Marco Bianchessi (STMicroelectronics, Italy)

15:21

Isoelectric and Grafting Density Profiling of Si- and Au-Immobilized Nucleic Acids

Emanuele Luigi Sciuto and Paolo Calorenni (University of Messina, Italy)

15:34

Electrochemiluminescence-Based Biosensors: From Academic Curiosity to an Industrial Success

Giovanni Valenti (University of Bologna, Italy)

15:47

Recombinant Bacteriophages as Innovative Probes for Biosensors for Infectious Agents

Marco Sebastiano Nicolò (University of Messina, Italy)

16:00

Electrochemiluminescence Biosensors for the Detection of Viruses

Maria Vittoria Balli (University of Bologna, Italy)

GAS SENSORS II

14:30 - 16:15 / Room: RAFFAELLO

Chair: Ralf Moos (University of Bayreuth, Germany)

14:30

A Novel Indium Oxide-Based Nanostructured Material Designed for CO2 Detection

Arianna Rossi, Barbara Fabbri and Elena Spagnoli (University of Ferrara, Italy); Andrea Gaiardo and Matteo Valt (Fondazione Bruno Kessler, Italy); Vincenzo Guidi (University of Ferrara, Italy)

14:45

Sensor Protection Caps: Development Aspects and Verification

Gunter Hagen, Julia Herrmann, Thomas Kern, Thomas Wöhrl and Ralf Moos (University of Bayreuth, Germany)

15:00

Rapid Determination of Hexane Residues in Refined Vegetable Oils Using Semiconducting Metal Oxides-Based Sensors

Asia Kalinichenko and Benjamin Junker (Eberhard Karls University of Tuebingen, Germany); Udo Weimar and Nicolae Bârsan (Institut für Physikalische Chemie, Germany)

15:15

ZnO/WS2 Hybrid Material, for NO2 Detection, via the Combination of AACVD and APCVD Techniques

Fatima Ezahra Annanouch and Shuja Bashir Malik (Universitat Rovira i Virgili, Spain); Eduard Llobet (Rovira i Virgily University Tarragona, Spain)

15:30

Low-Temperature and Selective Formaldehyde Sensing With Metal Cluster-Loaded Co3O4 Catalysts

Matteo D'Andria and Andreas Thomas Guentner (ETH Zurich, Switzerland

15:45

Sensing Material Temperature Effect on the Multiple Gas Sensor Sensing Response

Anze Sitar (FBK, Italy); Elia Scattolo and Matteo Valt (Fondazione Bruno Kessler, Italy); Alvise Bagolini (Italy); Pietro Tosato and Andrea Gaiardo (Fondazione Bruno Kessler, Italy)

16:00

Smart Odour Sensing for Automated Monitoring of Bread Products

Carmen Bax, Bianca Di Diodoro and Alessandro Ticozzi (Politecnico di Milano, Italy); Nicolò Dellarosa and Flavio Corazza (Electrolux Italia SPA, Italy); Giacomo Langfelder and Laura Capelli (Politecnico di Milano, Italy)

Company Profile

The **Distretto Tecnologico Sicilia Micro e Nano Sistemi** (a Technology Cluster) is a consortium company, founded in 2008, owned by companies, universities, public and private research bodies, trade associations. (PIC number 952919368)

It represents an integrated and coherent research-training-innovation system and intends to play a driving role in sustainable economic growth.

The Distetto synthesizes within itself, integrating them vertically, the main players in the micro and nanotechnology supply chain present in the regional territory.

The Distretto, in the field of Micro and Nanotechnologies, focuses its activities on micro and nano systems aimed at introducing radical innovations in the sectors: Health, Ambient Assisted Living, Energy, Smart Communities, Sustainable Mobility, Intelligent Factory.

It develops an Open Innovation process in the area based on multiple interactions and interdependencies between research, innovation, development and production.

The high quality level of the member companies, together with the excellence of the skills expressed by the knowledge and research system, makes it possible to identify paths of innovation and the consequent validation of the solutions, by a public-private system represented in the its components at the highest levels of competence and strategic vision.

The Distretto also participates, as a member, in some National Technological Clusters: Alisei (life sciences) Smile (Ambient Assisted Living), Energy, Smart Communities and Intelligent Factory.

Overall, the District, through its partnership, has the KET's (Key Enabling Technologies) at the highest level of competence and strategic vision to exploit and finalize the European funds destined for research, innovation, digital agenda, etc.

The Distretto has, through its members, an important and advanced system of laboratories and research facilities.

Over the years, the Distretto has assumed responsibility, with direct resources, for the project management of numerous R&D projects at national, regional and European level. In particular, at the European level, the WInSiC4AP and GaN4AP projects are worth mentioning. The first, in response to the ECSEL RIA 2016 call, saw the participation of 20 partners from 4 European countries and a cost amount of approximately 30.5 million euros. In this project, the Distretto played the role of coordinator of the entire structure towards ECSEL JU and of national coordinator of the Italian component towards the MUR. The GaN4AP project, still ongoing, was born from a design idea of the Distretto in the automotive and energy efficiency field, presented at EFECS 2019 which found the adhesion of 36 partners (in addition to 9 linked third parties) from 5 countries. In this project, worth about 64 million euros, selected on the ECSEL IA 2020 call, the Distretto is responsible with its own resources for the management of the entire project, for the coordination of the entire team in relation to ECSEL JU and for the national coordination for all aspects of the relationship and reporting of the Italian participants in relation to MIMIT. Furthermore, he coordinates four of his members (linked 3rd parties of the Distretto) for the support to the scientific manager (expression of IUNET) and for the management of all aspects of communication & dissemination.

BIOMEDICAL SENSORS & DIAGNOSTICS II

14:30 - 16:15 / Room: GIOTTO

Chair: Brice Sorli (University of Montpellier & IES, France)

14:30

Wearable System for Monitoring ECG and Specific EEG Waves in Hypoglycemia

Fernanda Irrera (University of Roma La Sapienza, Italy); Giordana Di Bernardino and Enrico Fornito (Sapienza University of Rome, Italy); Angelo Avogaro (Università degli Studi di Padova, Italy); Federico Boscari (University of Padova, Italy)

14:45

Experimental Development and Validation of an E-Textile Sleeve for Surface Electromyography

Armando Coccia and Federica Amitrano (Bioengineering Unit, ICS Maugeri SPA SB, Pavia, 27100, Italy); Gaetano Pagano (ICS Maugeri SB of Bari, Italy); Arcangelo Biancardi (ICS Maugeri SPA SB, Pavia, 27100, Italy); Giuseppe Tombolini (Officine Ortopediche Tombolini, Italy); Giovanni D'Addio (S. Maugeri Foundation, Rehabilitation Institute of Telese, Italy)

15:00

Room Temperature Sensing With Metal Non-Oxides for Medical Breath Analysis

Simone Hersberger (ETH Zurich & University Hospital Zurich, Switzerland); Andreas Thomas Guentner (ETH Zurich, Switzerland)

15:15

Multianalyte-Compatible Lysis for the Detection of P. Aeruginosa and IL-6 via Lateral Flow Immunoassay

Anna Klebes (Hahn-Schickard & University of Freiburg, Germany); Bianka Pfefferle (University of Freiburg, Germany); Anna-Sophia Kittel (Hahn-Schickard, Germany); Bastian J Breiner (University of Freiburg & Hahn-Schickard, Germany); Nadine Borst (Hahn-Schickard & University of Freiburg, Germany); Felix von Stetten (Hahn-Schickard, Germany)

15:30

Development of an e-Nose System for the Early Diagnosis of Sepsis in Mechanically Ventilated Patients: A Preliminary Study

Stefano Robbiani and Aurora Pierantozzi (Politecnico di Milano, Italy); Louwrina H. te Nijenhuis, Patricia A.C. Specht and Floor A. Harms (University Medical Center Rotterdam, The Netherlands); Carmen Bax (Politecnico di Milano, Italy); Willem van Weteringen (University Medical Center Rotterdam, The Netherlands); Laura Capelli and Raffaele Dellacà (Politecnico di Milano, Italy)

15:45

Portable Fluorescence Biosensing System for Low-Cost, Quantitative, and Multiplexed Allergen Screening

Hui Chai-Gao and Yevhen Shynkarenko (Swiss Center for Electronics and Microtechnology, Switzerland); Silvia Demuru (Swiss Center for Electronics and Microtechnology (CSEM), Switzerland); Nicola Hermann, Daiana Boia, Peter Cristofolini, Bradley Petkus, Silvia Generelli, Stefano Cattaneo and Loic Burr (Swiss Center for Electronics and Microtechnology, Switzerland)

16:00

Highly Sensitive Plasmon-Enhanced Spectroscopic Detection of Peptide-Antibody Interactions

Divya Balakrishnan (Luxembourg Institute of Science and Technology, Luxembourg)

BIOSENSORS & LAB-ON-CHIP II

14:30 - 16:15 / Room: DONATELLO

CHair: Tomasz Matusiak
(Wrocław University of Science and Technology & Genomtec, Poland)

14:30

Automated Allergen Sample Preparation and Detection via Centrifugal Microfluidic Lateral Flow Assay

Bastian J Breiner (University of Freiburg & Hahn-Schickard, Germany); Daniel M Kainz and Stefan Wagner (Hahn-Schickard, Germany); Maxime Gavage (CER Groupe, Belgium); Serhat Sahakalkan (Hahn-Schickard, Germany); Riccardo Marega (CER Groupe, Belgium); Felix von Stetten (Hahn-Schickard, Germany); Anna Klebes (Hahn-Schickard & University of Freiburg, Germany)

14:45

Integration of a Bead-Based Immunoassay on a Commercial PCR-Performing POC Device

Benita Johannsen and Desirée Baumgartner (Hahn-Schickard, Germany); Michal Karpíšek (BioVendor-Laboratorni Medicina a. s., Czech Republic); David Stejskal (University Hospital Ostrava, Czech Republic); Nils Paust (Hahn-Schickard, Germany); Roland Zengerle (Hahn-Schickard & University of Freiburg, Germany); Konstantinos Mitsakakis (Hahn-Schickard, Germany & University of Freiburg, Germany)

15:00

Smart Surface Functionalizations for Exosome Capture

Lorenzo Lunelli and Cecilia Pederzolli (Fondazione Bruno Kessler, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy); Cristina Potrich (Fondazione Bruno Kessler, Italy)

15:15

TITAN Project: Microfluidic and Sensing Tools for Immunotherapy

Maria Serena Chiriacò, Antonio Turco, Elisabetta Primiceri and Francesco Ferrara (CNR Nanotec Institute of Nanotechnology, Italy); Giuseppe Gigli (Università del Salento, Italy); Marco Donato De Tullio (Politecnico di Bari, Italy)

15:30

Electrochemical Analysis of Rationally Designed ZnO Nanostructures for Biodegradable Cellular Scaffolds

Giuseppe Arrabito and Vittorio Ferrara (University of Palermo, Italy); Giuseppe Prestopino and Pier Gianni Medaglia (University of Rome Tor Vergata, Italy); Michelangelo Scopelliti and Bruno Pignataro (University of Palermo, Italy)

15:45

Etched and Polymer Coated Long Period Fiber Gratings for Low Limit of Detection Biosensing

Cosimo Trono (Istituto di Fisica Applicata Nello Carrara, Italy); Tanoy Kumar Dey (Central Glass and Ceramic Research Institute, India); Sara Tombelli (Istituto di Fisica Applicata Nello Carrara, Italy); Palas Biswas (Central Glass and Ceramic Research Institute Kolkata, India); Ambra Giannetti (Istituto di Fisica Applicata Nello Carrara, Italy); Nandini Basumallick (CSIR-CGCRI, India); Francesco Baldini (Istituto di Fisica Applicata Nello Carrara, Italy); Somnath Bandhopadyya (CGCRI, Kolkatta, India)

COFFEE BREAK

16:15 - 16:30

ADVANCED MATERIALS FOR SENSORS III

16:30 - 17:30 / Room: BERNINI

16:30

Innovative Silicon-Based Sensing Strategy for the Alzheimer's Disease Detection by Phage Display

Paolo Calorenni, Maria Giovanna Rizzo and Maria Laura De Plano (University of Messina, Italy); Antonio Leonardi, Vincenzo Paratore and Guglielmo Guido Condorelli (University of Catania, Italy); Alessia Irrera (URT LAB SENS, Beyond Nano-CNR, Italy); Emanuele Luigi Sciuto, Salvatore Oddo and Sabrina Conoci (University of Messina, Italy)

16:45

Development of Innovative MIP Based Sensors for Liquid Biopsy

Elisabetta Primiceri, Maria Serena Chiriacò and Francesco Ferrara (CNR Nanotec Institute of Nanotechnology, Italy); Giuseppe Gigli (Università del Salento, Italy); Silvia Romano and Luca De Stefano (Institute of Applied Sciences and Intelligent Systems CNR, Italy)

17:00

Construction of an Array of Antibody-Gold Nanoparticle Conjugates for Their Comparative Assessment on Multiplex Lateral Flow Test to Detect Mycotoxins

Bilal Javed (Post Doctoral Fellow, Ireland); Vinayak Sharma (Technological University of Dublin, Ireland); Furong Tian (Lecturer at Technological University of Dublin, Ireland)

17:15

Ecoresorbable Radio-Frequency Platform for Humidity and Temperature Sensing

James Bourely (LMTS, EPFL, Switzerland); Danick Briand (Ecole Polytechnique Fédérale de Lausanne, Switzerland); Jaemin Kim (EPFL, Switzerland); Xavier Aeby (EMPA, Switzerland); Gilberto de Freitas Siqueira and Gustav Nystroem (Empa, Switzerland); Alexander Vorobyov (CSEM & Center Suisse d'Electronique et de Microtechnique SA, Switzerland); Christian Beyer and DavidSchmid (CSEM, Switzerland)

POSTER SESSION DAY 1

16:30 - 18:00 / Room: POSTERS ROOM

P1-1 **Printed PEDOT: PSS Sensing Labels for Real-Time Monitoring of Hydrogen Peroxide Vapors**

Silvia Demuru (Swiss Center for Electronics and Microtechnology (CSEM), Switzerland); Jaemin Kim (Ecole Polytechnique Fédérale de Lausanne, Switzerland); Martin Novak and Gregor Hommes (SKAN AG, Switzerland); Danick Briand (Ecole Polytechnique Fédérale de Lausanne, Switzerland)

P2-1 **Development of an Indirect Photoacoustic Sensor Concept for Highly Accurate Low-Ppm Gas Detection**

Ananya Srivastava (Hahn-Schickard-Gesellschaft, Germany); Achim Bittner (Hahn-Schickard, Germany); Alfons Dehe (Hahn-Schickard-Gesellschaft für Angewandte Forschung e. V., Germany)

P3-1 **A New Hall Microdevice With Minimal Complexity**

Siya Lozanova, Avgust Ivanov, Martin Ralchev and Chavdar Roumenin (Institute of Robotics at Bulgarian Academy of Sciences, Bulgaria)

P4-1 **Use of CMOS Image Sensor as Efficient Low Cost Fluorescence Detector**

Palma Fabrizio (Università di Roma La Sapienza, Italy)

P5-1 **Effect of Noble Metal Nanoparticles on the Gasochromism of WO3 Sol-Gel Thin Film**

Alessandro Martucci (University of Padova, Italy)

P6-1 **Amperometric Biosensing of L-Glutamate Using Reduced Graphene Oxide and Glutamate Oxidase**

Ieva Sakinyte-Urbikiene, Vidute Gureviciene and Julija Razumiene (Vilnius University, Lithuania)

P7-1 From a Memory Sensor to a Sensor Without Memory: Trigger Mechanism

Giada Marchi, Viviana Mulloni, Andrea Gaiardo and Matteo Valt (Fondazione Bruno Kessler, Italy); Massimo Donelli (University of Trento, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy)

P8-1 Development of NOx Gas Sensor Based on Electrospun ZnO Nanofibers for Diagnosing Asthma Disease

Niloufar Khomarloo (University of Lille & Amirkabir University of Tehran, France); Hayriye Gidik (JUNIA, Italy); Elham Mohsenzadeh (Univ. Lille, ENSAIT, ULR 2461 - GEMTEX - Génie et Matériaux Textiles, F-59000 Lille, France); Roohollah Bagherzadeh (Advanced Fibrous Materials Lab Institute for Advanced Textile Materials and Tec, Italy); Masoud Latifi (Advanced Fibrous Materials Lab Institute for Advanced Textile Materials, Iran); Driss Lahem (Materia Nova, Belgium); Ly Ahmadou (Materia Nova Belgium, Barbados); Ari Hakgor (Junia Lille, France)

P9-1 The Role of Convection and Size Effects in Sensor Microhotplate Heat Exchange

Alexey Andreevich Vasiliev (University “Dubna”, Dubna, Moscow region, Russia); Alexey Vladimirovich Shaposhnik (Voronezh State Agrarian University, Russia); Oleg Vladimirovich Kul (LLC C-Component, Russia)

P10-1 Room Temperature CO2 Detection by Metal Oxides Based Nanosensors

José Pedro Santos (CSIC, Spain); Isabel Sayago (Institute of Physics Technology and Information ITEFI-CSIC, Spain); Julia Gonzalez (University of Barcelona, Spain)

P11-1 Energy Harvesting Smart Tiles for Human Machine Interface Applications

Alessandro Zompanti (University Campus Bio-Medico di Roma & Unit of Electronics for Sensor Systems, Italy); Paolo Romeo (University Campus Biomedico di Roma, Italy); Anna Sabatini (Campus Bio-Medico University of Rome, Italy); Luca Vollero and Marco Santonico (Università Campus Bio-Medico di Roma, Italy); Giorgio Pennazza (Campus Biomedico, Italy)

P12-1 Temperature Effect of Synthesis of Gold Nanoparticles by Microfluidics

Sheng Shu, Mao Hamamoto and Hiromasa Yagyu (Kanto Gakuin University, Japan)

P13-1 A Gas Sensor Based on Fully Tunable & Electrically Coupled BAW Resonators

Bernardo Pereira Madeira, Linlin Wang, Chen Wang and Michael Kraft (KU Leuven, Belgium)

P14-1 Design and Integration of an Elastic Sensor Sheet for Pressure Ulcer Prediction: Materials, Methods, and Network Connections

Mohammad Mohammad Amini (SENSOMATT Lda., Portugal); Davood Fanaei (Rua Da Eira, Portugal); Rogerio Dionisio (Instituto Politecnico de Castelo Branco & DiSAC R&D Unit, Portugal); Ahmadreza Heravi and Mahdi Faghihi (SENSOMATT Lda., Portugal)

P15-1 Novel Peptide-Based Sensors Designed to Detect Antioxidant Phenolic Compounds

Constantin Apetrei and Irina Georgiana Munteanu (Dunarea de Jos University of Galati, Romania)

P16-1 Optimizing Polyaniline-Based Gas Sensors for Hydrogen Sulfide Detection: The Crucial Role of Solvent Choice

Maria Luisa Braunger and Edilene A. da Silva (IMT Nord Europe, France); Igor Fier (Quantum Design Latin America, Brazil); Nathalie Redon and Caroline Duc (IMT Nord Europe, France)

P17-1 Fabrication of 3D Nanostructures via AFM-Based Nanolithography

Lorenzo Vincenti (Università del Salento, Italy); Paolo Pellegrino (Via Monteroni & Università del Salento, Italy); Isabella Farella (CNR-IMM, Italy); Mariafrancesca Cascione and Valeria DeMatteis (Università del Salento, Italy); Fabio Quaranta (CNR-IMM, Italy); Rosaria Rinaldi (Università del Salento, Italy)

P18-1 Pulsed Temperature Operation of SnO2-Based Gas Sensors

Larissa Egger (Roseggerstrasse 12 & Materials Center Leoben Forschung GmbH, Austria)

P19-1 Swelling Behavior of an Ethanol-Sensitive Hydrogel Immobilized on a Plasmonic Sensor Substrate

Julia Herzog (Technische Universität Dresden & Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany); Martin Sobczyk (TU Dresden, Germany); Marisa Rio (Fraunhofer Portugal Center for Smart Agriculture and Water Management AWAM, Germany); Christiane Schuster and Thomas Härtling (Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany); Gerald Gerlach (Technische Universität Dresden, Germany)

P20-1 Develop a Smart Material Based on Carbon-Aramid Hybrid Composite for Health Monitoring Structure

Khalid Alblalaihid (Saudi Arabia & King Abdulaziz City for Science and Tech, Saudi Arabia); Saad Aldoihi (KACST & King Abdulaziz City for Sciences and Technology (KACST), Saudi Arabia); Abdulaziz Alharbi, Meshal Abuobaid, Sabri Alkhibart, Khalid Khormi, Sami Alsaleh, Khaled Almutairi and Majid Albahkali (KACST, Saudi Arabia)

P21-1 A Flexible Functionalization Strategy of Porous Silicon Interferometers for Chemical Sensing Applications

Tiziano Di Giulio (Università del Salento, Italy); Cosimino Malitesta (University of Salento, Italy); Martina Corsi and Giuseppe Barillaro (Università di Pisa, Italy); Elisabetta Mazzotta and Francesco Gagliani (University of Salento, Italy)

P22-1 An On-Demand and Wireless Drug-Delivery System Based on a Smart Ultrasound-Responsive Piezoelectric Biopolymer

Gaia de Marzo (Istituto Italiano di Tecnologia, Italy); Danilo De Pascali, Valentina Antonaci and Virgilio Brunetti (Center for Biomolecular Nanotechnologies Istituto Italiano di Tecnologia, Italy); Vincenzo Mariano Mastronardi, Francesco Rizzi and Massimo De Vittorio (Istituto Italiano di Tecnologia, Italy)

P23-1 Systematic Review on Biosensor Systems for Covid-19 Aerosol Detection

Divya Pragna Mulla (SyDA Lab, Italy); Mario A. Bochicchio (CINI - Consorzio Interuniversitario Nazionale per l'Informatica & Università Degli Studi di Bari Aldo Moro, Italy); Antonella Longo (University of Salento, Italy)

P24-1 Wearable Enzymatic Sensor for Non-Invasive Glucose Detection in Sweat

Vanessa Esposito, Elisa Sciurti, Daniele Bellisario, Alessandra Calogiuri, Enrico Melissano, Maria Concetta Martucci, Adriana Campa, Pasquale Cretì, Pietro Siciliano and Luca Francioso (CNR- Institute for Microelectronics and Microsystems, Lecce Italy)

P25-1 Comparative Assessment of Gold Nanoparticle-Antibody Conjugates With Two Differently Shaped Particles for Multimodal Colorimetric Lateral Flow Assay

Vinayak Sharma (Technological University of Dublin, Ireland); Bilal Javed (Post Doctoral Fellow, Ireland); Furong Tian (Lecturer at Technological University of Dublin, Ireland)

P26-1 Contactless Heating Technology for Lab-On-Chip Microfluidic-Based Nucleic Acid Amplification Testing System

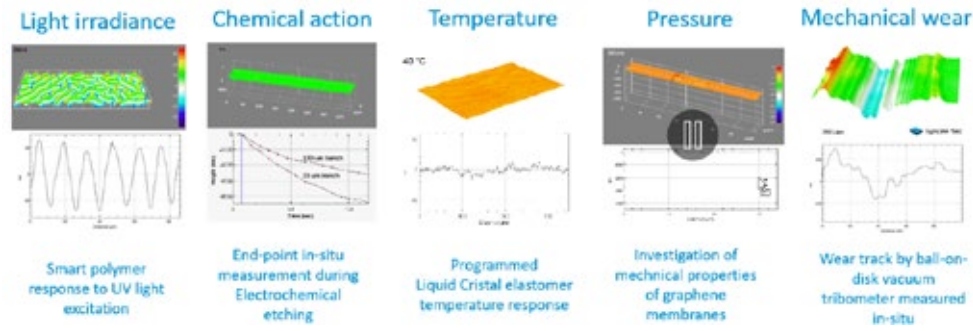
Tomasz Matusiak (Wrocław University of Science and Technology & Genomtec, Poland)

Schaefer SEE (www.schaefer-tec.it) is a microscopy & metrology services company funded in Italy back in 2005. Our competence and offering include various optical metrology tools, SEM microscopes and x-ray microtomography. We provide Italian academia and industry with TOP solutions for their microscopy needs, through selected partners such as **Lyncée Tec** described below.

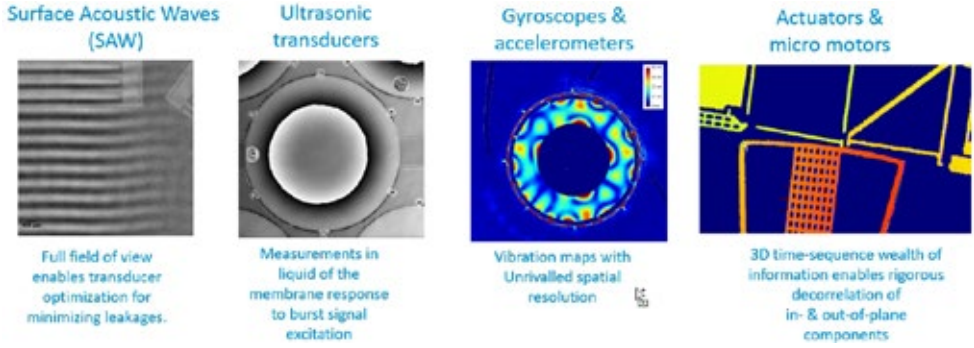
lyncée tec
TIME-RESOLVED 3D OPTICAL PROFILOMETERY

Lyncée Tec SA (www.lynceetec.com) is the reference company in the field of 4D microscopy and of Quantitative Phase Imaging (QPI). Its unique technology, based on digital holography (DHM®), provides simultaneously high acquisition rate and interferometric resolution. It opens new quality control possibilities and novel research opportunities, enabling applications that were not possible before. Lyncée offers complete solutions, from sample handling to data analysis, in the field of micro production, semiconductor, micro-optics, ultrasonic transducers, watch industry, high content screening, and cell imaging.

4D applications



MEMS applications



GAS SENSORS III

16:30 - 18:00 / Room: RAFFAELLO

Chairs: Marina Cole (University of Warwick, United Kingdom (Great Britain)), Giovanni Neri (University of Messina, Italy)

16:30

Efficient Methane Monitoring With Low-Cost Chemical Sensors and Machine Learning

Guillem Domènech-Gil and Nguyen Thanh Duc (Linköping University, Sweden); J Jacob Wikner (GE HealthCare, Sweden & Cognicatus AB, Prismatic Sensors AB, NovaVisus AB, Sweden); Jens Eriksson, Donatella Puglisi and David Bastviken (Linköping University, Sweden)

16:45

Towards Alkali-Doped Chemoresistive Gas Sensors: A Preliminary Study on Visible Light-Activated Na: ZnO

Barbara Fabbri and Elena Spagnoli (University of Ferrara, Italy); Emanuela Tavaglione (Universityof Ferrara, Italy); Arianna Rossi, Paolo Bernardoni and Vincenzo Guidi (University of Ferrara, Italy)

17:00

Optical Interference Analysis of ZIF-8 Films for Chemical Vapors Detection

Anna Estany Macia, Mauricio Moreno-Sereno, Sr and Sachin Tatyasaheb Navale (University of Barcelona, Spain); Albert Romano-Rodriguez (Universitat de Barcelona, Spain); Ignasi Fort-Grandas and Joshi Niravkumar (University of Barcelona, Spain)

17:15

Machine Learning for Enhanced Operation of Underperforming Sensors in Humid Conditions

Guillem Domènech-Gil and Donatella Puglisi (Linköping University, Sweden)

17:30

Recent Improvements on Double-Parametric Optical Sensing of O2 Exploiting Near-Infrared Luminescence of Mixed-Phase Anatase/Rutile TiO2 Nanoparticles

Stefano Lettieri (Università degli Studi di Napoli Federico II, Italy); Romina Rega (Institute for Applied Sciences and Intelligent Systems, Italy); Ambra Fioravanti (CNR-STEMS, Italy); Pietro Marani (STEMS CNR, Italy); Sara Morandi (Università di Torino, Italy); Laura Giordfano (Institute of Marine Sciences National Research Council, Italy)

17:45

Gas Sensors: A Non-Contact and Non-Invasive Solution for Checking Hydraulic Fluid Degradation

Ambra Fioravanti (CNR-STEMS, Italy); Pietro Marani (STEMS CNR, Italy); Luigi Sequino (STEMS-CNR, Italy); Fulvio Palmieri (Università Roma TRE, Italy); Francesca Rapparini (IBE-CNR, Italy); Achill Holzer (RWTH Aachen University, Institute for Fluid Power Drives and Systems, Germany); Zita Tappeiner and Katharina Schmitz (RWTH Aachen University, Germany); Sara Morandi (Università di Torino, Italy); Stefano Lettieri (Università degli Studi di Napoli Federico II, Italy); Maria Cristina Carotta (STEMS-CNR, Italy)

MEMS & NEMS II

16:30 - 17:45 / Room: GIOTTO

16:30

Biaxial Piezoelectrically-Driven MEMS-Mirror With Large Design Flexibility

Lena Wysocki (Fraunhofer Institute for Silicon Technology ISIT, Germany); Patrick Schütt (Fraunhofer Institute for Silicon Technology, Germany); Jörg Albers (Fraunhofer ISIT, Germany); Gunnar Wille (Fraunhofer-Institut für Siliziumtechnologie, Germany); Erdem Yarar (Fraunhofer Institut für Silizium Technologie (ISIT), Germany); Paul Raschdorf (Fraunhofer Institute for Silicon Technology ISIT, Germany); Lianzhi Wen and Shanshan Gu-Stoppel (Fraunhofer ISIT, Germany)

16:45

Optimization of MEMS Lorentz Actuator Using a Surrogate Model Accelerated Genetic Algorithm

Phiona Buhr and Cyrus Shafai (University of Manitoba, Canada); Byoungyoul Park (National Research Council of Canada, Canada); Miroslav Belov and Yunli Wang (National Research Council Canada, Canada)

17:00

Flexural Plate Wave Piezoelectric MEMS Pressure Sensor

Alessandro Nastro and Marco Ferrari (University of Brescia, Italy); Libor Rufer (University of Grenoble-Alpes, France); Skandar Basrour (University of Grenoble-Alpes France, France); Vittorio Ferrari and Stefano Bertelli (University of Brescia, Italy)

17:15

Nitrogen Monoxide Detection With Pentacene Based Film Bulk Acoustic Resonators

José Manuel Carmona-Cejas (Universidad Politécnica de Madrid, Spain); Teona Mirea (Universidad Politecnica de Madrid, Spain); Ricardo Hervás, Jimena Olivares and Marta Clement (Universidad Politécnica de Madrid, Spain)

17:30

Denoising MEMS Accelerometer Signals Using EMD and Hurst Analysis

Joao Vitor Campello (Instituto Militar de Engenharia (IME), Brazil); Daniel Santos and Marcos Pinto (Instituto Militar de Engenharia, Brazil)

MICRO- AND NANOFABRICATION TECHNOLOGIES I

16:30 - 17:45 / Room: DONATELLO

16:30

Tailoring Selectivity of Flame-Made Porous Metal Oxide Films for Chemoresistive Sensing

Adrien Baut (ETH Zürich, Switzerland); Andreas Thomas Guentner (ETH Zurich, Switzerland)

16:45

Engineered Porous Metal Structures by Electroplating in Two-Photon Polymerized Molds

Ana Luiza S Fiates (University of Bremen, Germany); Sina Sina Reede (Reede, Germany); Franziska Bollhorst and Lukas Hansen (University of Bremen, Germany); Klaus Froehner (NB Technologies, Germany); Michael J. Vellekoop (University of Bremen, Germany)

17:00

Morpho-Mechanical Characterization and Removal Strategy of Pile-Ups in AFM-Based Nanolithography

Paolo Pellegrino (Via Monteroni & Università del Salento, Italy); Isabella Farella (CNR-IMM, Italy); Lorenzo Vincenti, Mariafrancesca Cascione and Valeria De Matteis (Università del Salento, Italy); Fabio Quaranta (CNR-IMM, Italy); Rosaria Rinaldi (Università del Salento, Italy)

17:15

A Process to Realize 2PP-Based Electrodes in Microfluidic Channels

Wiebke Gehlken (Universität Bremen & IMSAS, Germany); Melanie Kirsch and Michael J. Vellekoop (University of Bremen, Germany)

17:30

Influence of Ultrasonic Bath on Mold-Assisted Electrodeposition of Gold Microelectrode Arrays

Neeraj Yadav (FBK - Foundation Bruno Kessler & University of Trento, Italy); Flavio Giacomozzi, Alessandro Cian and Damiano Giubertoni (Fondazione Bruno Kessler, Italy); Leandro Lorenzelli (FBKCenter for Materials and Microsystems, Italy)

PLENARY SESSION 2 - Prof. Paolo Dario

9:00 - 9:45 / Room: Tiziano Plenary

09:00

Short History and Prospects of Sensors and Sensory Systems in Robotics

Prof. Paolo Dario (Scuola Superiore Sant'Anna, Italy)

ADVANCED MATERIALS FOR SENSORS IV

9:45 - 11:30 / Room: BERNINI

09:45

Shaping the Future of Gas Sensors With VSPARTICLE Nanoparticle Printing Technology

Aaike Van Vugt (VSParticle B.V. Netherlands, The Netherlands)

10:00

Zn-Based Triphenylene Metal-Organic Frameworks as a Chemiresistive Platform for Methane Detection

Sachin Tatyasaheb Navale, Ignasi Fort-Grandas, Yuzelfy Mendoza, Paolo Pellegrino, Mauricio Moreno-Sereno, Sr, Daniel Sainz and Anton Vidal-Ferran (University of Barcelona, Spain); Albert Romano-Rodriguez (Universitat de Barcelona, Spain)

10:15

Housing MIP Nanoparticles in PVP/MWCNT Nanofibers to Detect Chiral Terpene Vapors

Antonella Macagnano (CNR-IIA, Italy); Fabricio N Molinari (CNR-IIA, Italy & Instituto Nacional de Tecnología Industrial, Argentina); Fabrizio De Cesare (Università Della Tuscia, Italy)

10:30

Selective Detection of Toxic Gases by Arrays of Single Layer Graphene Sensors Functionalized With Nanolayers of Different Oxides

Margus Kodu, Martin Lind, Valter Kiisk, Indrek Renge and Raivo Jaaniso (University of Tartu, Estonia)

10:45

Fabricating Acetic Acid Sensors Using PVP Nanofibrous Scaffold Doubly Decorated With Mesoporous Graphene

Antonella Macagnano (CNR-IIA, Italy)

11:00

WO3-Pt/Graphene Nanocomposite Sensors for Methane Sensing Applications

Patricia Arroyo (Universidad de Extremadura, Spain); Tiziana Polichetti and Brigida Alfano (ENEA, Italy); Maria Lucia Miglietta (ENEA C. R. Portici, Italy); Ettore Massera (ENEA, Italy); Jesús Lozano (University of Extremadura, Spain)

11:15

New Silicon Carbide (SiC) Microwire Based Ion Sensitive Junction Field Effect Transistors (SiC ISJFETs) for pH Sensing

Valerie Stambouli (CNRS & LMGP, France)

CHEMICAL SENSORS II

9:45 - 11:30 / Room: RAFFAELLO

09:45

Development of a Potentiometric Nitrate Ions Microsensor Improved by Conductive Polymer Doped With Carbon Nanotubes as a Transducing Layer

Camille Bene (LAAS-CNRS & University of Toulouse, France); Emmanuel Flahaut and Morgan Legnani (CIRIMAT-CNRS, France); Jérôme Launay and Pierre Temple-Boyer (LAAS, France)

10:00

An Electrochemical Sensor Based on Polyaniline for Acid Uric Determination

Nacira Mecheri (University Abbes Laghrour-Khenchela & LCIP Labratory, Algeria)

10:15

Multi-Micro-Sensor Platform for Monitoring Toxic Algal Blooms and Pollution in Coastal Marine Waters: Transducer Integration in Micro-Technology

Pierre Groc (LIRMM-University of Montpellier, France); Guy Cathébras (Universiy Montpellier 2, France); Vincent Kerzérho (CNRS, France); Adrian Laborde (LAAS CNRS, France); Fabien Soulier (University of Montpellier, France); Pierre Temple-Boyer and Jérôme Launay (LAAS, France); Serge Bernard (University Montpellier 2, France)

10:30

ZnO Tetrapod/Modified Salan Type Ligands Composites for Optical Detection of Cu2+, Fe2+ Ions

Iryna Tepliakova (University of Latvia, Institute of Atomic Physics and Spectroscopy, Latvia)

10:45

Smart Sensor for Mercury Detection in Novel Food

Giovanna Marrazza (University of Florence, Italy); Ilaria Antonia Vitale (Università degli Studi di Firenze, Italy); Giulia Selvolini (Università di Firenze, Italy); Cristina Truzzi (Polytechnic University of Marche, Italy)

11:00

LIG/ZnO/Porphyrins Functionalized EGFET-Based Electronic Tongue

Alexandro Catini (University of Roma Tor Vergata, Italy); Kishore Pushparaj, Rosamaria Capuano, Leonardo Papale, Valerio Allegra, Gabriele Magna and Gianni Antonelli (University of Rome Tor Vergata, Italy); Eugenio Martinelli (Tor Vergata University of Rome, Italy); Yuvaraj Sivalingam (SRM Institute of Science and Technology, India); Roberto Paolesse (University Tor Vergata, Italy); Corrado Di Natale (Università di Roma Tor Vergata, Italy)

11:15

Electrochemical Sensors for Detection of Bisphenols in Water

Kristina Žagar Soderžnik (Jožef Stefan Institute, Slovenia)

BIOMEDICAL SENSORS & DIAGNOSTICS III

9:45 - 11:30 / Room: GIOTTO

Chair: Fernanda Irrera (University of Roma La Sapienza, Italy)

09:45

Effect of Aesthetic Images in a Population With Mild Cognitive Decline: An EEg/fNirs Study

Livio Clemente (University of Bari, Italy); Marianna La Rocca (University of Bary, Italy); Marianna Delussi (Aldo Moro University - Bari, Italy); Giusy Tancredi, Katia Ricci and Giuseppe Procida (University of Bari, Italy); Vitoantonio Bevilacqua (Politecnico di Bari, Italy); Antonio Brunetti (Polytechnic University of Bari, Italy); Marina de Tommaso (Aldo Moro University - Bari, Italy)

10:00

Capacitive Biosensor Based on a Peptide Hybrid Substrate for the Detection of MMP-13 in Chronic Wounds

Brice Sorli (University of Montpellier & IES, France); Arnaud Vena (University of Montpellier & Institut d'Electronique Et Des Systèmes (IES), France); Cecile Echalier (Montpellier University, Italy); Ahmad Mehdi (Université de Montpellier, France); Gilles Subra (Montpellier University, France)

10:15

Analysis of Urinary Volatile Organic Compounds by Electronic Nose for Prostate Cancer Diagnosis

onio V Radogna (University of Salento, Italy); Angiola Forleo and Valentina Longo (Institute for Microelectronics and Microsystems CNR-IMM, Italy); Stefano Lorenzetti (Istituto Superiore di Sanità, Italy); Paolo Verza (University of Salerno, Italy); Giuseppe Grassi (University of Salento, Italy); Pietro Siciliano (CNR-IMM, Italy); Simonetta Capone (Istituto per la Microelettronica ed i Microsistemi - Consiglio Nazionale delle Ricerche (IMM-CNR), Italy)

10:30

A Cervical Plethysmography System to Monitor Blood Vessel Pulses on the Neck

Antonino Proto (University of Ferrara, Italy)

10:45

Questioning Breath: A Digital Dive Into CO2 Levels

Silvia Casalinuovo, Alessio Buzzin, Antonio Mastrandrea and Marcello Barbirotta (Sapienza University of Rome, Italy); Donatella Puglisi (Linköping University, Sweden); Giampiero De Cesare and Caputo Domenico (Sapienza University of Rome, Italy)

11:00

Plant Extracts as Fluorescence Sensors for Metal Ions and Biomolecules Detection

Meryam Chelly (University of Messina, Italy); Sabrine Chelly and Hanen Bouaziz-Ketata (University of Sfax, Tunisia); Silvana Ficarra, Ester Tellone, Davide Barreca, Angelo Ferlazzo and Giovanni Neri (University of Messina, Italy)

11:15

Stability of Full Diamond Implant for Neural Prosthesis: Set-Up and Results Over an Equivalent 10-Year Period

Patrick Poulichet (ESYCOM, France); Hakim Takhedmit (Univ Gustave Eiffel, France); Sarah Uummetabassum (ESIEE Paris, France)

BIOSENSORS & LAB-ON-CHIP III

9:45 - 11:30 / Room: DONATELLO

Chair: Massimo Mastrangeli
(Delft University of Technology, The Netherlands)

09:45

Controlled Contact Between Beads and Cells for the Characterization of Receptor-Ligand Bonds

Clémentine Lipp **Keynote Speaker** (EPFL, Switzerland); Laure Koebel (Institut FEMTO-ST, France); Romain Loyon (Établissement Français Du Sang Bourgogne Franche-Comté, France); Aude Bolopion (Institut FEMTO-ST, France); Laurie Spehner (Établissement Français Du Sang Bourgogne Franche-Comté, France); Michaël Gauthier (Institut FEMTO-ST, France); Christophe Borg (Établissement Français Du Sang Bourgogne Franche-Comté, France); Arnaud Bertsch (EPFL, Switzerland); Philippe Renaud (Ecole Polytechique Federale de Lausanne, Switzerland)

10:10

Microcalorimetric Measurement on a Microfluidic Chip in a Thermally Fluctuating Environment

Signe Lin K Vehusheia, Cosmin I Roman, Markus Arnoldini and Christofer Hierold (ETH Zurich, Switzerland)

10:25

Microfluidic Cuvette for Near Infrared Spectroscopy

Zoltán Szabó, János Márk Bozorádi and Orsolya Hakkel (Centre for Energy Research - ELKH, Hungary); Szabolcs Bella (Aedus Space Ltd., Hungary); Bianka Fabinyi and Sandro Meucci (Micronit BV, The Netherlands); Péter Fürjes (Centre for Energy Research - ELKH, Hungary)

10:40

Silver-Based Plasmonic Grating With PDMS Microchannel for Biological Sensors

Pongsak Sarapukdee (TU Dortmund, Germany); Dirk Schulz (TU Dortmund University, Germany); Stefan Palzer (TU Dortmund, Germany)

10:55

Development of Fluid Handling Capabilities for Autonomous Sampling Capsule

Bharathesh Badadamath (University College Cork & Tyndall National Institute, Ireland); Des Brennan (Tyndall National Institute, Ireland); Paul Galvin (University College Cork, Ireland); Paul Cotter (Teagasc Food Research, Ireland)

11:10

Optically-Induced Dielectrophoresis and Machine Learning Algorithms for the Identification of the Circulating Tumor Cells

anna Filippi, Francesca Corsi, Paola Casti, Gianni Antonelli, Michele D'Orazio, Francesco Capradossi, Rosamaria Capuano, Giorgia Curci, Lina Ghibelli, Arianna Mencattini and Eugenio Martinelli (University of Rome Tor Vergata, Italy)

COFFEE BREAK
11:30 - 11:45

SPECIAL SESSION

Microphysiological platforms: in-situ and real-time monitoring advance

11:45 - 13:00 / Room: BERNINI

Chair: Elisa Sciurti (CNR-IMM, Italy)

E. Martinelli (University of Rome Tor Vergata, Italy)

11:45

Dielectric Spectroscopy for Non-Invasive Sensing of Multi-Layered Organ-On-Chip Devices

Tim Hosman, Massimo Mastrangeli and Marco Spirito (Delft University of Technology, The Netherlands)

12:00

Sensitivity Characterization of an Impedance-Based Platform for Viability Analysis of 3D Spheroids

Claudia Sampaio da Silva (ETH Zurich & CSEM, Switzerland)

12:15

SERS for the Detection of Oxidative Stress Markers Using SiNWs/Ag Nanostructures Fabricated by MACE

Ioannis Kochylas (National and Kapodistrian University of Athens, Greece); Anastasia Kanioura (NCSR Demokritos, Greece); Spiros Gardelis and Vlassis Likodimos (National and Kapodistrian University of Athens, Greece); Anastasion Dimitriou, Nikolaos Papanikolaou, Sotirios Kakabakos, Panagiota Petrou and Georgia Geka (NCSR Demokritos, Greece)

12:30

Tumor on Chip Death-Related Effects of Oncolytic Vaccinia Virus Using Machine Learning and Image Analysis

Eugenio Martinelli (Tor Vergata University of Rome, Italy); Arianna Mencattini (University of Rome Tor Vergata, Italy); MAria Carla Parrini (Insitute Curie, Italy); Fatima Mechta-Grigoriou (Institut Curie - Inserm U830, France)

12:45

Sensors Integration in Microphysiological Systems and AI-Enabled High-Content Strategies: Towards a Digital Twin for Preclinical Studies

Elisa Sciurti (CNR-IMM, Italy); Tania Prontera (Institute of Nanotechnology CNR-NANOTEC, Italy); Chiara De Pascali (CNR-IMM, Italy); Laura Blasi, Lucia Giampetruzzi and Alessandra Calogiuri (CNRIMM Institute for Microelectronics and Microsystems, Italy); Daniele Bellisario, Vanessa Esposito and Pietro Siciliano (CNR-IMM, Italy); Luca Francioso (CNR- Institute for Microelectronics and Microsystems, Italy)

GAS SENSORS IV

11:45 - 13:00 / Room: RAFFAELLO

Chair: Nicolae Bârsan (Institut für Physikalische Chemie, Germany)

11:45

Copper Corrole Based Heterojunction Devices for Sensing Applications

Lorena Di Zazzo and Gabriele Magna (University of Rome Tor Vergata, Italy); Sujithkumar Ganesh-Moorthy and Maria-Rita Meunier Prest (University of Burgundy Dijon France, France); Marcel Bouvet (Universite de Bourgogne, France); Corrado Di Natale (Università di Roma Tor Vergata, Italy); Roberto Paolesse (University Tor Vergata, Italy)

12:00

Noble Metal Loaded WO3 Based Gases - the Gold Anomaly

Anna F Staerz (Colorado School of Mines, USA); Udo Weimar and Nicolae Bârsan (Institut für Physikalische Chemie, Germany)

12:15

Multi-Sensor System for Saffron Quality Identification

Alexandro Catini (University of Roma Tor Vergata, Italy); Rosamaria Capuano, Valerio Allegra and Leonardo Papale (University of Rome Tor Vergata, Italy); Corrado Di Natale (Università di Roma Tor Vergata, Italy); Chiara Serafini (University of Rome Tor Vergata, Italy)

12:30

Resistive Gas Dosimeters as a Novel Method to Measure Small Gas Concentrations and Quantities, Both Accumulative and Timely Resolved

Ralf Moos, Andrea Groß and Daniela Schönauer-Kamin (University of Bayreuth, Germany)

12:45

Investigation on the Development, Stabilization and Impact of Thermally Induced Oxygen Vacancies on the Chemoresistive Sensing Properties of MOX / WO3

Andrea Gaiardo, Lia Vanzetti, Andrea Pedrielli and Matteo Valt (Fondazione Bruno Kessler, Italy); Soufiane Krik (Free University of Bolzano-Bozen, Italy)

MEMS & NEMS III

11:45 - 13:00 / Room: GIOTTO

11:45

Development of Pheromone-Receptor Based Biosensors for the Early Detection of Pest Insects

Oumaima Zaki (CEA, France); Emmanuel Scorsone (Université Paris Saclay CEA LIST, France)

12:00

Noise Analysis of MEMS Microphones as Gas Sensing Element

Stefan Palzer and Gabriel Rodriguez Gutierrez (TU Dortmund, Germany)

12:15

A Comprehensive Characterization Procedure for Resonant MEMS Scanning Mirrors

Clement Fleury and Markus Bainschab (Silicon Austria Labs GmbH, Austria); Roberto Carminati and Gianluca Mendicino (STMicroelectronics, Italy); Pooja Thakkar, Dominik Holzmann, Sara Guerreiro and Adrien Piot (Silicon Austria Labs GmbH, Austria)

12:30

Thermal Behavior of Biaxial Piezoelectric MEMS-Scanner for 1550 nm Long-Range LIDAR

Clement Fleury and Markus Bainschab (Silicon Austria Labs GmbH, Austria); Roberto Carminati and Gianluca Mendicino (STMicroelectronics, Italy); Pooja Thakkar, Dominik Holzmann, Sara Guerreiro and Adrien Piot (Silicon Austria Labs GmbH, Austria) (University Grenoble Alpes, France)

12:45

Electrostatic MEMS Speaker Array With Out-Of-Plane Piston Displacement and Simplified Microfabrication

Diogo Elói Aguiam, Inês Sofia Garcia, Edoardo Sotgiu and Filipe S. Alves (INL - International Iberian Nanotechnology Laboratory, Portugal)

MICRO - AND NANOFABRICATION TECHNOLOGIES II

11:45 - 13:00 / Room: DONATELLO

Chair: Ulrich Schmid
(Technische Universität Wien, Österreich, Austria)

11:45

Parameters Affecting Single ZnO Nanowire Assembly by Dielectrophoresis

Achilleas Bardakas (INN, NCSR 'Demokritos', Athens, 15310, Greece, Physics Department, University of Patras, Patras, 26504, Greece.); Christos Tsamis (INN, NCSR 'Demokritos', Athens, 15310, Greece.)

12:00

Towards Next-Generation Glucose Sensors: Reactively Sputtered Nanostructured Nickel Nitrides for CMOS Integration

Filippo Franceschini, Catarina Fernandes and Irene Taurino (KU Leuven, Belgium)

12:15

Rational Design of a Planar Junctionless Field-Effect Transistor for Sensing Biomolecular Interactions

Rajendra Prasad Shukla (University of Twente, The Netherlands); Jg Bomer and Daniel Wijnperle (University of Twente, Italy); Naveen Kumar (University of Glasgow, United Kingdom (Great Britain)); Janwa El Maiss and Divya Balakrishnan (Luxembourg Institute of Science and Technology, Luxembourg); Vihar Georgiev (University of Glasgow, United Kingdom (Great Britain)); Cesar Garcia (Luxemburg Institute of Technology, Luxembourg); Sivashankar Krishnamoorthy (Luxembourg Institute of Science and Technology, Italy); Sergey Pud (University of Twente, Italy); Aruna Chandra Singh (Nano-Enabled Medicine and Cosmetics Group Luxembourg Institute of Science and Te, Luxembourg)

12:30

A Low-Cost Testbed for Neural Microelectrodes

Cat-Vu H. Bui, Neethu Maliakal, Hasan Ulusan, Andreas Hierlemann and Fernando Cardes (ETH Zurich, Switzerland)

12:45

Direct Growth and Integration of Gallium Oxide Nanowires for Relative Humidity Sensing

Anna Estany Macia (University of Barcelona, Spain); Marina Rojano-Mateos (Universitat de Barcelona, Spain); Paolo Pellegrino and Mauricio Moreno-Sereno, Sr (University of Barcelona, Spain); Albert Romano-Rodriguez (Universitat de Barcelona, Spain)

CONFERENCE LUNCH

13:00 - 14:30

PLENARY SESSION 3

Prof. Gabriele Schrag (Eurosensors Fellow 2019)

14:30 - 15:15 / Room: TIZIANO PLENARY

14:30

The Digital Twin and Its Kin: Designing the Sensor Systems of the Future

Gabriele Schrag (Technische Universität München, Germany)

GAS SENSORS V

15:15 - 16:15 / Room: BERNINI

15:15

Co3O4 Nanowires for Hydrogen Sensing

huranga Kumarage (University of Brescia, Italy); Dario Zappa (Università degli Studi di Brescoa, Italy); Catalina G Mihalcea (University of Bucharest, Romania); Valentin A Maraloiu and Mariana Stefan (National Institute of Materials Physics, Romania); Elisabetta Comini (University of Brescia, Italy)

15:30

ZIF-8 Films and Surface Plasmon Resonance for Chemical Vapors Detection

Anna Estany Macia, Ignasi Fort-Grandas and Joshi Niravkumar (University of Barcelona, Spain); Winnie E. Svendsen and Maria Dimaki (Technical University of Denmark, Denmark); Albert Romano-Rodriguez (Universitat de Barcelona, Spain); Mauricio Moreno-Sereno, Sr (University of Barcelona, Spain)

15:45

Measuring Exhaled Propofol in an Ex-Vivo Lung Model With Low-Cost Metal Oxide Gas Sensors

Christian Bur, Ksenia Karst and Andreas Schütze (Saarland University, Germany); Felix Maurer, Stefan Radermacher, Klaus Hoffmann and Sascha Kreuer (Saarland University Medical Center, Germany)

BIOSENSORS & LAB-ON-CHIP IV

15:15 - 16:15 / Room: RAFFAELLO

15:15

Sample Preparation and qPCR Detection of Tuberculosis on a Centrifugal Microfluidic Cartridge Enabling Molecular Downstream Resistance Profiling by tNGS

Judith Schlanderer **Keynote Speaker** (Hahn-Schickard, Germany); Markus Beutler (IML red, Germany); Jan Lüddecke (Hahn-Schickard, Germany); Harald Hoffmann (IML red and Synlab, Germany); Nils Paust (Hahn-Schickard, Germany)

15:40

Optical Detection System of Heavy Metals Based on Microplasma Excitation

Tomasz Matusiak (Wrocław University of Science and Technology & Genomtec, Poland)

15:45

PANI/PS-Au NPs-Based Electrochemical Biosensor for Testing of COVID-19

Špela Trafela (Jožef Stefan Institute, Slovenia)

ADVANCED MATERIALS FOR ACTUATORS I

15:15 - 16:15 / Room: GIOTTO

15:15

Transparent PZT Capacitors on Glass for Actuating Applications

Franklin Pavageau (CEA Grenoble, France)

15:30

Shape Memory Polymer Micro Structures Using Melt Electrowriting

Biranche Tandon (École Polytechnique Fédérale de Lausanne (EPFL), Switzerland); Nasim Sabahi (The University of New South Wales, Australia); Reza Farsi and Taavet Kangur (École Polytechnique Fédérale de Lausanne (EPFL), Switzerland); Xiaopeng Li (The University of New South Wales, Australia); Jürgen Brugger (École Polytechnique Fédérale de Lausanne (EPFL), Switzerland)

15:45

Study of Sc-Doped AlN Thin Films Grown by RF Magnetron Sputtering by Tuning the Nitrogen Flux in (Ar+N2) Reactive Atmosphere

Luciano Velardi (Institute for Microelectronics and Microsystems, CNRI-MM Lecce, Italy), Maria Assunta Signore, Enrico Melissano, Maria Concetta Martucci, Adriana Campa and Pasquale Cretì (Institute for Microelectronics and Microsystems, CNRI-MM Lecce, Italy), Antonio Serra and Daniela Manno (University of Salento, Lecce) and Luca Francioso (Institute for Microelectronics and Microsystems, CNRI-MM Lecce, Italy)

16:00

Development of a Compact, Reliable and Electrostatically Actuated Device for Microfluidic-Based Active Glasses

Simon Kulifaj (France)

BIOMEDICAL SENSORS & DIAGNOSTICS IV

15:15 - 16:15 / Room: DONATELLO

15:15

High Throughput Biosensing With Plasmonic Fiber Gratings Interrogated Using a 512-Pixel Spectrometer

Christophe Caucheteur (Université de Mons, Belgium); Médéric Loyez (University of Mons, Belgium)

15:30

A PAL Capacitive Sensor for Phenylalanine Detection

Bruno Ando, Salvatore Castorina and Ludovica Maugeri (DIEEI, University of Catania, Catania 95123, Italy); Salvatore Petralia (Dep. of Drug and Health Sciences, University of Catania, Catania 95123, Italy); Marianna Messina (Expanded Newborn Screening Laboratory, AOU Policlinico G. Rodolico-San Marco, Catania, Italy); Martino Ruggieri (AOU Policlinico G. Rodolico San Marco Catania, Italy); Giovanni Neri and Angelo Ferlazzo (Dep. of Engineering, University of Messina, Messina 98122, Italy); Emilio Sardini and Mauro Serpelloni (Dep. of Information Engineering, University of Brescia, Brescia 25123, Italy)

15:45

Label-Free Detection of Dopamine Using Defective Molybdenum Oxide Nanosheets and Fe+3 Nanoparticles as a Cross-Linker for Enhanced Sensitivity

Shohreh Shahabadi, Mehdi Ranjbar and Mozhdeh Tataei (Isfahan University of Technology, Iran); Vahid Salari (University of Calgary, Canada)

16:00

Embedded Sensing System for Wireless Apnea Monitoring

Gabriel Rodriguez Gutierrez and Chenchen Shen (TU Dortmund, Germany); Daniel Rau (Technische Universität Dortmund, Germany); Alvaro Ortiz Perez (TU Dortmund, Germany); Jürgen Götze (TU Dortmund University, Germany); Stefan Palzer (TU Dortmund, Germany)

COFFEE BREAK

16:15 - 16:30

ADVANCED MATERIALS FOR SENSORS V

16:30 - 18:00 / Room: BERNINI

Chair: Rafał Walczak

(Wrocław University of Science and Technology, Poland)

16:30

Mono-, Bi- and Tri- Metallic Nanoparticles to Improve Selectivity and Sensitivity of CMOS Integrated SnO2 Thin Film Gas Sensors

Larissa Egger (Roseggerstrasse 12 & Materials Center Leoben Forschung GmbH, Austria)

16:45

Micromechanical Tensile Testing on Chip-Level

Philip Schmitt (Ruhr University Bochum, Germany); Maira Buschheuer and Martin Hoffmann (Ruhr-Universität Bochum, Germany)

17:00

Low-Cost, Low-Footprint X-Ray Sensors Based on Colloidal Quantum Dots

Marco Ruggieri (Roma Tre University, Italy); Andrea De Iacovo (University Roma Tre, Italy); Lorenzo Colace (University "Roma Tre", Italy); Paolo Branchini (INFN - Sezione di Roma 3, Italy)

17:15

Electropolymerized PEDOT: PSS Thin Films for Fabrication of Vertical Organic Electrochemical Transistors

Andreas Schander, Michael Skowrons and Melanie Kirsch (University of Bremen, Germany); Björn Lüssem (Universität Bremen, Germany)

17:30

Gas Sensing Capabilities of CuInS2/ZnO Core-Shell Quantum Dot

Antonio Orlando (Free University of Bolzano-Bozen & Sensors and Devices Center, Bruno Kessler Foundation, Italy); Guglielmo Trentini (Free University of Bolzano-Bozen, Italy); Pietro Tosato (Fondazione Bruno Kessler, Italy); Soufiane Krik (Free University of Bolzano-Bozen, Italy); Matteo Valt and Andrea Gaiardo (Fondazione Bruno Kessler, Italy); Luisa Petti (Free University of Bolzano, Italy)

17:45

An Innovative Layer on SAW Sensors Integrated in a Cascade Impactor to Optimize PM10 Detection for Air Pollution Monitoring

Ghida Fawaz (Université Bourgogne Franche-Comté, FEMTO-ST Research Institute, France)

POSTER SESSION DAY 2

16:15 - 18:00 / Room: POSTERS ROOM

P1-2 **Neural Network Approaches for Distributional Shifts in Environmental Sensors**

Tobias Sukianto (Infineon Technologies AG, Munich Germany & Johannes Kepler University Linz, Germany); Sebastian Anton Schober (Infineon Technologies AG Neubiberg & Institute for Integrated Circuits, Johannes Kepler University Linz, Germany); Cecilia Carbonelli (Infineon Technologies AG, Germany); Robert Wille (Technical University of Munich, Germany)

P2-2 **Annealed Gallium-Doped Zinc Oxide (ZnO: Ga) Thin Films for Sub-Ppm NO2 Sensing**

Benjamin Paret (Université Toulouse III - Paul Sabatier & CNRS, France); Philippe Menini and Thierry Camps (LAAS-CNRS, France); Yohann Thimont and Antoine Barnabe (CIRIMAT, France); Laurent Mazenq (LAAS-CNRS, France); Lionel Presmanes (CIRIMAT, France)

P3-2 **Efficient Methods for Training and Validation of Odor Sensors**

Gina Zeh and Maximilian Koehne (Fraunhofer-Institute for Process Engineering and Packaging, Germany); Tilman Sauerwald (Saarland University, Germany)

P4-2 **Mechanochemical Approach for Carbon Nanotubes Based Piezoresistive Sensors Fabrication**

Elisabetta Primiceri (CNR Nanotec Institute of Nanotechnology, Italy); Anna Grazia Monteduro and Francesco Montagna (University of Salento, Italy); Maria Serena Chiriacò and Francesco Ferrara (CNR Nanotec Institute of Nanotechnology, Italy); Mariaenrica Frigione and Giuseppe Maruccio (University of Salento, Italy); Antonio Turco (CNR Nanotec Institute of Nanotechnology, Italy)

P5-2 Simple Synthesis of Hematite Iron Oxide Nanoparticles via Polyol Method for Sensing Application

Hadjer Hakkoum and Elisabetta Comini (University of Brescia, Italy); Dario Zappa (Università degli Studi di Brescoa, Italy); Hakimeh Pakdel (University of Brescia, Italy)

P6-2 Wearable Prototype for Smart Protective Protection Equipment

Fabrizio Formisano and Antonio Del Giudice (ENEA, Italy); Michele Dellutri (STMicroelectronics, Italy); Girolamo Di Francia (ENEA, Italy)

P7-2 Driver Position Measured Based on Textile Capacitive Sensor Array

Marc Martinez (Universitat Politecnica de Catalunya, Spain); Ignacio Gil (Universitat Politècnica de Catalunya, Spain); Raul Fernandez-Garcia (Universitat Politecnica de Catalunya, Spain)

P8-2 Development of Biomass-Derived NO and NO2 Conductometric Sensors

Simona Crispi, Giovanni Neri, Giuseppe Nocito and Sabrina Conoci (University of Messina, Italy); Guglielmo Guido Condorelli (University of Catania, Italy); Francesco Nastasi (University of Messina, Italy)

P9-2 Nanoparticles - Functionalized α-Bi2O3 NWs for Hydrogen Detection

Abderrahim Moumen, Dario Zappa and Elisabetta Comini (University of Brescia, Italy)

P10-2 Soft Optomechanical Devices Featuring Intrinsic Redox Activity

Ferran Pujol-Vila and Mar Álvarez (Institute of Microelectronics of Barcelona IMB-CNM-CSIC, Spain)

P11-2 Development of a Flexible Tactile Sensor Based on the Piezo-Resistive Technology

Viktor Novak (University of Life Sciences Prague, Czech Republic); Jaromír Volf, Stanislava Papezova and Vladimir Ryzenko (Czech University of Life Sciences Prague, Czech Republic

P12-2 Bub-Kick Monitor: A Novel Wearable Fibre Optic-Based Technique to Monitor Fetal Movement

Lourdes Alwis (Edinburgh Napier University, Edinburgh, United Kingdom (Great Britain))

P13-2 An Autonomous Multi-Technological LoRa Sensor Network for Landslide Monitoring

Mattia Ragnoli (University of L'Aquila, Italy); Paolo Esposito (University of L'Aquila, Italy); Gianluca Barile, Giuseppe Ferri and Vincenzo Stornelli (University of L'Aquila, Italy)

P14-2 Conductive Polycorrole Sensors for Room-Temperature Detection of Nitric Oxide

Gabriele Magna (University of Rome Tor Vergata, Italy); Corrado Di Natale (Università di Roma Tor Vergata, Italy); Lorena Di Zazzo and Ilaria Di Filippo (University of Rome Tor Vergata, Italy); Larisa Lvova (University Tor Vergata, Rome, Italy); Manuela Stefanelli (University of Rome Tor Vergata, Italy); Roberto Paolesse (University Tor Vergata, Italy)

P15-2 Volatilome of Blood, Urine and Semen by GC/MS and Gas Sensors as Exposomic Approach Investigating Health Risk in Contaminated Sites in Italy

Angiola Forleo and Valentina Longo (Institute for Microelectronics and Microsystems CNR-IMM, Italy); Antonio V Radogna (University of Salento, Italy); Pietro Siciliano (CNR-IMM, Italy); Tiziana Notari (Reproductive Medicine Unit of Check Up Polydiagnostic Center, Italy); Sebastiana Pappalardo (Reproduction and Fertility Center, Italy); Marina Piscopo (University of Naples Federico II, Italy); Giuseppe Grassi (University of Salento, Italy); Luigi Montano (Local Health Authority (ASL), Italy); Simonetta Capone (Istituto per la Microelettronica ed i Microsistemi - Consiglio Nazionale delle Ricerche (IMM-CNR), Italy)

P16-2 Octahalogeno-Phthalocyanine-Based Heterojunction as Ambipolar Gas Sensor

Sujithkumar Ganesh-Moorthy (University of Burgundy Dijon France, France); Marcel Bouvet (Universite de Bourgogne, France); Seydou Ouedraogo and Mabinty Bayo-Bangoura (Université Joseph Ki-Zerbo, Burkina Faso)

P17-2 Effect of Synthesis Conditions on Hydrogen Peroxide Detection Using Silver-Iron Oxide Nanoparticles Prepared by Laser Ablation

Mozhdeh Tataei, Mehdi Ranjbar and Shohreh Shahabadi (Isfahan University of Technology, Iran); Naimeh Naseri (Sharif University of Technology-Tehran- Iran, Iran)

P18-2 Reliable Damping Simulation of Highly Perforated MEMS by Physical Compact Modelling

Friederike Michael (TU Munich, Germany); Gabriele Schrag (Technische Universität München, Germany); Barbara Gabriele Leikam (Technical University of Munich, Germany)

P19-2 Graphene Oxide-Based Flexible Sensors for Detection of Volatile Organic Compounds at Room Temperature

Anna Maria Laera (ENEA-Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy)

P20-2 All-Solid-State Optodes: Recent Developments and Applications

Larisa Lvova and Fabrizio Caroleo (University Tor Vergata, Rome, Italy); Gabriele Magna (University of Rome Tor Vergata, Italy); Federica Mandoj (University Tor Vergata, Italy); Sara Nardis and Manuela Stefanelli (University of Rome Tor Vergata, Italy); Roberto Paolesse (University Tor Vergata, Italy); Corrado Di Natale (Università di Roma Tor Vergata, Italy)

P21-2 Microhotplate as a Platform for Calorimetry

Gabor Battistig (University of Debrecen, Hungary); Rebeka Gy. Kiss (University of Debrecen, Hungary); Lajos Harasztosi (University of Debrecen, Hungary); István A. Szabó (University of Debrecen, Hungary)

P22-2 Numerically Stable Magnetic Field Expressions for End-Of-Shaft Angle Sensing Systems

Peter Leitner (Silicon Austria Labs GmbH, Austria); Lukas Rauber (Sensitec GmbH, Germany); Michael Ortner (Silicon Austria Labs GmbH, Austria)

P23-2 Development of Triboelectric Devices for Human - Machine Interface Applications

Andreas Anastasopoulos (University of Western Attica, Greece); VAsiliki Zacharia (Institute of Nanoscience and Nanotechnology, Italy); Achilleas Bardakas (University of Patras & NCSR Demokritos, Greece); Christos Tsamis (NCSR Demokritos, Greece)

P24-2 Stimulation of the Nasal Cavity Using Flexible PCB Electrode

Clémentine Lipp **Keynote Speaker** (EPFL, Switzerland); Evgenii Glushkov (Ecole Polytechnique Fédérale de Lausanne, Switzerland); Halina Stanley and Camille Ferdenzi (Centre de Recherche En Neurosciences de Lyon, France); Arnaud Bertsch (EPFL, Switzerland); Jürgen Brugger (École Polytechnique Fédérale de Lausanne (EPFL), Switzerland); Moustafa Bensafi (Centre de Recherche En Neurosciences de Lyon, France)

P25-2 Chemometry Assisted Voltammetric Sensors Based on Electropolymerized Ion Imprinted Polymeric Film

Sabrina Di Masi, Nelson Arturo Manrique Rodriguez and Cosimino Malitesta (University of Salento, Italy)

P26-2 Non-Destructive Analysis of Cellular Physiological Functions for Organ-On-a-Chip Applications via Raman Microspectroscopy

Alessandra Calogiuri (CNR-IMM Institute for Microelectronics and Microsystems, Italy); Daniele Bellisario (CNR-IMM, Italy); Laura Blasi (CNR-IMM Institute for Microelectronics and Microsystems, Italy); Elisa Sciurti, Vanessa Esposito and Pietro Siciliano (CNR-IMM, Italy); Luca Francioso (CNR- Institute for Microelectronics and Microsystems, Italy)

P27-2 **Fabrication of an Ultrathin PMMA Foil for Sensing Applications in Microfluidic Systems**

Rafael Ecker, Tina Mitteramskogler, MSc, Andreas Fuchsluger and Bernhard Jakoby (Johannes Kepler University Linz, Austria)

GAS SENSORS VI

16:30 - 18:00 / Room: RAFFAELLO

Chair: Eduard Llobet (Rovira i Virgily University Tarragona, Spain)

16:30

Isotope-Selective Gas Sensing Using Photoacoustic, Non-Dispersive Spectroscopy

Gabriel Rodriguez Gutierrez, Loay Marouani and Alvaro Ortiz Perez (TU Dortmund, Germany); Peter Kreuzaler (University of Cologne, Germany); Stefan Palzer (TU Dortmund, Germany)

16:45

Prediction of Atmospheric Ozone Concentrations With a Temperature Modulated Gas Sensor Array

Arne Kobald, Udo Weimar and Nicolae Bârsan (Institute of Physical and Theoretical Chemistry, University of Tübingen, D-72076 Tübingen, Germany)

17:00

Data Processing Procedure for the Real-Time Estimation of Odour Concentrations at a Plant Fenceline by e-Noses

Beatrice Julia Lotesoriere, Carmen Bax, Laura Capelli and Christian Ratti (Politecnico di Milano, Italy)

17:15

An Application of Back-Compatible Color QR Codes to Colorimetric Sensors

Ismael Benito-Altamirano (Universitat de Barcelona & Universitat Oberta de Catalunya, Spain); Ferran Crugeira (ColorSensing SL and Universitat Autònoma de Barcelona, Spain); Míriam Marchena (ColorSensing SL, Spain); Joan Daniel Prades (Universitat de Barcelona, Spain)

17:30

Synthesis and Characterization of NaxWO3 Thin Films for Optical H2 Sensing via Flame Deposition Method

Mehdi Ranjbar (Isfahan University of Technology, Iran)

17:45

Indoor Air Quality CO2 Thermally Modulated SMR Sensor

Siavash Esfahani and Thomas Dawson (University of Warwick, United Kingdom (Great Britain)); Barbara Urasinska Wojcik (Sorex Sensors Limited, United Kingdom (Great Britain)); Marina Cole and Julian Gardner (University of Warwick, United Kingdom (Great Britain))

BIOMEDICAL SENSORS & DIAGNOSTICS V

16:30 - 17:30 / Room: GIOTTO

Chair: Cristina Potrich (Fondazione Bruno Kessler, Italy)

16:30

Inkjet-Printed Split Ring Resonators for the Detection of Analyte Binding to a Gold Surface

Markus Wellenzohn, Matthias Paul, Doris Pollhammer, Christoph Mehofer, Rudolf Oberpertinger and Harald Kühnel (University of Applied Sciences Vienna, Austria)

16:45

4D Optical Mapping of pH in 3D Cell Systems

Anna Chiara Siciliano (CNR-Nanotec, Italy)

17:00

A Novel Optical Sensor Readout Concept for Smart Hydrogel-Based Biomedical Sensors

Guannan Mu (Leibniz University Hannover, Germany); Julia Körner (Leibniz Universität Hannover, Germany); Yihui Wang and Hao Zhang (Leibniz University Hannover, Germany)

17:15

Development of Wearable Sweat Sensor Chip Based on Surface-Enhanced Raman Spectroscopy

Cristiano D'Andrea (Italian National Research Council (CNR), Italy); Martina Banchelli, Chiara Amicucci, Panagis Polykretis and Filippo Micheletti (Italian National Research Council - CNR, Italy); Marella de Angelis (Istituto di Fisica Applicata - CNR, Italy); Yurim Han, Heboo Ha and Byungil Hwang (Chung-Ang University, Korea (South)); Paolo Matteini (Istituto di Fisica Applicata - CNR, Italy)

PHOTONIC SENSORS

16:30 - 17:45 / Room: DONATELLO

16:30

Naked Eye Detection of Air Pollutants Using Chemical Reaction-Mediated Plasmonic Nanoparticles

Michael Pereira Martins and Andreas Thomas Guentner (ETH Zurich, Switzerland)

16:45

Correction of 2π Phase Jumps for Silicon Photonic Sensors Based on Mach Zehnder Interferometers With Application in Gas and Biosensing

Loic Laplatine (University of Grenoble Alpes, CEA-LETI, France); Thierry Livache (Aryballe Technologies, France); Sonia Messaoudene (University of Grenoble Alpes CEA LETI 38054 Grenoble France, France); Nicolas Gaignebet (University of Grenoble Alpes CEA LETI 38054 Grenoble, France); Cyril Herrier (Aryballe Technologies, France)

17:00

Selectivity Enhancement of an Acetone Monitoring SPR Sensor: Theoretical Evaluation

Gabriel Bruno Fernandes (Universidade Federal de Santa Catarina (UFSC) & Instituto de Engenharia Biomédica, Brazil); Villeneve Oliveira (Federal Institute of Paraiba, Brazil); Jefferson Marques (Federal University of Santa Catarina, Brazil); Cleumar da Silva Moreira (Instituto Federal da Paraíba & Campus Joao Pessoa, Brazil)

17:15

Development of a Direct Reading Instrument for Oxidative Potential Measurement in Air

Guillaume Suarez (Center for Primary Care and Public Health, Lausanne, Switzerland)

17:30

Novel Methodology for On-Site Sulfite Detection of Wines by SERS Spectroscopy

Alberto Villar Verguizas and Santos Merino (TEKNIKER, Spain); Roberto Alvarez Boto and Javier Aizpurua (DIPC Donostia International Physics Center, Spain); Aitzol Garcia (DIPC Donostia Inyternational Physics Center, Spain); Mikel Azkune and Joseba Zubia (Engineering School of Bilbao, Spain)

PLENARY SESSION 4 - Prof. Krishna Persaud

9:00 - 9:45 / Room: Tiziano Plenary

09:00

Advances in Odorant Binding Protein Biosensors

Krishna C Persaud (The University of Manchester, United Kingdom (Great Britain))

ADVANCED MATERIALS FOR SENSOR VI

9:45 - 11:15 / Room: BERNINI

09:45

Non-Stoichiometric Titanium-Oxide Gate Electrodes for EGFET Based pH Sensors

Zsombor Szomor, Lilia Bató, Csaba Dücső, Zsófia Baji and Péter Fürjes (Centre for Energy Research - ELKH, Hungary)

10:00

Light-Emitting Si NWs as a Novel Sensing Platform for SARS-CoV-2 Detection

Antonio Leonardi (University of Catania, Italy); Emanuele Luigi Sciuto (University of Messina, Italy); Maria J Lo Faro (University of Catania, Italy); Barbara Fazio (URT LAB SENS, Beyond Nano-CNR, Italy); Maria Giovanna Rizzo (University of Messina, Italy); Luca Francioso (CNR- Institute for Microelectronics and Microsystems, Italy); Rosaria Anna Picca (University of Bari, Italy); Francesco Nastasi (University of Messina, Italy); Alessia Irrera (URT LAB SENS, Beyond Nano-CNR, Italy); Sabrina Conoci (University of Messina, Italy)

10:15

Ultrasensitive 3D Printed Self-Healing Ionic Hydrogels for Wearable Multifunctional Sensing

Giorgio Mogli and Marco Reina (Politecnico di Torino, Italy); Annalisa Chiappone (University of Cagliari, Italy); Ignazio Roppolo, Andrea Lamberti and Stefano Stassi (Politecnico di Torino, Italy)

10:30

Comparison of Bacterial Cellulose Deformation Sensors Based on Choline Malonate and EMIM-BF4 Ionic Liquids

nthosh Kurukunda, Salvatore Cerruto, Salvatore Graziani and Carlo Trigona (University of Catania, Italy); Giovanna Di Pasquale (Università degli Studi di Catania, Italy); Antonio Pollicino (University of Catania, Italy); Kaija Põhako-Esko (University of Tartu, Italy); Alvo Aabloo (IMS Lab, Institute of Technology, University of Tartu, Estonia)

10:45

Plasmonic Nanopores as Tunable Optical Platforms for Single-Molecule Detection

Adriano Colombelli (CNR-IMM Institute for Microelectronic and Microsystems Lecce Italy, Italy); Daniela Lospinoso and Maria Grazia Manera (IMM-CNR Institute for Microelectronic and Microsystems Lecce, Italy)

11:00

Cheap, Tunable and Versatile Nanoparticles for Explosive Detection: Quantum Dots

Federica Mitri, Andrea De Iacovo and Serena De Santis (University Roma Tre, Italy); Lorenzo Colace (University “Roma Tre”, Italy)

PHYSICAL SENSORS AND ACTUATORS I

9:45 - 11:30 / Room: GIOTTO

09:45

2D Localization of an Aluminium Tag Using the Electromagnetic Shielding Effect

Kiera S Montgomery (University of Auckland, New Zealand); Kean C Aw (The University of Auckland, New Zealand)

10:00

UV Light Induced Response Degradation Characteristics of Silicon Based Detectors

Daniel Gäbler (X-FAB Silicon Foundries, Germany); Pablo Siles (X-FAB Semiconductor Foundries, Germany)

10:15

Integration of Printed PVDF-Based Force Sensors Into a Printed Circuit Board Stack

Sebastian Maria Lang (Johannes Kepler University Linz, Austria); Wolfgang Hilber (Johannes Kepler University, Austria); Bernhard Jakoby (Johannes Kepler University Linz, Austria); Herbert Enser (EplusE Elektronik, Austria)

10:30

Highly Sensitive Silicon Micro-Electromechanical Resonator for Photoacoustic Gas Sensing

Tarek Seoudi, Julien Charensol, Wioletta Trzpil, Fanny Pages, Diba Ayache, Aurore Vicet and Michael Bahriz (University of Montpellier, France)

10:45

A Novel Sensor Effect Applicable in Seismically Active Regions

Siya Lozanova, Martin Ralchev, Avgust Ivanov and Chavdar Roumenin (Institute of Robotics at Bulgarian Academy of Sciences, Bulgaria)

11:00

Printed Anisotropic Magnetoresistive Sensors on Flexible Polymer Foils

Clemens Voigt (Fraunhofer IKTS & TU Dresden, Germany); Mykola Vinnichenko (Group Leader, Germany); Sindy Mosch (Fraunhofer IKTS, Germany); Morris Ott (Fraunhofer FEP, Germany); Thomas Preussner (Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology, Germany); Eduardo Sergio Oliveros-Mata and Conrad Schubert (Helmholtz Zentrum Dresden Rossendorf, Germany); Denys Makarov (Institute of Ion Beam Physics and Materials Research, Germany)

11:15

Humidity Impact on Thermal Conductivity Sensors

Sophie Emperhoff (Albert-Ludwigs-Universität Freiburg & Infineon Technologies AG, Germany); Matthias Eberl and Tim Dwertmann (Infineon Technologies AG, Germany); Jürgen Wöllenstein (Universität Freiburg - IMTEK, Germany)

aixACCT systems

Who are we?

THE SPECIALIST FOR CHARACTERIZING PIEZOELECTRIC MATERIALS AND MEMS DEVICES FOR PRODUCTION AND RESEARCH

When others say it cannot be done, we go ahead and do it. With a combination of experience and a passion for innovation, we have been developing modular measurement systems for characterizing piezoelectric materials and designing integrated system solutions since 1995, always with the needs of our customers in mind.
Our goal: reliable tools, tailored precisely to the respective needs.

We offer our customers unique production tools based on own modules and components from our partners that have proven themselves for years.

Combining system integration with automation

We have an experienced team of physicists, engineers, electricians and programmers that combines tried-and-tested modules and components with new developments like suitable sample fixtures. This lets us deliver guaranteed quality to customers like you in the shape of our highly reliable production tools, with short run-up times.

Always up to date

We cooperate with specialists or consult with experts from your industry. You can rest assured that we will always take the latest expert insights into account when designing and producing our systems. Although we always tailor our production tools precisely to customer needs, a few base systems have become established. Maybe one of them is the solution you have been looking for. If not, do not hesitate to get in touch!

Always the right software for your application

THEORY & MODELLING I

9:45 - 11:30 / Room: DONATELLO

09:45

Temperature Sensing by Advanced Thermoacoustic Signals in Miniaturized Photoacoustic Gas Sensors

Simon Essing (TUM, Germany)

10:00

A Flexible PCB Based MEMS Field Mill With a Vertical Movement Shutter Driven by an Electrostatic Actuator

Tao Chen and Cyrus Shafai (University of Manitoba, Canada)

10:15

Optimization of Dielectric Excitation for Metal Oxide Sensors: Simulation and Experimental Results

Alessandro Benegiamo (Insitute for Bioengineering of Catalonia, Spain); Santiago Marco (Institute for Bioengineering of Catalonia & University of Barcelona, Spain); Stefano Robbiani and Raffaele Dellacà (Politecnico di Milano, Italy); Meryl Cruz (Universitat de Barcelona, Spain)

10:30

Equivalent Circuit Models for Impedimetric Sensors

Eva-Maria Korek and Evanthia Chrysanthi Kounoupioti (Technical University of Munich, Germany); Ralf Brederlow (Technische Universitaet Muenchen, Germany)

10:45

Platform for Weakly Coupled Electro-Mechanical Resonators With Arbitrary Tunability

Ruopeng Chen, Bernardo Pereira Madeira, Chen Wang, Michael Kraft and Georges Gielen (KU Leuven, Belgium)

11:00

Contact Angle Measurement Through Liquid Flow in Curved Open Microchannels

Tina Mitteramskogler, MSc, Andreas Fuchsluger and Rafael Ecker (Johannes Kepler University Linz, Austria); Thomas Wilfinger (Ernst Wittner GmbH, Austria); Bernhard Jakoby (Johannes Kepler University Linz, Austria); Robert Wille (Technical University of Munich, Germany)

11:15

Efficient Modeling of Piezoelectric Micromachined Ultrasonic Transducers Using a Combination of Finite and Lumped Element Modeling

Romain Liechti (CEA, France)

COFFEE BREAK

11:30 - 11:45

SPECIAL SESSION: Sustainable Sensors

11:45 - 13:00 / Room: BERNINI

Chairs: Massimo De Vittorio (Istituto Italiano di Tecnologia, Italy), Vittorio Ferrari (University of Brescia, Italy)

11:45

Systematic Experimental Evaluation of Submilliwatt PV Cells for Indoor Applications

Eduard Ferré, Marc Azlor, Manel Gasulla and Ferran Reverter (Universitat Politècnica de Catalunya, Spain)

12:00

FOCV-MPPT Power Management Unit for Submilliwatt Indoor PV Cells

Marc Azlor, Eduard Ferré, Manel Gasulla and Ferran Reverter (Universitat Politècnica de Catalunya, Spain)

12:15

Classification in Early Fire Detection Using Multi Sensor Nodes: A Transfer Learning Approach

Pascal Vorwerk (Otto Von Guericke University of Magdeburg, Germany); Jörg Kelleter and Steffen Müller (GTE Industrieelektronik GmbH, Germany); Ulrich Krause (Otto Von Guericke University of Magdeburg, Germany)

12:30

Additive Manufacturing Electronics for Packaging High-Frequency Aluminum Nitride pMUT Probes

Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Antonio Qualtieri (Center for Biomolecular Nanotechnologies Istituto Italiano di Tecnologia, Italy); Enrico Boni and Piero Tortoli(University of Florence, Italy); Roberto de Fazio and Paolo Visconti (University of Salento, Italy); Maria Teresa Todaro (Institute of Nanotechnology National Research Council, Italy); Massimo De Vittorio (Istituto Italiano di Tecnologia, Italy)

SYSTEMS INTEGRATION & PACKAGING

11:45 - 13:00 / Room: RAFFAELLO

Chair: Bruno Ando (University of Catania, Italy)

11:45

A Wireless Strain Sensor for Measurement in Composites

Lukas Bertram (University of Bremen, Germany); Michael Brink (BIBA - Bremer Institut Für Produktion Und Logistik GmbH, Germany); Walter Lang (Universität Bremen, Germany)

12:00

3D-Printed Resonator With Piezoelectric Actuation and Machine Learning Calibration for In-Line Density-Viscosity Sensing

Victor Corsino, Victor Ruiz-Diez, Mario Ramirez-Palma, Javier Toledo and Jose Manuel Gilperez (University of Castilla-La Mancha, Spain); Jose-Luis Sánchez-Rojas (Universidad de Castilla-La Mancha & Institute of Nanotechnology, Spain)

12:15

Evaluation of a Machine Learning Algorithm to Classify Ultrasonic Transducer Misalignment

Des Brennan (Tyndall National Institute, Ireland); Paul Galvin (University College Cork, Ireland)

12:30

Healing Substance Measurement System Based on Gas Sensor Arrays in Forest Environmen

Joon-Boo Yu (Knagwon National University, Korea (South)); Hyung-Gi Byun (Kangwon National University, Korea (South))

12:45

FBK Experience on Strategies to Improve the Yield in PFIB Circuit Edit

David Novel, Evgeny Demenev and Lorenza Ferrario (Fondazione Bruno Kessler, Italy)

PHYSICAL SENSORS AND ACTUATORS II

11:45 - 13:00 / Room: GIOTTO

11:45

Analysis and Development of Rotational Angle Sensor

Yu-Wen Chen and Cheng-Yao Lo (National Tsing Hua University, Taiwan)

12:00

Laser-Based Fabrication of a Piezoelectric Micro-Actuator for Strain-Tuning of Entangled-Photon Quantum Emitters

Sandra Stroj (Vorarlberg University of Applied Sciences & FH Vorarlberg, Austria)

12:15

Inductive Sensor With Contactless Interrogation for Conductive Target Detection

Marco Zini (Università degli Studi di Brescia, Italy); Marco Baù, Marco Ferrari, Alessandro Nastro and Vittorio Ferrari (University of Brescia, Italy)

12:30

A New Active Antenna' s Unit for Portable Microwave Bio-Dosimeters

Andrey Borisovich Simakov (National Research Nuclear University MEPhI, Russia)

THEORY & MODELLING II

11:45 - 13:00 / Room: DONATELLO

11:45

Simple Method to Extract Piezoelectric Coefficient d31 by Fitting Experimental Data With an Analytical Model

Yangyang Guan (KU Leuven, Belgium); Mert Torunbalci (Broadcom Inc., USA); Sanjog Vilas Joshi, Sina Sadeghpour, Aojie Quan, Chen Wang and Michael Kraft (KU Leuven, Belgium)

12:00

MR Sensor Array Design for the Realization of a 3D Magnetic Tactile Sensor

Stefano Lumetti, Perla Malagò, Peter Andreas Stürmer, Francisco Ferreira Relvão and Michael Ortner (Silicon Austria Labs GmbH, Austria)

12:15

Measuring the Thermal Conductivity of Humid Air Over a Broad Temperature and Water Content Range

Hans-Fridtjof Pernau, Mike Benkendorf and Martin Jaegle (Fraunhofer Institute for Physical Measurement Techniques IPM, Germany); Stephan Heinrich and Thorsten Knittel (Vitesco Technologies GmbH, Germany); Jürgen Wöllenstein (Fraunhofer IPM, Germany)

12:30

Self-Diagnostic Method for Resistive Displacement Sensors

derico Mazzoli (University of Brescia); Davide Alghisi (Gefran SpA, Italy); Vittorio Ferrari (University of Brescia, Italy)

12:45

Freeform Optimization of an Ultrasonic Horn Coupled to an Airborne MEMS Transducer

Gabriele Bosetti, Stefan Hofstetter-Spona and Gabriele Schrag (Technische Universität München, Germany)

CONFERENCE LUNCH

13:00 - 14:30

SPECIAL SESSION

Microsystems technologies in Italy

14:30 - 16:10 / Room: BERNINI

Chair: Leandro Lorenzelli
(FBK-Center for Materials and Microsystems, Italy)

14:30

The ST MEMS Journey: Exploring Innovative Technologies for a Smarter Future

Giorgio Allegato **Invited speaker** (STMicroelectronics, Italy)

15:10

MEMS at FBK: From Research to Industrial Applications

Andrea Adami (FBK - Center for Materials and Microsystems, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy)

15:25

Fabrication of Wafer-Level Vacuum-Packaged 3C-SiC Resonators With Q-Factor Above 250,000

Sergio Sapienza (National Research Council - Institute for Microelectronics and Microsystems of Bologna, Italy); Luca Belsito (National Research Council - Institute for Microelectronics and Microsystems, Italy); Matteo Ferri (IMM CNR, Italy); Ivan Elmi (CNR-IMM Bologna, Italy); Marcin Zielinski (NOVASIC, France); Francesco La Via (CNR-IMM, Italy); Alberto Roncaglia (Institute of Microelectronics and Microsystems, Italy)

15:40

Micromachined Vaporizing Liquid Microthruster With Pulsed Dual Heating: Sensors & Efficiency

Luca Francioso (CNR- Institute for Microelectronics and Microsystems, Lecce Italy); Donato Fontanarosa (KU Leuven, Italy); Guido Marseglia, Angelica Maria Toscano and Maria Grazia De Giorgi (University of Salento, Italy); Maria Assunta Signore, Enrico Melissano, Maria Concetta Martucci, Adriana Campa, Pietro Siciliano and Pasquale Cretì (CNR-IMM Lecce, Italy); Johan Steelant (ESTEC-ESA, The Netherlands); Maria Rosaria Vetrano (KU Leuven, Italy)

15:55

Electrochemical Machining of Silicon at the Micro and Nano Scales: Past, Present, and Future

Giuseppe Barillaro (Università di Pisa, Italy)

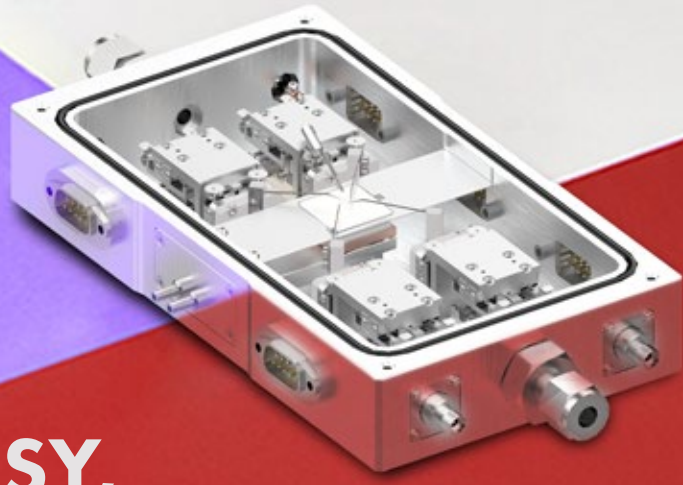
NEXTRON
MICRO PROBE SYSTEM

www.microprobesystem.com
Contact : sales@nextron.co.kr

When stability and resolution are of the utmost importance, the Piezo-Driven Positioner provides the perfect solution. With Nextron Piezo-driven Micro Probe System, precise positioning is possible remotely to the desired location. Even if the contact pads are very small, will not be a problem as we have very ultra-fine tips under 10um. The piezo-driven Micro probe system has the most comfortable price amongst others on the market.

Chamber Dimensions: 180(L)x100(W)x36(H)mm

Piezo Module Micro Probe System



EASY, UNIQUE & COMPACT

POSTER SESSION DAY 3

14:30 - 16:30 / Room: POSTERS ROOM

P1-3 **Design and Modelling of Laterally Stable High Aspect Ratio Sharp Nanotip for Low Thermal Budget AFM Cantilevers**

Fawwaz E Fajingbesi (University of New South Wales, Australia & UNSW, Australia)

P2-3 **Hydrogen Gas Sensor Based on Pr-Doped CoFe2O4 Nanoparticles**

Saeid Salari (Slovak University of Technology & Isfahan University of Technology, Slovakia)

P3-3 **Functionalization of ITO With Noble Metals Nanoparticles in Hydrogen Sensing**

Maria Lucia Miglietta (ENEA C. R. Portici, Italy); Brigida Alfano and Ettore Massera (ENEA, Italy); Patricia Arroyo (Universidad de Extremadura, Spain); Tiziana Polichetti (ENEA, Italy); Jesús Lozano (University of Extremadura, Spain)

P4-3 **Bio-Based Photoreceptors for Quantum Technologies**

Ilaria Cardace (Università del Salento, Lecce (LE) & CNR-Nanotec Istituto di Nanotecnologia, Italy)

P5-3 **RFID Autonomous Sensors for Monitoring Corrosion on Prestressed Concrete Bridges**

Stephane Rioual (University of Brest, France); Philippe Talbot (LabSTICC - UBO Brest, France)

P6-3 **A Conductive MEMS-SPM Using Exchangeable AFM Probes as Indenter for Nanoelectromechanical Measurement of Nanomaterials**

Zhi Li (Physikalisch- Technischen Bundesanstalt, Germany)

P7-3 **Tire Deformation Monitoring Sensor for Advanced Driver-Assistance Systems**

János Radó, Ferenc Braun, Gábor Battistig and István Bársony (Institute of Technical Physics and Materials Science, Hungary); Alexandros Soumelidis and Tamás Dózsa (Institute for Computer Science and Control, Hungary); Péter Kovács (Eötvös L. University, Hungary); János Volk (Centre for Energy Research, Hungary)

P8-3 **Design and Validation of a Sensitive Readout Circuit for Smart Cantilevers**

Fawwaz E Fajingbesi (University of New South Wales, Australia & UNSW, Australia)

P9-3 **Kinetic Modeling of the Metal Oxides Chemoresistive Gas Sensors**

Krystyna Schneider (AGH University of Science and Technology, Poland)

P10-3 **Microfluidic System With Integrated Electrode Array for High-Throughput EIS Analysis of Localised Cells**

Lilia Bató and Péter Fürjes (Centre for Energy Research - ELKH, Hungary)

P11-3 **Electronic Nose for Early Diagnosis of Ovarian Cancer**

Jens Eriksson and Donatella Puglisi (Linköping University, Sweden); Christer Borgfeldt (Lund University, Sweden)

P12-3 **Magneto-Optic Sensor for Angular Position Measurements**

Vedran Budinski (University of Maribor & UM FERI, Slovenia); Simon Pevec (University of Maribor, Slovenia); Stanislav Campelj and Alenka Mertelj (Jožef Stefan Institute, Slovenia); Darja Lisjak (Jozef Stefan Institute, Slovenia); Denis Donlagic (University of Maribor, Slovenia)

P13-3 **A Portable AuNP-Enhanced SPR Sensor for Highly Sensitive β-Bungarotoxin Quantification in Snake Poisoning Diagnosis**

Samuel Husin Surya Mandala, Mochamad Januar, Chien-Chun Liu and Jau-Song Yu (Chang Gung University, Taiwan); Kou-Chen Liu (Chang Gung University & Chang Gung Memorial Hospital,Taiwan)

P14-3 LDH, With or Without Catalase Crosslinked, to Improve Performances of Direct Catalytic Ethanol Fuel Cell (DCEFC), Used to Ethanol Determination in Human Saliva and in Disinfectant Anti-Covid19 Gel

Mauro Tomassetti (University of Rome La Sapienza & University of Rome Tor Vergata, Italy); Corrado diNatale (Roma Tor Vergata University, Italy); Luigi Campanella (University of Rome La Sapienza, Italy); Riccardo Pezzilli (University of Rome Tor Vergata, Italy)

P15-3 Pull-In Voltage and Stress in Fixed-Fixed Beams of RF MEMS Switches

Anna Persano (IMM-CNR Lecce, Italy); Girolamo Tagliapietra (University of Trento & Fondazione Bruno Kessler, Italy); Jacopo Iannacci (Fondazione Bruno Kessler - FBK, Italy); Alvise Bagolini (Italy); Fabio Quaranta and Pietro Siciliano (CNR-IMM, Italy)

P16-3 Zinc-Based Electrically Conductive Adhesive for the Transfer of SMD Components on Paper PCB

James Bourely (LMTS, EPFL, Switzerland); Nicolas Fumeaux (EPFL, Switzerland); Danick Briand (Ecole Polytechnique Fédérale de Lausanne, Switzerland); Marie Sanglé-Ferrière (EPFL, Switzerland)

P17-3 Aerosol Measurements by OPC Aided by QCM Mass Sensor

Emiliano Zampetti and Aurora Mancuso (CNR-IIA, Italy)

P18-3 A Low-Cost Solution and CWT Analysis for SHM

Bruno Ando and Danilo Greco (University of Catania, Italy); Giacomo Navarra (Kore University of Enna, Italy)

P19-3 Flexible Fan Out Wafer-Level Packaging Using PDMS and Printed Redistribution Layers

Muhammad Hassan Malik (Alpen Adria University, Klagenfurt & Silicon Austria Labs GmbH, Austria); Ali Roshanghias (Silicon Austria Labs GmbH, Austria); Muhammad Shaukat Khan and Sherjeel Khan (Silicon Austria Labs, Austria)

P20-3 An Innovative and Versatile Vapor-Phase Synthesis Approach to Obtain MIP-Based Sensors

Tiziano Di Giulio (Università del Salento, Italy); Muhammad Ibrar Ibrar Asif and Cosimino Malitesta (University of Salento, Italy); Martina Corsi and Giuseppe Barillaro (Università di Pisa, Italy); Elisabetta Mazzotta (University of Salento, Italy)

P21-3 Film Bulk Acoustic Resonators for Nitrogen Monoxide Detection at 250˚C

Teona Mirea (Universidad Politecnica de Madrid, Spain); José Manuel Carmona-Cejas, Ricardo Hervás, Jimena Olivares and Marta Clement (Universidad Politécnica de Madrid, Spain)

P22-3 Magnetic Nanoparticles and Magnetic Sensors for Ultrasensitive and Fast Diagnostics

Alessandro Surpi (CNR-IMM, Italy); Luca Gnoli (Istituto per Lo Studio Dei Materiali Nanostrutturati, Italy); Tatiana Shelyakova (IRCCS Istituto Ortopedico Rizzoli, Italy); Gianluca Giavaresi (IOR, Italy); Manuel A. González-Gómez, Yolanda Piñeiro and Josè Rivas (NANOMAG Laboratory, Spain); Valentin A. Dediu (Istituto per Lo Studio Dei Materiali Nanostrutturati, Italy)

P23-3 IR3MA Parkinson Cyclone in Life: A Project Based on RTD-Fluxgate Magnetometers for the Early Diagnosis of Neurodegenerative Diseases

Carlo Trigona (University of Catania, Italy); Yosra Ben Fadhel (High Institute of Medical Technologies of the University of Tunis El-Manar, Tunisia); Sara Panebianco, Damiana Spagnuolo and Sara Galvagno (D. I. E. E. I. University of Catania, Italy); Davide Di Maria (DIEEI University of Catania, Italy); Marco Finocchiaro, Gianluca Nicotra and Salvatore Panebianco (D. I. E. E. I. University of Catania, Italy); Bruno Ando (University of Catania, Italy); Giulia Donzuso (University of Catania); Giovanni Mostile and M. Zappia (University of Catania, Italy); Adi R. Bulsara (Naval Information Warfare Center, USA)

P24-3 Impedance-Based Classification of Contaminated Dielectric Liquids Based on Supervised Machine Learning

Chiara De Pascali, Maria Assunta Signore, Elisa Sciurti and Daniele Bellisario (CNR-IMM, Italy); Enrico Melissano, Adriana Campa and Maria Concetta Martucci (CNR-IMM Institute for Microelectronics and Microsystems, Italy); Pietro Siciliano (CNR-IMM, Italy); Luca Francioso (CNR- Institute for Microelectronics and Microsystems, Italy)

P25-3 Development of a MIP Based Electrochemical Sensor for TGFβ1 Detection and Its Application in Liquid Biopsy

Giulia Siciliano (CNR-NANOTEC, Italy); Maria Serena Chiriacò (CNR-NANOTEC, Italy); Francesco Ferrara (CNR-NANOTEC, Italy); Antonio Turco (CNR-NANOTEC, Italy); Luciano Velardi (Institute for Microelectronics and Microsystems, CNR-IMM, Italy); Maria Assunta Signore (CNR-IMM, Italy); Marco Esposito (CNR-NANOTEC, Italy); Giuseppe Gigli (Università del Salento, Italy); Elisabetta Primiceri (CNR-NANOTEC, Italy)

Fondazione Bruno Kessler (FBK)

Fondazione Bruno Kessler (Trento, Italy) is a non-profit research institution of public interest, ranking first for scientific excellence in three different areas: ICT, History and Sociology.

The result of a history spanning more than half a century, through 11 research centers of high international standing and thanks to more than 450 researchers, FBK aims at excellence in the science and technology fields with special regard to cross-disciplinary approaches and application aspects.

It pays relentless attention to collaborations and exchange activities with research organizations, including institutional and corporate, national and international ones, which expand its capacity for innovation and involve the local community and economy in the circulation of knowledge and technology.
It conducts work in the following fields: Cybersecurity, Digital Society, Digital Industry, Digital Health and Wellbeing, Health Emergencies, Sustainable Energy, Sensors and Devices, Theoretical Physics, Evaluation Research on Public Policies, Italian-German Historical Studies and Religious Studies.

FBK aims at excellence both in fundamental research for the advancement of knowledge, and in the more mature fields of science and technology that allow greater and more immediate economic and social consequences.

www.fbk.eu

FBK-Sensors and Devices (FBK-SD)

FBK-SD is a research center of reference, in Italy and internationally, for the development of novel concepts in sensors and devices for Big Science, and for industrial and technical applications. The ever-increasing demand for sensors and devices with improved performance driven by frontier research and experiments on one side and by the advanced technology challenges faced by innovative industries on another side are stimulating the fundamental scientific progresses of the Center.
The unique system made of our various competences, excellent skills and advanced infrastructure to cover activities from silicon technologies to photonics, materials and bio-physics gives us the ability to achieve scientific developments of absolute international value. Our capability to work in partnership with many actors involved in Big Science, industry and education gives us the cultural flexibility for making our results available to manufacturing and social fruition in a reduced time.

FBK-SD state of art research infrastructures (500 sqm ISO 4-5 and 100 sqm ISO 5-6 clean rooms for silicon detectors and MEMS respectively, and 700 sqm lab for Micro Nano Bio Science and Biotechnologies) allow to achieve outstanding results in both research and innovation fields. Infrastructure laboratories cover a wide range of competences and capabilities present at the Center for Sensors and Devices.

https://sd.fbk.eu/

MICRO- AND NANOFABRICATION TECHNOLOGIES III

14:30 - 16:15 / Room: RAFFAELLO

14:30

Refractive Index Sensitivity of LSPR Sensor Using Gold Nanotriangles Synthesized by Seedless Non-Thermal Liquid-Phase Reduction

Mao Hamamoto and Hiromasa Yagyu (Kanto Gakuin University, Japan))

14:45

Laser-Induced Graphitization of Polyimide Tape as Modifiable Sensor in ASV

Laura Chirivì (University of Salento, Italy)

15:00

An Acoustically-Transparent Electrical Cap for Piezoelectric Ultrasound Transducers on Silicon

Gandhika Wardhana, Tiago Costa and Massimo Mastrangeli (Delft University of Technology, The Netherlands)

15:15

Screen-Printed Ceramic MEMS for Metal Oxide Gas Sensor

Alexey Andreevich Vasiliev (University “Dubna”, Dubna, Moscow region, Russia); Oleg Vladimirovich Kul, Andrey Sergeevich Nikitin, Anna Dmitrieva and Alexandr Bolshakov (LLC C-Component, Russia)

15:30

Design and Simulation of Piezoelectric Active Microcantilevers for Dynamic Mode High Speed Atomic Force Microscopy

Fawwaz E Fajingbesi (School of Electrical Engineering and Telecommunications, University of New South Wales, Sydney, 2052, Australia.); Aron Michael (UNSW Sydney, Australia)

15:45

Microengineered Flexible Pressure Sensors With Sacrificial Molding Layer: A Novel Fabrication Approach for Improved Performance

Maria Brites Atalaia Rosa (University of Leuven, Belgium); Michael Kraft (KU Leuven, Belgium)

MICRO- AND NANOFABRICATION TECHNOLOGIES IV

14:30 - 16:15 / Room: RAFFAELLO

14:30

A Microfluidic Refreshable Braille Display System

Ömer Gökalp Akcan, Batuhan İstanbullu, Onur Ferhanoğlu and Ahmet Can Erten (Istanbul Technical University, Turkey)

14:45

Frequency Selective AlGaN/GaN Cantilevers for Human Implantable Acoustic Sensors

Peter Neumann (Centre for Energy Research, Hungary)

15:00

Magnetic Field Sensors for Non-Invasive Current Monitoring in Wire-Bond-Less Power Modules

Perla Malagò, Stefano Lumetti, Dominik Holzmann, Michael Ortner and Ali Roshanghias (Silicon Austria Labs GmbH, Austria)

15:15

Chem-FETs pH Sensor With Two Measurement Modes

Syed Fahad Ali (Fraunhofer Institute for Electronic Microsystems and Solid State Technologies EMFT, Germany)

15:30

Feedback Controller for Self-Sensing Piezoelectric Micro-Lens Actuator

Aron Michael (UNSW Sydney, Australia)

15:45

Small Footprint Temperature Sensing NFC Tag

Rosana A. Dias, Filipe S. Alves and Inês Sofia Garcia (INL - International Iberian Nanotechnology Laboratory, Portugal); Jose Fernandes, Jorge Pereira, Marco Martins and Andre Cardoso (International Iberian Nanotechnology Laboratory, Portugal); Gabriel Ribeiro (Edilasio Carreira da Silva Lda, Portugal)

PHYSICAL SENSORS AND ACTUATORS III

14:30 - 16:15 / Room: GIOTTO

14:30

A Magnetic Tracking System Featuring Calibrated Three-Axis AMR Sensors

Thomas Quirin (University of Applied Sciences and Arts Northwestern Switzerland | FHNW & University of Strasbourg, Switzerland); Corentin Féry (University of Applied Sciences and Arts Northwestern Switzerland | FHNW, Switzerland); Celine Vergne (University of Applied Sciences and Arts Northwestern Switzerland & FHNW, Switzerland); Morgan Madec (iCube, France); Luc Hebrard (University of Strasbourg, France); Joris Pascal (University of Applied Sciences Northwestern Switzerland, Switzerland)

14:45

Advanced Analysis of Solutions With a Low-Cost Electronic Device Containing Color Sensor and Programmable RGB LED

Ondrej Kerestes and Miroslav Pohanka (Faculty of Military Health Sciences, Hradec Kralove, CZE)

15:00

Active Conversion of Bubbly Flow Into Slug and Annular Flow During Microchannel Flow Boiling Using Thin-Film Platinum Microheaters

Mark Schepperle and Sebastian Arnold (University of Freiburg, Germany); Peter Woias (Albert-Ludwigs-Universität Freiburg, Germany)

15:15

Concept and Proof of Principle of an Acoustofluidic Single-Particle Sorting Device Using a Spatially Confined Acoustic Active Region

Andreas Fuchsluger (Johannes Kepler University Linz, Austria); Annalisa De Pastina (Silicon Austria Labs, Austria); Tina Mitteramskogler, MSc, Rafael Ecker and Thomas Voglhuber-Brunnmaier (Johannes Kepler University Linz, Austria); Nikolai Anrianov, Alexander Shatalov, Norbert Cselyuszka and Mohssen Moridi (Silicon Austria Labs, Austria); Bernhard Jakoby (Johannes Kepler University Linz, Austria)

15:30

Atmospheric Particulate Matter Sensing With Commercial Quartz Crystal Microbalance. Feature Extraction and Evaluation

Ettore Massera, Tiziana Polichetti and Brigida Alfano (ENEA, Italy); Maria Lucia Miglietta (ENEA C. R. Portici, Italy)

15:45

Triboelectric Energy Harvesting Shoe Insole

Zifan Li (University of Auckland, New Zealand); Lihua Tang (The University of Auckland, New Zealand); Wee Chan Gan (Xiamen University Malaysia, Malaysia); Kean C Aw (The University of Auckland, New Zealand)

16:00

Effect of Heat Treatment on Electrical Insulation of Strain Sensors for Aluminum Cast Parts

Marco A. Cen-Puc and Tim M. de Rijk (University of Bremen, Germany); Dirk Lehmhus (Fraunhofer Institute for Manufacturing Technology and Advanced Materials, Germany)

MEMS & NEMS IV

14:30 - 16:15 / Room: DONATELLO

14:30

High-Frequency Grating-Based MEMS Actuator

Inês E. Pires, Inês Sofia Garcia and João Vieira (INL - International Iberian Nanotechnology Laboratory, Portugal); Zeev Zalevsky (Bar Ilan University, Israel); Carlos Calaza, Filipe S. Alves and Rosana A. Dias (INL - International Iberian Nanotechnology Laboratory, Portugal)

14:45

Development of Piezoelectrically Driven Quasi-Static 2D MEMS Mirrors With Extremely Large FoV for Scanning LiDARs

Paul Raschdorf (Fraunhofer Institute for Silicon Technology ISIT, Germany); Jeong-Yeon Hwang (Fraunhofer ISIT, Germany); Lena Wysocki (Fraunhofer Institute for Silicon Technology ISIT, Germany); Lianzhi Wen and Jörg Albers (Fraunhofer ISIT, Germany); Gunnar Wille (Fraunhofer-Institut für Siliziumtechnologie, Germany); Erdem Yarar (Fraunhofer Institut für Silizium Technologie (ISIT), Germany); Shanshan Gu-Stoppel (Fraunhofer ISIT, Germany)

15:00

Real-Time Tracking of the Dynamic Viscosity of Bitumen With Piezoelectric MEMS Resonators

Suresh Alasatri (Institute of Sensor and Actuator Systems (ISAS), TU Wien, Austria); Michael Schneider (Technische Universität Wien, Österreich, Austria); Johannes Mirwald (TU Wien, Austria); Bernhard Hofko (Vienna University of Technology, Austria); Ulrich Schmid (Technische Universität Wien, Österreich, Austria)

15:15

Zero Power MEMS Resonant Mass Sensors With Piezoelectric Vibration Energy Harvesting: A Promising Innovation for Mass Detection

Aylar Abouzarkhanifard (Memorial University of Newfoundland & Memorial University, Canada); Hamidreza Ehsani Chimeh (Memorial University of Newfoundland, Canada); Seyed Nabavi (Nditive3D INC, Canada); Mohammad Al Janaideh (Memorial University, Canada); Lihong Zhang (Memorial University of Newfoundland, Canada)

15:30

A Conductive MEMS-SPM Using Exchangeable AFM Probes as Indenters for Nanoelectromechanical Measurement of Nanomaterials

Zhi Li (Physikalisch- Technischen Bundesanstalt, Germany); Khaled Kaja and François Piquemal (LNE, France); Karla Hiller (Fraunhofer ENAS, Germany); Susann Hahn (Fraunhofer Institute for Electronic Nano Systems ENAS, Germany); Hüsnü Aslan (Danish National Metrology Institute, Denmark)

15:45

Design and Demonstration of RF-MEMS Switches With Meandered Beams for a Reduced Actuation Voltage

Girolamo Tagliapietra (University of Trento & Fondazione Bruno Kessler, Italy); Jacopo Iannacci (Fondazione Bruno Kessler - FBK, Italy); Flavio Giacomozzi (Fondazione Bruno Kessler, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy)

16:00

Co-Design and Characterization of a Differential Wireless Passive MEMS Pressure Sensor

Romain Alcesilas (Université Grenoble Alpes & CEA-Leti, France); Jean-Claude Bastien and Marc Sansa (CEA-Leti, France); Camille Jouvaud (CEA LETI, France); Patrice Rey (CEA-Leti, France); Cristophe Delaveaud (CEA-LETI, France)

COFFEE BREAK

16:15 - 16:30

WSN AND AUTOMOTIVE SENSORS

16:30 - 17:45 / Room: BERNINI

16:30

Energy Autonomous Tread Wear Wireless Sensor System for Tire Monitoring

Danick Briand (Ecole Polytechnique Fédérale de Lausanne, Switzerland)

16:45

Chipless RFID Humidity Sensor for Smart Packaging Applications

Viviana Mulloni, Giada Marchi, Andrea Gaiardo and Matteo Valt (Fondazione Bruno Kessler, Italy); Massimo Donelli (University of Trento, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy)

17:00

Passive Vision-Based System for Stress Evaluation in Automotive Safety Applications

Andrea Manni and Andrea Caroppo (National Research Council of Italy, Italy); Gabriele Rescio (CNR, Italy); Pietro Siciliano (CNR-IMM, Italy); Alessandro Leone (CNR, Italy)

17:15

Concept Drift Mitigation in Low-Cost Air Quality Monitoring Networks

Gerardo D'Elia (ENEA, Italy); Matteo Ferro (AcusticLab SRL, Italy & Department of Industrial Engineering (DIIn), University of Salerno, Italy); Paolo Sommella (University of Salerno, Italy); Sergio Ferlito, Saverio De Vito and Girolamo Di Francia (ENEA, Italy)

17:30

Modified Local Regression for Signal Resampling

Reiner Jedermann (University of Bremen & FB1, Germany); Yogesh Kapoor (University of Bremen, Germany); Walter Lang (Universität Bremen, Germany)

EMBEDDED SYSTEMS II

16:30 - 17:30 / Room: RAFFAELLO

16:30

Development and Deployment of Portable Sensor Platforms, Based on a MEMS Chemoresistive Gas Sensor Array, for Outdoor Air Quality Monitoring

Andrea Gaiardo, Matteo Valt and Pietro Tosato (Fondazione Bruno Kessler, Italy); Marco Magoni (University of Ferrara & FBK Foundation, Italy); Vincenzo Guidi (University of Ferrara, Italy); Claudia Dolci and Pierluigi Bellutti (Fondazione Bruno Kessler, Italy)

16:45

A Transformer-Based Front-End Circuit for Grounded Capacitive Sensors With Square-Wave Excitation

Viviana Mulloni, Giada Marchi, Andrea Gaiardo and Matteo Valt (Fondazione Bruno Kessler, Italy); Massimo Donelli (University of Trento, Italy); Leandro Lorenzelli (FBK-Center for Materials and Microsystems, Italy)

17:00

HyperTaste Lab - A Notebook With Machine Learning Pipeline for Chemical Sensor Arrays

Gianmarco Gabrieli (IBM Research Europe & University of Rome Tor Vergata, Switzerland); Michal Muszynski, Matteo Manica and Joris Cadow (IBM Research Europe, Switzerland); Patrick Ruch (IBM Research - Zurich, Switzerland)

17:15

Towards Material-Integrated Wireless Electronics for SHM in Fiber Metal Laminates

Sarah Bornemann (University of Bremen, Germany); Björn Lüssem (Universität Bremen, Germany); Jan Niklas Haus (Technische Universität Braunschweig, Germany)

ENERGY HARVESTING

16:30 - 17:30 / Room: GIOTTO

16:30

A Low Cost, Self-Powered, Plantar Pressure Distribution Sensing Insole

Abdo-rahmane Anas Laaraibi (ENS RENNES & IETR & RENNES, France); Gurvan Jodin (Laboratory SATIE ENS of RENNES, France); Mario Costanza (UNIPA, Italy); Damien Hoareau (SATIE Laboratory ENS RENNES, France); Samuel Margueron (FEMTO-ST Institute University of Franche-Comte, France); Nicolas Bideau (M2S University Rennes 2, France); Florence Razan (OASIS IETR Université de Rennes 1 Rennes, France)

16:45

Design and Improvement of Inverted T-Shaped Counter Electrode for Low Parasitic Capacitance Structure in eVEH

Koki Yamamoto (Ebara Corporation, Japan)

17:00

A Hybrid Piezoelectric and Reverse Electrowetting Energy Harvester for Wearable Biosensors

Sotiria D. Psoma and Ihor Sobianin (The Open University, United Kingdom (Great Britain)); Antonios Tourlidakis (University of Western Macedonia, Greece)

17:15

Available Kinetic Energy Sources on the Human Body During Sports Activities: An Optimization Investigation Using Cantilevered Piezoelectric Harvester Model

Damien Hoareau (SATIE Laboratory ENS RENNES, France); Gurvan Jodin (Laboratory SATIE ENS of RENNES, France); Abdo-rahmane Anas Laaraibi (ENS RENNES & IETR & RENNES, France); Jacques Prioux (ENS - Rennes, France); Florence Razan (OASIS IETR Université de Rennes 1 Rennes, France)

OPTICAL MICROSYSTEMS

16:30 - 17:45 / Room: DONATELLO

16:30

Multispectral Integrated System With Discrete Light Sources for Material Classification

Anju Manakkakudy, Kumaran (Roma Tre University, Italy); Federica Mitri and Andrea De Iacovo (University Roma Tre, Italy); Emanuele Maiorana (Roma Tre University, Italy); Lorenzo Colace (University "Roma Tre", Italy)

16:45

Colour Catcher®: A Low-Cost Support for Realizing Colorimetric Sensors for PFOA Detection

Fabrizio Caroleo (University Tor Vergata, Rome, Italy); Gabriele Magna (University of Rome Tor Vergata, Italy); Corrado Di Natale (Università di Roma Tor Vergata, Italy); Roberto Paolesse (University Tor Vergata, Italy); Francesco Pizzoli, Sara Nardis and Valerio Allegra (University of Rome Tor Vergata, Italy); Emma Gallo (University of Milan, Italy)

17:00

Optical System Design and Characterization of MEMS Mirror Based SPAD LiDAR System for Smart Factory Applications

Jeong-Yeon Hwang (Fraunhofer ISIT, Germany); Paul Raschdorf (Fraunhofer Institute for Silicon Technology ISIT, Germany); Andre Henschke, Manuel Ligges and Sara Grollius (Fraunhofer IMS, Germany); Shanshan Gu-Stoppel (Fraunhofer ISIT, Germany)

17:15

Spike Proteins Spectroscopic Characterization of MERS-CoV, SARS-CoV, SARS-CoV-2 and Its Variants for the Development of an IR Optical Biosensing Platform

Tiziana Mancini (Università La Sapienza di Roma, Italy); Annalisa D'Arco (National Institute for Nuclear Physics Laboratori Nazionali Frascati - INFN-LNF, Italy); Marta Di Fabrizio (IPHYS SB EPFL and UNIL, Switzerland); Rosanna Mosetti and Salvatore Macis (La Sapienza University of Rome, Italy); Giovanna Tranfo (INAIL, Italy); Giancarlo Della Ventura (University Rome Tre, Italy); Augusto Marcelli (INFN-LNF and Rome International Centre for Materials Science Superstipes, Italy); Massimo Petrarca (Università di Roma La Sapienza, Italy); Stefano Lupi (Università La Sapienza di Roma, Italy)

17:30

Improvement of Tamm Interface State Detection by Using a Porous Layer Between a Metal Nanostructured Network and a DBR

Oumaima Haidar (University of Lille & IEMN, France); Baptiste Mathmann and Yannick Dusch (Central Lille & IEMN, France); Mohamed El barghouti (Moulay Ismail University, France); Gaetan Leveque and Abdellatif Akjouj (University of Lille & IEMN, France); Abdellah Mir (Moulay Ismail University, Morocco); Abdelkrim Talbi (Centrale Lille Institut IEMN, France)

AWARDS CEREMONY & CLOSING REMARKS

17:45 - 18:00

SPONSORING & EXHIBITION

PLATINUM SPONSOR

GOLD SPONSOR

BRONZE SPONSOR

BASIC EXHIBITION

NEXTRON
MICRO PROBE SYSTEM

DISTRETTO TECNOLOGICO
SICILIA MICRO E NANO SISTEMI
S.C.A.R.L.

OTHER PARTNERS

Sensors & Diagnostics

SMART LIVING TECHNOLOGIES

INNOVAAL
Research and innovation for Active & Assisted Living

Dhitech SCARL
DISTRETTO TECNOLOGICO HIGH TECH

DANTE
EUROPEAN DIGITAL INNOVATION HUB

IMM Istituto per la Microelettronica e Microsistemi
Consiglio Nazionale delle Ricerche

POLO
BIBLIO · MUSEALE
DI LECCE

H-BIO
Distretto H-BIO Puglia Scrl

DTA
DISTRETTO
TECNOLOGICO
AEROSPAZIALE

NOTES

NOTES

NOTES

NOTES

CONTACT

Roma Multiservizi – Conference Organization
e-mail reservation@eurosensors2023.eu
tel. +39 0832231822

www.eurosensors2023.eu