

# Table of Contents

<b>Welcome Message .....</b>	<b>2</b>
<b>Organizing Committee .....</b>	<b>3</b>
<b>Plenary Lectures .....</b>	<b>4</b>
<b>Social Functions .....</b>	<b>5</b>
<b>Welcome Party .....</b>	<b>5</b>
<b>Gala Dinner .....</b>	<b>5</b>
<b>Touristic Tours.....</b>	<b>5</b>
<b>Conference Venue Map .....</b>	<b>6</b>
<b>Conference Grid – Thursday, May 7 .....</b>	<b>7</b>
<b>Conference Grid: Friday, May 8 - Saturday, May 9.....</b>	<b>8</b>
<b>Thursday, May 7th .....</b>	<b>9</b>
<b>Friday, May 8 .....</b>	<b>17</b>
<b>Saturday, May 9 .....</b>	<b>25</b>

# Welcome Message

The IEEE International Symposium on Medical Measurements and Application - MeMeA2015 is the 10<sup>th</sup> edition of a successful international series of scientific meetings in the field of measurements for medicine and healthcare.

MeMeA event started in 2006 with a workshop dedicated to all aspects of interaction between the measurement and the medical fields and, over the years, has developed into an important symposium, which collects the international community of researchers interested in medical measurements.

This year's symposium theme "*Medical measurements: a need and a challenge*" highlights how medical measurements represent a real challenge to collect correct and trustworthy data for patient healthcare. The scope and ideas of the original MeMeA are, therefore, still of actuality.

Medical measurements and devices continue to deal with the measurands variability over time and among patients due to a multitude of intrinsic and extrinsic factors; then, there is an increasingly need of sensors and embedded systems for non-invasive measurements. Furthermore, the reliability, accuracy and efficiency of the implemented methods and systems are the main concerns of researchers in medical measurements and applications in a context of increasing cost-conscious customers, governments and regulatory agencies.

The MeMeA2015 symposium deals with medical sensors design, physiological signal and imaging processing, which continue to be the most preferred topics, together with bioengineering, rehabilitation and automation for disability and old age. The symposium also hosts six special sessions specifically devoted to mechanical and thermal measurements for medicine and biology, wireless communications in healthcare, non-invasive assessment of the neuromuscular system, precise motion measurement using inertial measurement units, ultrasound technology in medical applications, metrology for bioscience.

After a rigorous reviewing process, more than 120 high quality papers have been selected for publication in the Symposium proceedings. More than 550 authors of academia, industry, government and NGO institutions come from Europe, Canada, USA, Asia and Middle East to attend the symposium in the historical Savoy residence of Castello del Valentino, property of Politecnico di Torino.

Following the positive experience of previous MeMeA edition in Lisboa, a Best Paper Award, Best Student Paper Award, Best Women in Engineering Paper Award and the Best Poster Award are granted on the basis of the paper classification provided by Technical Program Committee members and of the presentations quality.

A special thank to the Technical Program Committee Members and to the reviewers who contributed to make this outstanding program possible. Finally a special thank to the authors, whose research and development efforts are presented during the IEEE MeMeA 2015.

Welcome to MeMeA2015 at Politecnico di Torino, Italy!

## General Chair

Sabrina Grassini, Politecnico di Torino, Italy

## Technical Program Chairs

Voicu Groza, University of Ottawa, Canada

Luca De Vito, Università del Sannio, Italy

# Organizing Committee

## **Honorary Chair**

Marco Parvis, Politecnico di Torino, Italy

## **General Chair**

Sabrina Grassini, Politecnico di Torino, Italy

## **Technical Program Chair**

Voicu Groza, University of Ottawa, Canada

Luca De Vito, Università del Sannio, Italy

## **Special Session Chair**

Simone Corbellini, Politecnico di Torino, Italy

## **Steering Committee**

Gregorio Andria, Politecnico di Bari, Italy

Pasquale Daponte (Chair), Università del Sannio, Italy

Aime Lay Ekuakille, Università del Salento, Italy

Alessandro Ferrero, Politecnico di Milano, Italy

Rafik Goubran, Carleton University, Canada

Sabrina Grassini, Politecnico di Torino, Italy

Domenico Grimaldi, Università della Calabria, Italy

Voicu Groza, University of Ottawa, Canada

Baki Karaböce, TÜBİTAK UME, Turkey

Marco Parvis, Politecnico di Torino, Italy

Emil Petriu, University of Ottawa, Canada

Octavian Postolache, Instituto Universitário de Lisboa and Instituto de Telecomunicações, Lisboa, Portugal

Sreeraman Rajan, Defence Research and Development Canada-Ottawa, Canada

Sergio Rapuano (Secretary), Università del Sannio, Italy

Mario Savino, Politecnico di Bari, Italy

Wendy van Moer, Vrije Universiteit Brussel, Belgium

Annamaria Varkony-Koczy, Obuda University, Hungary

## **Conference Management**

Conference Catalysts, LLC

# Plenary Lectures

## Plenary Lecture 1 – May 7

Location: Castello del Valentino, Room 1 (Salone d'Onore)

Carlo Gulotta, MD, S. Luigi Hospital, Orbassano (TO), Italy

**“Measurements based on the forced oscillation technique (FOT) for asthma assessment and management”**



Carlo Gulotta, MD, was born in 1952 in Italy. He is specialist in Pneumology and Head of the Department of Cardio Respiratory Pathophysiology of San Luigi Hospital, Orbassano, Turin. He is President of the scientific association for the study of respiratory disease (AIMAR) of Piemonte and Valle d'Aosta, Italy. His clinical and research activities concern lung volume assessment, gas exchange, lung mechanics and mechanical ventilation in heart and lung diseases in chronic and acute patients. He actively cooperates with Politecnico of Turin and Milan to develop new original methods in lung function assessment. He is author of more than one hundred scientific papers in National and International Journals.

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## Plenary Lecture 2 – May 8

Location: University of Gastronomic Science, Pollenzo

Anthimos Georgiadis, Leuphana University Lüneburg, Germany

**“Mechanical and electrical characterization of fibrous nano-materials in medicine”**



Anthimos Georgiadis is Professor of measuring technologies and intelligent systems and director of the Institute of Product and Process Innovation (PPI) at Leuphana University of Lueneburg, Germany. His research in measuring technologies, sensors and intelligent systems is mainly funded by European projects. Further funding of the public and private sectors has resulted in over a dozen patents and technology transfers to the private sector, a number of innovation awards and over 60 publications. At the moment more than 10 PhD candidates follow the activities of the laboratory of measuring technologies and intelligent systems. A group of master students working on intelligent systems have won the German championship in the ROBOCUP, Logistics competition 2011 and became second in the

world championship logistics competition in 2012 in Mexico. He is member of IEEE, Instrumentation and Measurement Society, member of the VDI and the DPG (German Physical Society) and independent evaluator of the European Commission, the Italian Research Ministry, the Greek and Cyprus ministry of research.

## **Social Functions**

### **Welcome Party**

The welcome party is held on Thursday, May 7th, at the end of the afternoon sessions, in the Sala delle Colonne and in the courtyard of the Castello del Valentino.

A buffet with traditional and regional cuisine will be offered to all MeMeA2015 attendees. During the party a musical entertainment will be organized with the participation of the Choir of Politenico di Torino, directed by Giorgio Guiot and Dario Ribechi.

### **Gala Dinner**

The MeMeA 2015 Gala Dinner is held on Friday, May 8th, in the Albergo dell'Agenzia, an historical Savoy residence, in Pollenzo, a town located in "The Vineyard landscape of Piedmont: Langhe-Roero and Monferrato", which is part of the UNESCO World Heritage List. The residence also houses the first University of Gastronomic Sciences in the world.

The buses to Pollenzo leave on Friday, May 8th at about 2.30 p.m. from - Castello del Valentino.

The University of Pollenzo hosts the May 8th afternoon session of the Symposium and, in particular, one of the plenary lectures and the round table.

Before the dinner, a "Wine and cheese" tour in the Wine Bank located in the historical cellars of the Agenzia di Pollenzo is organized for all attendees with the taste of 2 wines, local products and Slow Food presidia products. Non-alcoholic cocktails and pork-free meals will be also available.

## **Touristic Tours**

### **Holy Shroud: Exposition 2015**

A visit to the exposition of the Holy Shroud is organized for a limited number of MeMeA attendees in the following dates, on a first arrived, first served policy; the visit is free of charge:

- Friday, May 8th at 11.00 a.m.
- Saturday, May 9th at 4.00 p.m.

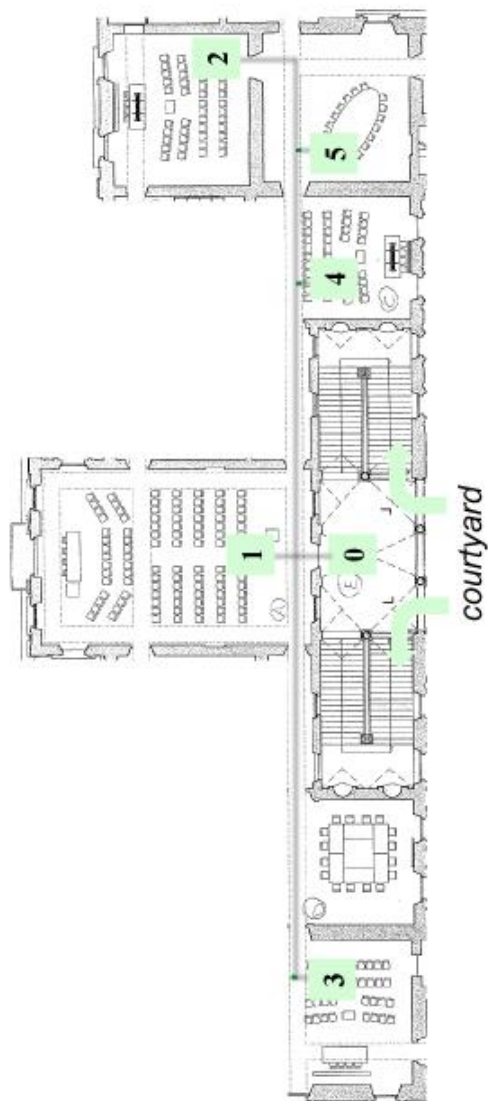
### **The Merenda Reale**

A visit to a historical café in the downtown of Torino is organized on Saturday, May 9th in the afternoon after the symposium end.

The visit is associated to a dip in the old fashioned ritual of chocolate following the customs of 18th century Courts. The Bicerin and the hot chocolate, whose cocoa beans were brought from America to Piemonte by the Savoy family, play a leading role. Moreover, the Merenda Reale celebrates the noble art of pastry making in Torino with its "bagnati" (i.e. biscuits for dunking) and some chocolate specialties.

## Conference Venue Map

### Castello del Valentino – First floor Registration & Conference Rooms



- 0 – Reception desk
- 1 – Room 1 Salone d'Onore
- 2 – Room 2 Stanza dello Zodiaco
- 3 – Room 3 Stanza della Caccia
- 4 – Poster session Stanza dei Gigli
- 5 – Meetings Stanza del Valentino

## Conference Grid – Thursday, May 7

<b>Thursday - 07/05/2015</b>			
9.30 - 10.15	Registration		
10.15 - 10.30	<i>Welcome - Opening session - Room 1 (Salone d'Onore)</i>		
10.30 - 11.00	<i>Plenary lecture - Room 1 (Salone d'Onore)</i> <i>Carlo Gulotta - "Measurements based on the forced oscillation technique (FOT) for asthma assessment &amp; management"</i>		
	<i>Room 1 - Salone d'Onore</i>	<i>Room 2 - Stanza dello Zodiaco</i>	<i>Room 3 - Stanza della Caccia</i>
11.00 - 12.40	<b>T1.1</b> Biosignal processing I Chair: V. Groza - Lanzolla	<b>T2.1</b> Imaging and communication I Chair: R. Goubran, S. Rapuano	<b>T3.1</b> Special Session: Non-invasive assessment of the neuromuscular system Chair: M. Knafnitz - F. Molinari
12.40 - 14.10	<i>Lunch - Sala delle Colonne</i>		
14.10 - 15.50	<b>T1.2</b> Sensors for medical systems / Sensor fusion and calibration Chair: B. Wallace, S. Corbellini	<b>T2.2</b> Special Session: Ultrasound technology in medical applications Chair: G. Durando, B. Karaboce	<b>T3.2</b> Special Session: Precise motion measurement using Inertial Measurement Units (IMU) Chair: M. Gebhard - Axel Gräser
15.50 - 16.20	<i>Coffee break - Sala delle Colonne</i>		
16.20 - 18.00	<b>T1.3</b> Measurement for patient safety and quality control Chair: A. Varkonyi-Koczy, S. Grassini	<b>T2.3</b> Special Session: Wireless Communications in Healthcare Chair: O. Postolache, G. Andria	<b>T3.3</b> Special Session: Mechanical and Thermal Measurements for Medicine and Biology Chair: Z. Del Prete - R. Vallascas
18.00 - 18.30	<i>Vocal performance of the Choir of Politecnico di Torino, Room 1 (Salone d'onore)</i>		
18.30 - 20.00	<i>Welcome Party - Sala delle Colonne</i>		

## Conference Grid: Friday, May 8 - Saturday, May 9

<b>Friday 08/05/2015</b>			
	<i>Room 1 - Salone d'Onore</i>	<i>Room 2 - Stanza dello Zodiaco</i>	<i>Room 3 - Stanza della Caccia</i>
9.00 - 10.40	<b>F1.1</b> Biosignal processing II Chair: V. Groza, A. Lay-Ekuakille	<b>F2.1</b> Imaging and communication II Chair: S. Bennet, M. Parvis	<b>F3.1</b> Special Session: Mechanical and Thermal Measurements for Medicine and Biology Chair: L. Scalise, P. Cappa
10.40 - 11.00	<b>Coffee break - Sala delle Colonne</b>		
11.00 - 12.30	<b>PS1 Poster session 1 - Stanza dei Gigli - Chair: M. Bertocco, F. Lamonaca</b>		<b>Steering Committee meeting - Stanza del Valentino</b>
12.30 - 13.00	<b>Award ceremony in the memory of Prof. De Benedetti - Room 1 (Salone d'Onore)</b>		
13.00 - 14.30	<b>Lunch - Sala delle Colonne</b>		
14.30 - 16.00	<b>Bus transfer to the University of Gastronomic Science, Pollenzo</b>		
16.00 - 16.30	<b>Plenary lecture - Pollenzo conference room</b> Anthimos Georgiadis - " <i>Mechanical and electrical characterization of fibrous nano-materials in medicine</i> "		
16.30 - 17.45	<b>Round table - Pollenzo conference room</b> " <i>International network in metrology for patient health care</i> " A. Georgiadis, R. Goubran, C. Gulotta, M. Inguscio, B. Karaboce, - Chair: P. Vassiliou		
17.45 - 18.00	<b>Preview of MeMeA2016 in Benevento, Italy - Pollenzo conference room</b>		
18.00 - 19.00	<b>Wine &amp; Cheese tour at University of Gastronomic Science, Pollenzo</b>		
19.00 - 21.00	<b>Gala Dinner - Albergo dell'Agencia, Pollenzo</b>		
21.00 - 23.00	<b>Bus transfer to Torino</b>		
<b>Saturday 09/05/2015</b>			
	<i>Room 1 - Salone d'Onore</i>	<i>Room 2 - Stanza dello Zodiaco</i>	<i>Room 3 - Stanza della Caccia</i>
9.00 - 10.40	<b>S1.1</b> Bioengineering and rehabilitation - Monitoring of rehabilitation Chair: M. Serpelloni, R. Goubran	<b>S2.1</b> Embedded systems - Medical and Instrumentation uncertainty Chair: A. Depari, A. El-Saddik	<b>S3.1</b> Special Session: Metrology in Biosciences Chair: M. Sassi - A. Georgiadis
10.40 - 12.10	<b>PS2 Poster session 2 - Stanza dei Gigli - Chair: L. De Vito, M. Riccio</b>		
12.10 - 12.30	<b>Closing session - Best poster award Room 1 (Salone d'onore)</b>		
12.30 - 14.00	<b>Brunch - Sala delle Colonne</b>		
15.00 - 19.00	<b>Post tour</b>		



# Thursday, May 7th

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**09:30 - 10:15**

**Registration**

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**10:15 - 10:30**

**Welcome - Opening session**

**Room:** Room 1 (Salone d'Onore)

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**10:30 - 11:00**

**Plenary lecture**

**Room:** Room 1 (Salone d'Onore)

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**Measurements based on the forced oscillation technique (FOT) for asthma assessment & management**

Carlo Gulotta, MD, S. Luigi Hospital, Orbassano (TO), Italy

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**11:00 - 12:40**

**T1.1: Biosignal processing I**

**Room:** Room 1 (Salone d'Onore)

**Chairs:** Voicu Groza (University of Ottawa, Canada), Anna Maria Lucia Lanzolla (Polytechnic of Bari, Italy)

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**Gaussian Mixture Modeling for Statistical Analysis of Features of High-Resolution CT Images of Diffuse Pulmonary Diseases**

Eliana Almeida (Universidade Federal de Alagoas, Brazil)

Rangaraj M. Rangayyan (University of Calgary, Canada)

Paulo M. Azevedo-Marques (University of Sao Paulo, Brazil)

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**Using Deconvolution to Determine the Sphincter Strength Distribution Around the Urethra**

Mario Klünder (University of Stuttgart, Germany)

Ronny Feuer (University of Stuttgart, Germany)

Oliver Sawodny (University of Stuttgart, Germany)

Michael Ederer (University of Stuttgart, Germany)

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**Spatio-Temporal Video Processing for Respiratory Rate Estimation**

Davide Alinovi (University of Parma, Italy)

Luca Cattani (University of Parma, Italy)

Gianluigi Ferrari (University of Parma, Italy)

Francesco Pisani (University of Parma, Italy)

Riccardo Raheli (University of Parma, Italy)

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**Combining Graph Analysis and Recurrence Plot on fMRI Data**

Angela Lombardi (Politecnico di Bari, Italy)

Pietro Guccione (Politecnico di Bari, Italy)

Luigi Mascolo (Politecnico di Bari, Italy)

Giovanni Nico (National Research Council, Italy)

Paolo Taurisano (University of Bari, Italy)

Leonardo Fazio (University of Bari, Italy)

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## Thursday, May 7th

### **Automated Hippocampus Segmentation with the Channeler Ant Model: results on different datasets**

Elisa Fiorina (University of Torino and INFN, Italy)  
Francesco Pennazio (University of Torino and INFN, Italy)  
Cristiana Peroni (University of Torino and INFN, Italy)  
Ernesto Lopez Torres (Ceaden, INFN sez. Torino, Cuba)  
Maria Evelina Fantacci (University of Pisa & INFN, Italy)  
Alessandra Retico (INFN sez. Pisa, Italy)  
Luca Rei (University of Genoa & INFN Genoa, Italy)  
Andrea Chincarini (INFN sez. Genova, Italy)  
Paolo Bosco (IRCCS San Giovanni di Dio-FBF, Italy)  
Marina Boccardi (IRCCS San Giovanni di Dio-FBF, Italy)  
Martina Bocchetta (IRCCS San Giovanni di Dio-FBF, Italy)  
Piergiorgio Cerello (INFN sez. Torino, Italy)

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**11:00 - 12:40**

### **T2.1: Imaging and communication I**

**Room:** Room 2 (Stanza dello Zodiaco)

**Chairs:** Rafik Goubran (Carleton University, Canada), Sergio Rapuano (University of Sannio, Italy)

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### **Measurements of Change in Thermal Images Due to Applied Pressure**

Stephanie Bennett (Carleton University, Canada)  
Rafik Goubran (Carleton University, Canada)  
Frank Knoefel (University of Ottawa, Canada)

### **Detection of Necrotizing Enterocolitis in Newborns using Abdominal Thermal Signature Analysis**

Guy Mathurin Kouamou Ntonfo (University of Modena and Reggio Emilia, Italy)  
Monique Frize (Carleton University, Canada)  
Erika Bariciak (University of Ottawa, Canada)

### **Digital Chest Tomosynthesis: the Main Steps to a Computer Assisted Lung Diagnostic System**

Daniel Hadhazi (Budapest University of Technology and Economics, Hungary)  
Róbert Varga (Budapest University of Technology and Economics, Hungary)  
Áron Horváth (Budapest University of Technology and Economics, Hungary)  
Benjamin Czétényi (Budapest University of Technology and Economics, Hungary)  
Gábor Horváth (Budapest University of Technology and Economics, Hungary)  
Ákos Horváth (Innomed Medical Inc., Hungary)

### **Preliminary Test of a Prototype of Microwave Axial Tomograph for Medical Applications**

Manuela Maffongelli (University of Applied Sciences of Southern Switzerland, Switzerland)  
Samuel Poretti (University of Applied Sciences of Southern Switzerland, Switzerland)  
Andrea Salvadè (University of Applied Sciences of Southern Switzerland, Switzerland)  
Ricardo D. Monleone (University of Applied Sciences of Southern Switzerland, Switzerland)  
Francesco Meani (Ente Ospedaliero Cantonale, Switzerland)  
Alessandro Fedeli (University of Genoa, Italy)  
Matteo Pastorino (University of Genoa, Italy)  
Andrea Randazzo (University of Genoa, Italy)

## Thursday, May 7th

### **AvanTomography: A Compact Module for Positron Emission Mammography**

Defne Us (Tampere University of Technology, Finland)  
Amalia Moreno Galera (Tampere University of Technology, Finland)  
Sanaz Nazari Farsani (Tampere University of Technology, Finland)  
Karri Palovuori (Tampere University of Technology, Finland)  
Heikki Kosola (Icraft Oy, Finland)  
Tiziana Zedda (Ghent University, Finland)  
Ulla Ruotsalainen (Tampere University of Technology, Finland)

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**11:00 - 12:40**

### **T3.1: Special Session: Non-invasive assessment of the neuromuscular system**

**Room:** Room 3 (Stanza della Caccia)

**Chairs:** Marco Knafnitz (Politecnico di Torino, Italy), Filippo Molinari (Politecnico di Torino, Italy)

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### **Gait Feature Analysis of Polyneuropathy Patients**

Xingchen Wang (University of Bremen, Germany)  
Olena Kuzmicheva (University of Bremen, Germany)  
Matthias Spranger (Neurological Rehabilitation Center Friedehorst, Germany)  
Axel Graeser (University of Bremen, Germany)

### **Dynamic Posturography: perturbed equilibrium assessment on healthy adult subjects**

Lucia Grassi ("Sapienza" University of Rome, Italy)  
Stefano Rossi (University of Tuscia, Italy)  
Paolo Cappa ("Sapienza" University of Rome, Italy)

### **Non-Invasive Assessment of Neuromuscular Disorders by 7 Tesla Magnetic Resonance Imaging and Spectroscopy: Dedicated Radio-Frequency Coil Development**

Alessandra Retico (Istituto Nazionale di Fisica Nucleare (INFN), Sez. di Pisa, Italy)  
Riccardo Stara (Dip. di Fisica dell'Università di Pisa e Sez. INFN di Pisa, Italy, Italy)  
Maria Evelina Fantacci (Dip. di Fisica dell'Università di Pisa e Sez. INFN di Pisa, Italy, Italy)  
Angelo Galante (Dipartimento MESVA, Università degli Studi dell'Aquila e INFN (LNGS), L'Aquila, Italy, Italy)  
Tiziana Florio (Dipartimento MESVA, Università degli Studi dell'Aquila e INFN (LNGS), L'Aquila, Italy, Italy)  
Marcello Alecci (Dipartimento MESVA, Università degli Studi dell'Aquila e INFN (LNGS), L'Aquila, Italy, Italy)  
Mirco Cosottini (Dip. di Ricerca Traslationale e delle Nuove Tecnologie in Medicina e Chirurgia, Univ. di Pisa e Fondazione IMAGO7, Pisa, Italy)  
Guja Astrea (IRCCS Stella Maris, Pisa, Italy, Italy)  
Roberta Battini (IRCCS Stella Maris, Pisa, Italy, Italy)  
Gianluigi Tiberi (IRCCS Stella Maris e Fondazione IMAGO7, Pisa, Italy, Italy)  
Alessandra Toncelli (IRCCS Stella Maris e Fondazione IMAGO7, Pisa, Italy)  
Mauro Costagli (IRCCS Stella Maris e Fondazione IMAGO7, Pisa, Italy)  
Michela Tosetti (IRCCS Stella Maris e Fondazione IMAGO7, Pisa, Italy)

### **A Non-Invasive Method for a Quantitative Evaluation of Muscle Involvement in MRI of Neuromuscular Diseases**

Maria Evelina Fantacci (University of Pisa and INFN Pisa, Italy)  
Chiara Sottocornola (University of Pisa and INFN Pisa, Italy)  
Alessandra Retico (INFN Pisa, Italy)  
Guja Astrea (Stella Maris Scientific Institute, Italy)  
Roberta Battini (IRCCS Fondazione Stella Maris, Italy)  
Michela Tosetti (IRCCS Fondazione Stella Maris, Italy)

### **Low cost inkjet printing for the fast prototyping of surface EMG detection systems**

Marco Gazzoni (Politecnico di Torino, Italy)

# Thursday, May 7th

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**12:40 - 14:10**

**Thursday Lunch**

**Room:** Sala delle Colonne

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**14:10 - 15:50**

**T1.2: Sensors for medical systems / Sensor fusion and calibration**

**Room:** Room 1 (Salone d'Onore)

**Chairs:** Simone Corbellini (Politecnico di Torino, Italy), Bruce Wallace (Carleton University, Canada)

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**A 7T double-tuned ( $^1\text{H}/^{31}\text{P}$ ) microstrip surface RF coil for the Imago7 MR scanner**

Alessandra Retico (Istituto Nazionale di Fisica Nucleare, Italy)

Assunta Vitacolonna (Universita' degli Studi dell'Aquila, Italy)

Angelo Galante (Universita' degli Studi dell'Aquila, Italy)

Tiziana Florio (Universita' degli Studi dell'Aquila, Italy)

Annamaria Cimini (Universita' degli Studi dell'Aquila, Italy)

Riccardo Stara (Universita' di Pisa e INFN (Sez. Pisa), Italy)

Gianluigi Tiberi (IRCCS Stella Maris e Fondazione IMAGO7, Pisa, Italy)

Michela Tosesti (IRCCS Stella Maris e Fondazione IMAGO7, Pisa, Italy)

Nunzia Fontana (Universita' di Pisa e INFN (Sez. Pisa), Pisa, Italy)

Giuliano Manara (Universita' di Pisa e INFN (Sez. Pisa), Pisa, Italy)

Agostino Monorchio (Universita' di Pisa e INFN (Sez. Pisa), Pisa, Italy)

Marcello Alecci (Universita' degli Studi dell'Aquila, Italy)

**Big Data Analytics to Identify Deceleration Characteristics of an Older Driver**

Bruce Wallace (Carleton University, Canada)

Akshay Puli (Carleton University, Canada)

Rafik Goubran (Carleton University, Canada)

Frank Knoefel (Bruyere Research Institute, Canada)

Shawn Marshall (Ottawa Hospital Research Institute, Canada)

Michelle Porter (University of Manitoba, Canada)

Andrew Smith (Ottawa Hospital Research Institute, Canada)

**Temperature monitoring during laser ablation by FBG sensors encapsulated within a metallic needle: experiments on healthy swine tissue**

Emiliano Schena (University Campus Bio-Medico of Rome, Italy)

Paola Saccomandi (University Campus Bio-Medico of Rome, Italy)

Carlo Massaroni (Universita' Campus Bio-Medico di Roma, Italy)

Valeria Quattrocchi (Universita' Campus Bio-Medico di Roma, Italy)

Giulia Frauenfelder (Universita' Campus Bio-Medico di Roma, Italy)

Francesco Giurazza (Universita' Campus Bio-Medico di Roma, Italy)

Sergio Silvestri (University Campus Bio-Medico of Rome, Italy)

Michele Arturo Caponero (Research Centre of Frascati, ENEA, Italy)

Andrea Polimadei (Research Centre of Frascati, ENEA, Italy)

**On-site, parallel detection of bio-analytes in water by an integrated capillary flow based opto-microfluidic device**

Nuno Pires (Buskerud and Vestfold University College, Norway)

Tao Dong (Buskerud and Vestfold University College, Norway)

**A Photoacoustics based Continuous Non-Invasive Blood Glucose Monitoring System**

Praful P. Pai (Indian Institute of Technology Kharagpur, India)

Pradyut K. Sanki (Indian Institute of Technology Kharagpur, India)

Swapna Banerjee (Indian Institute of Technology, Kharagpur, India)

## Thursday, May 7th

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**14:10 - 15:50**

### **T2.2: Special Session: Ultrasound technology in medical applications**

**Room:** Room 2 (Stanza dello Zodiaco)

**Chairs:** Giovanni Durando (Istituto Nazionale di Ricerca Metrologica, Italy), Baki Karaböce (Tübitak Ulusal Metroloji Enstitüsü, Turkey)

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#### **Measurements of temperature increase induced on a tissue-mimicking material by a clinical US-guided HIFU system**

Federica Palorini (Ospedale San Raffaele, Italy)

Daniela Origgi (Istituto Europeo di Oncologia, Italy)

Marika Guernieri (Azienda Ospedaliero Universitaria di Udine, Italy)

Adriano Troia (Istituto Nazionale di Ricerca Metrologica, Italy)

Chiara Magnetto (Istituto Nazionale di Ricerca Metrologica, Italy)

Giovanni Durando (Istituto Nazionale di Ricerca Metrologica, Italy)

#### **Heat capacity measurements of novel tissue-mimicking materials**

P. Alberto Giuliano Albo (Istituto Nazionale di Ricerca Metrologica, Italy)

Simona Lago (Istituto Nazionale di Ricerca Metrologica, Italy)

#### **Acoustic Characterization of Ultrasound Fields Able to Induce Sonodynamic Activity in an in Vitro Cancer Model**

Giovanni Durando (National Institute of Metrological Research (INRIM), Italy)

Claudio Guglielmone (National Institute of Metrological Research (INRIM), Italy)

Roberto Canaparo (University of Torino, Italy)

Loredana Serpe (University of Torino, Italy)

#### **New formulations for realization and characterization of homogeneous tissue mimicking materials for HIFU exposures**

Adriano Troia (National Institute of Metrological Research (INRIM), Italy)

Rugiada Cuccaro (National Institute of Metrological Research (INRIM), Italy)

Alessandro Schiavi (National Institute of Metrological Research (INRIM), Italy)

#### **Focused ultrasound temperature effect in tissue-mimicking material and sheep liver**

Baki Karaböce (TÜBITAK, Turkey)

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**14:10 - 15:50**

### **T3.2: Special Session: Precise motion measurement using Inertial Measurement Units (IMU)**

**Room:** Room 3 (Stanza della Caccia)

**Chairs:** Marion Gebhard (Westphalian University of Applied Sciences, Germany), Axel Graeser (University of Bremen, Germany)

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#### **Evaluation of Control Modes for Head Motion-based Control with Motion Sensors**

Nina Rudigkeit (Westphalian University of Applied Sciences, Germany)

Marion Gebhard (Westphalian University of Applied Sciences, Germany)

Axel Graeser (University of Bremen, Germany)

#### **Real-time gait detection based on Hidden Markov Model: is it possible to avoid training procedure?**

Juri Taborri ("Sapienza" University of Rome, Italy)

Emilia Scalona ("Sapienza" University of Rome, Italy)

Stefano Rossi (University of Tuscia, Italy)

Eduardo Palermo (New York University School of Engineering, USA)

Fabrizio Patanè ("Niccolò Cusano" University, Italy)

Paolo Cappa ("Sapienza" University of Rome, Italy)

## Thursday, May 7th

### **Wearable sensors for gait analysis**

Valentina Agostini (Politecnico di Torino, Italy)  
Marco Knafnitz (Politecnico di Torino, Italy)  
Laura Antenucci (Politecnico di Torino, Italy)  
Giulia Lisco (Politecnico di Torino, Italy)  
Laura Gastaldi (Politecnico di Torino, Italy)  
Shigeru Tadano (Hokkaido University, Japan)

### **Accelerometer-Based Methods for Energy Expenditure using the Smartphone**

Susana Carneiro (Fraunhofer Portugal AICOS, Portugal)  
Joana Silva (Fraunhofer Portugal AICOS, Portugal)  
Bruno Aguiar (Fraunhofer Portugal AICOS, Portugal)  
Tiago Rocha (Fraunhofer Portugal AICOS, Portugal)  
Ines Sousa (Fraunhofer Portugal AICOS, Portugal)  
Tiago Montanha (Research Centre in Physical Activity and Health, Portugal)  
José Carlos Ribeiro (Research Centre in Physical Activity and Health, Portugal)

### **Compensating magnetic disturbances on MARG units by means of a low complexity data fusion algorithm**

Pasquale Daponte (University of Sannio, Italy)  
Luca De Vito (University of Sannio, Italy)  
Sergio Rapuano (University of Sannio, Italy)  
Maria Riccio (University of Sannio, Italy)  
Francesco Picariello (University of Sannio, Italy)

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**15:50 - 16:20**

**Coffee break**

**Room:** Sala delle Colonne

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**16:20 - 18:00**

### **T1.3: Measurement for patient safety and quality control**

**Room:** Room 1 (Salone d'Onore)

**Chairs:** Sabrina Grassini (Politecnico di Torino & Department of Applied Science and Technology, Italy), Annamária R. Várkonyi-Kóczy (Óbuda University, Hungary)

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### **An Anytime Voice Controlled Ambient Assisted Living System for Motion Disabled Persons**

Gabriella Nagy (Óbuda University, Hungary)  
Annamária R. Várkonyi-Kóczy (Óbuda University, Hungary)  
János Tóth (J. Selye University, Slovakia)

### **Home telemonitoring of vital signs through a TV-based application for elderly patients**

Silvia Macis (University of Cagliari, Italy)  
Daniela Loi (University of Cagliari, Italy)  
Danilo Pani (University of Cagliari, Italy)  
Luigi Raffo (University of Cagliari, Italy)  
Serena La Manna (Dedalus S.p.A., Italy)  
Vincenzo Cestone (Dedalus S.p.A., Italy)  
Davide Guerri (Dedalus S.p.A., Italy)

Thursday, May 7th

**Integration of Outcome Estimations with a Clinical Decision Support System:  
Application in the Neonatal Intensive Care Unit (NICU)**

Monique Frize (Carleton University, Canada)  
Hasmik Martirosyan (Carleton University, Canada)  
Jeff Gilchrist (Carleton University, Canada)  
Erika Bariciak (Children's Hospital of Eastern Ontario, Canada)

**Towards a Probabilistic Model Checking-based Approach for Medical Device Risk Assessment**

Giuseppe Cicotti (National Research Council, Italy)  
Antonio Coronato (National Research Council, Italy)

**An Automatic Sensing Test Procedure for Implantable Cardioverter Defibrillators**

Ivan Spano (University of Cagliari, Italy)  
Sara Sulis (University of Cagliari, Italy)  
Alessandro Serpi (University of Cagliari, Italy)  
Ignazio Marongiu (Università di Cagliari, Italy)  
Gianluca Gatto (Università di Cagliari, Italy)  
Vincenzo Nissardi (AOU Cagliari, Italy)

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**16:20 - 18:00**

**T2.3: Special Session: Wireless Communications in Healthcare**

**Room:** Room 2 (Stanza dello Zodiaco)

**Chairs:** Gregorio Andria (Politecnico di Bari, Italy), Octavian Adrian Postolache (Instituto de Telecomunicações, Lisboa/IT & Instituto Universitario de Lisboa, ISCTE-IUL, Portugal)

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**A Mobile Approach for Neurofeedback Cognitive Enhancement**

Ting-Ying Wei (National Cheng Kung University, Taiwan)  
Chung-Ping Young (National Cheng Kung University, Taiwan)

**A Wireless Personal Sensor Node for the Dosimetry of Interventional Radiology Operators**

Daniel Magalotti (University of Modena and Reggio Emilia, Italy)  
Pisana Placidi (University of Perugia, Italy)  
Marco Dionigi (University of Perugia, Italy)  
Andrea Scorzoni (University of Perugia, Italy)  
Lucia Bissi (University of Perugia, Italy)  
Leonello Servoli (Istituto Nazionale di Fisica Nucleare, Italy)

**Connected vision care for eradication of preventable blindness**

Nataraj Kuntagod (Accenture Technology Labs, India)  
Sanjoy Paul (Accenture Technology Labs, India)  
Senthil Kumaresan (Accenture Technology Labs, India)

**Gait Rehabilitation Assessment Based on Microwave Doppler Radars Embedded in Walkers**

Octavian Adrian Postolache (Instituto de Telecomunicações ISCTE-IUL, Portugal)  
Jose Costa Pereira (Instituto de Telecomunicações Instituto Politécnico de Setúbal, Portugal)  
Vitor Viegas (Instituto de Telecomunicações Instituto Politécnico de Setúbal, Portugal)  
Pedro Girão (Instituto de Telecomunicações DEEC/Instituto Superior Técnico, Portugal)

**s-Health as a driver towards better emergency response systems in urban environments**

Constantinos Patsakis (University of Piraeus, Greece)  
Achilleas Papageorgiou (University of Piraeus, Greece)  
Francisco Falcone (Universidad Publica de Navarra, Spain)  
Agusti Solanas (Rovira i Virgili University, Spain)

## Thursday, May 7th

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**16:20 - 18:00**

### **T3.3: Special Session: Mechanical and Thermal Measurements for Medicine and Biology**

**Room:** Room 3 (Stanza della Caccia)

**Chairs:** Zaccaria Del Prete (SAPIENZA University of Rome, Italy), Rinaldo Vallasca (University of Cagliari, Italy)

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#### **Thermocouples for temperature monitoring during pancreatic laser ablation: analysis of the measurement error**

Emiliano Schena (University Campus Bio-Medico of Rome, Italy)  
Paola Saccomandi (University Campus Bio-Medico of Rome, Italy)  
Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)  
Giulia Frauenfelder (Università Campus Bio-Medico di Roma, Italy)  
Francesco Giurazza (Università Campus Bio-Medico di Roma, Italy)  
Giorgio M. Peroglio (Università Campus Bio-Medico di Roma, Italy)  
Sergio Silvestri (University Campus Bio-Medico of Rome, Italy)  
Michele A. Caponero (Research Centre of Frascati, ENEA, Italy)  
Andrea Polimadei (Research Centre of Frascati, ENEA, Italy)

#### **A new Arterial Blood Pressure Holter based on the oscillometric method**

Rinaldo Vallasca (University of Cagliari, Italy)

#### **A measurement procedure for the assessment of thermoregulatory activity in premature babies**

Ilaria Ercoli (Università Politecnica delle Marche, Italy)  
Lorenzo Scalise (Università Politecnica delle Marche, Italy)  
Annalisa Cenci (Università Politecnica delle Marche, Italy)  
Paolo Marchionni (Università Politecnica delle Marche, Italy)  
Enrico Tomasini (Università Politecnica delle Marche, Italy)  
Virgilio Carnielli (Università Politecnica delle Marche, Italy)

#### **Pharyngeal and esophageal pressure measurements to evaluate respiratory mechanics in infants on high flow nasal cannula: a feasibility study**

Francesco Montecchia (University of Rome "Tor Vergata", Italy)  
Stefano Luciani ("Sapienza" University of Rome, Italy)  
Roberto Cicchetti ("Sapienza" University of Rome, Italy)  
Rosanna Grossi ("Sapienza" University of Rome, Italy)  
Fabio Midulla ("Sapienza" University of Rome, Italy)  
Corrado Moretti ("Sapienza" University of Rome, Italy)  
Paola Papoff ("Sapienza" University of Rome, Italy)

#### **Preliminary measurements of elasticity properties of lung tumor living cells for cancer detection**

Alessia Demichelis (Istituto Nazionale di Ricerca Metrologica, Italy)  
Carla Divieto (Istituto Nazionale di Ricerca Metrologica, Italy)  
Leonardo Mortati (Istituto Nazionale di Ricerca Metrologica, Italy)  
Mariapaola Sassi (Istituto Nazionale di Ricerca Metrologica, Italy)  
Guido Sassi (Politecnico di Torino, Italy)

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**18:00 - 18:30**

#### **Vocal performance of the Choir of Politecnico di Torino**

**Room:** Room 1 (Salone d'Onore)

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**18:30 - 20:00**

#### **Welcome Party**

**Room:** Sala delle Colonne

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# Friday, May 8

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**09:00 - 10:40**

**F1.1: Biosignal processing II**

**Room:** Room 1 (Salone d'Onore)

**Chairs:** Voicu Groza (University of Ottawa, Canada), Aime' Lay-Ekuakille (University of Salento, Italy)

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**A Compressive Sensing Spectral Model for fNIRS Haemodynamic Response De-Noising**

Guglielmo Frigo (University of Padova, Italy)

Sabrina Brigadoi (University College London, United Kingdom)

Giada Giorgi (University of Padova, Italy)

Giovanni Sparacino (University of Padova, Italy)

Claudio Narduzzi (University of Padova, Italy)

**A New Ultrasound Parameter for Osteoporosis Diagnosis: Clinical Validation on Normal- and Under-Weight Women**

Sergio Casciaro (National Council of Research, Institute of Clinical Physiology, Italy)

Francesco Conversano (National Council of Research, Institute of Clinical Physiology, Italy)

Paola Pisani (National Council of Research, Institute of Clinical Physiology, Italy)

Antonio Greco (National Council of Research, Institute of Clinical Physiology, Italy)

Aime' Lay-Ekuakille (University of Salento, Italy)

Maurizio Muratore (OU of Rheumatology, Galateo Hospital, ASL-LE, San Cesario di Lecce, Italy)

**Scalable ECG Hardware and Algorithms for Extended Runtime of Wearable Sensors**

Andreas Tobola (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Chris Espig (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Franz Streit (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Oliver Korpok (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Björn Schmitz (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Christian Hofmann (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Matthias Struck (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Christian Weigand (Fraunhofer Institute for Integrated Circuits IIS, Germany)

Heike Leutheuser (University Erlangen-Nurnberg (FAU), Germany)

Bjoern M. Eskofier (University Erlangen-Nurnberg (FAU), Germany)

Georg Fischer (University of Erlangen-Nurnberg, Germany)

**Seismocardiography: Toward Heart Rate Variability (HRV) Estimation**

Tadi Mojtaba Jafari (University of Turku, Finland)

Eero Lehtonen (University of Turku, Finland)

Tero Koivisto (University of Turku, Finland)

Mikko Pänkäälä (University of Turku, Finland)

Ari Paasio (University of Turku, Finland)

Mika Teräs (Turku University Central Hospital, Finland)

**Method for Evaluation of Trustworthiness of Oscillometric Blood Pressure Measurements**

Iraj Koohi (University of Ottawa, Canada)

Saif Ahmad (University of Ottawa, Canada)

Izmail Batkin (University of Ottawa, Canada)

Voicu Z. Groza (University of Ottawa, Canada)

Shervin Shirmohammadi (University of Ottawa, Canada)

Hilmi R. Dajani (University of Ottawa, Canada)

Emil M. Petriu (University of Ottawa, Canada)

# Friday, May 8

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**09:00 - 10:40**

## **F2.1: Imaging and communication II**

**Room:** Room 2 (Stanza dello Zodiaco)

**Chairs:** Stephanie Bennett (Carleton University, Canada), Marco Parvis (Politecnico di Torino, Italy)

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### **Data-driven selection of motion correction techniques in breast DCE-MRI**

Gabriele Piantadosi (University of Naples Federico II, Italy)  
Stefano Marrone (University of Naples Federico II, Italy)  
Roberta Fusco (National Cancer Institute of Naples, Italy)  
Antonella Petrillo (National Cancer Institute of Naples, Italy)  
Mario Sansone (University of Naples Federico II, Italy)  
Carlo Sansone (University of Naples Federico II, Italy)

### **A Web-based Application for Dermoscopic Measurements and Learning**

Giuseppe Di Leo (University of Salerno, Italy)  
Consolatina Liguori (University of Salerno, Italy)  
Alfredo Paolillo (University of Salerno, Italy)  
Paolo Sommella (University of Salerno, Italy)

### **Development of a Reliable Method for Orbit Segmentation & Measuring**

Matthias Becker (Welfenlab, University of Hanover, Germany)  
Karl-Ingo Friese (Welfenlab, University of Hanover, Germany)  
Franz-Erich Wolter (Welfenlab, University of Hanover, Germany)  
Nils-Claudius Gellrich (Hanover Medical School, Germany)  
Harald Essig (University Hospital of Zürich, Switzerland)

### **A novel automatically initialized level set approach based on region correlation for lumbar vertebrae CT image segmentation**

Yang Li (Shenyang Institute of Automation, Chinese Academy of Sciences & University of Chinese Academy of Sciences, P.R. China)  
Wei Liang (Shenyang Institute of Automation, P.R. China)  
Jindong Tan (The University of Tennessee, Knoxville, USA)  
Yinlong Zhang (Shenyang Institute of Automation, Chinese Academy of Sciences, P.R. China)

### **ChiMerge Discretization Method: Impact on a Computer Aided Diagnosis System for Prostate Cancer in MRI**

Samanta Rosati (Politecnico di Torino, Italy)  
Gabriella Balestra (Politecnico di Torino, Italy)  
Valentina Giannini (Candiolo Cancer Institute - FPO, IRCCS, Italy)  
Simone Mazzetti (Candiolo Cancer Institute - FPO, IRCCS, Italy)  
Filippo Russo (Candiolo Cancer Institute - FPO, IRCCS, Italy)  
Daniele Regge (Candiolo Cancer Institute - FPO, IRCCS, Italy)

## Friday, May 8

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**09:00 - 10:40**

**F3.1: Special Session: Mechanical and Thermal Measurements for Medicine and Biology**

**Room:** Room 3 (Stanza della Caccia)

**Chairs:** Paolo Cappa (Sapienza University of Rome, Italy), Lorenzo Scalise (Università Politecnica delle Marche, Italy)

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**MRI-thermometry on ex vivo swine liver: preliminary trials to assess the sensitivity of two sequences**

Emiliano Schena (University Campus Bio-Medico of Rome, Italy)

Paola Saccomandi (University Campus Bio-Medico of Rome, Italy)

Marina Piccolo (Università Campus Bio-Medico di Roma, Italy)

Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

Sergio Silvestri (University Campus Bio-Medico of Rome, Italy)

Claudia Piccolo (Università Campus Bio-Medico di Roma, USA)

Giulia Frauenfelder (Università Campus Bio-Medico di Roma, Italy)

Francesco Giurazza (Università Campus Bio-Medico di Roma, Italy)

Bruno Beomonte Zobel (Università Campus Bio-Medico di Roma, Italy)

**Preliminary study for a water-paraffin based phantom in MRI quality assurance test**

Giulia Lupi (Roma TRE University, Italy)

Andrea Scorza (Roma TRE University, Italy)

Maria Livia Rugiano (Roma TRE University, Italy)

Salvatore Andrea Sciuto (Roma TRE University, Italy)

Fabiano Bini (Sapienza University of Rome, Italy)

**A Digital Image Correlation based technique to control the development of a skeletal muscle engineered tissue by measuring its surface strain field**

Emanuele Rizzuto (Sapienza University of Rome, Italy)

Silvia Carosio (Istituto Italiano di Tecnologia Italy, Italy)

Antonio Musarò (Sapienza University of Rome, Italy)

Zaccaria Del Prete (Sapienza University of Rome, Italy)

**Effect of the calibration procedure of an optoelectronic system on the joint kinematics**

Roberto Di Marco (Sapienza University of Rome, Italy)

Stefano Rossi (University of Tuscia, Italy)

Benedetta Bachetti (Sapienza University of Rome, Italy)

Claudia Mazzà (INSIGNEO Institute for in silico medicine, The University of Sheffield, United Kingdom)

Paolo Cappa (Sapienza University of Rome, Italy)

**Performance assessment of FBG temperature sensors for laser ablation of tumors**

Wei Chen (Politecnico di Torino, Italy)

Riccardo Gassino (Politecnico di Torino, Italy)

Yu Liu (Politecnico di Torino, Italy)

Alessio Carullo (Politecnico di Torino, Italy)

Guido Perrone (Politecnico di Torino, Italy)

Alberto Vallan (Politecnico di Torino, Italy)

Daniele Tosi (Nazarbayev University, Kazakhstan)

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**10:40 - 11:00**

**Coffee Break**

**Room:** Sala delle Colonne

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**11:00 - 12:30**

**Steering Committee meeting**

**Room:** Stanza del Valentino

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## Friday, May 8

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**11:00 - 12:30**

**PS1: Poster session 1**

**Room:** Stanza dei Gigli

**Chairs:** Matteo Bertocco (University of Padova, Italy), Francesco Lamonaca (University of Calabria, Italy)

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**PS1-1: Submovements composition and quality assessment of reaching movements in subjects with Parkinson's Disease**

Luigi Ippariello (University of Naples Federico II, Italy)

Maria Romano (University of Naples Federico II, Italy)

Giovanni D'Addio (S. Maugeri Foundation, TeleseTerme, Italy)

Paolo Bifulco (University of Naples Federico II, Italy)

Mario Cesarelli (University of Naples Federico II, Italy)

**PS1-2: Development of Intraoperative Noninvasive Force Measuring System During Femoral Fracture Reduction**

Qing Zhu (Southeast University, P.R. China)

Xiaogang Sun (Southeast University, P.R. China)

Xingsong Wang (Southeast University, P.R. China)

Qingcong Wu (Southeast University, P.R. China)

Bin Liang (Nanjing First Hospital, P.R. China)

**PS1-3: Mechanical Ventilator Spontaneous Breathing Detection Tested by Robot SIMVENT**

Franco Simini (Universidad de la Republica, Uruguay)

Adrian Monkas (Universidad de la Republica, Uruguay)

Gonzalo Carballo (Universidad de la Republica, Uruguay)

Jonatan Aguirre (Universidad de la Republica, Uruguay)

Fabian Ferreira (Universidad de la Republica, Uruguay)

Sebastian Gomez (Universidad de la Republica, Uruguay)

**PS1-4: Contribution of Different Handwriting Modalities to Differential Diagnosis of Parkinson's Disease**

Peter Drotar (Brno University of Technology, Czech Republic)

Jiri Mekyska (Brno University of Technology, Czech Republic)

Zdenek Smékal (Brno University of Technology, Czech Republic)

Irena Rektorova (Masaryk University, Czech Republic)

Lucia Masarova (Masaryk University, Czech Republic)

Marcos Zanuy (Escuela Universitaria Politecnica, Spain)

**PS1-5: Forward Autoregressive Modeling for Stride Process Analysis in Patients with Idiopathic Parkinson's Disease**

Yunfeng Wu (Xiamen University, P.R. China)

Xin Luo (Xiamen University, P.R. China)

Pinnan Chen (Xiamen University, P.R. China)

Lifang Liao (Xiamen University, P.R. China)

Shanshan Yang (Xiamen University, P.R. China)

Rangaraj M. Rangayyan (University of Calgary, Canada)

**PS1-6: A software-based platform for multichannel electrophysiological data acquisition**

Guglielmo Frigo (University of Padova, Italy)  
Maria Rubega (University of Padova, Italy)  
Giacomo Lezziero (University of Padova, Italy)  
Roberto Fontana (University of Padova, Italy)  
Claudia Cecchetto (University of Padova, Italy)  
Stefano Vassanelli (University of Padova, Italy)  
Giovanni Sparacino (University of Padova, Italy)  
Matteo Bertocco (University of Padova, Italy)

**PS1-7: Blood Oxygen Saturation Measurement By Smartphone Camera**

Francesco Lamonaca (University of Calabria, Italy)  
Domenico Luca Carni (University of Calabria, Italy)  
Domenico Grimaldi (University of Calabria, Italy)  
Alfonzo Nastro (University of Calabria, Italy)  
Maria Riccio (University of Sannio, Italy)  
Vitaliano Spagnuolo (Unit of Internal Medicine - AO of Cosenza, Belgium)

**PS1-8: Automated Cardiac Self-gated Radial CMRI**

Xiahuan Yang (Missouri University of Science and Technology, USA)  
Yahong Rosa Zheng (Missouri University of Science and Technology, USA)  
Lixin Ma (University of Missouri, USA)

**PS1-9: A novel approach to a phantom based method for maximum depth of penetration measurement in diagnostic ultrasound: a preliminary study**

Andrea Scorza (Roma TRE University, Italy)  
Giulia Lupi (Roma TRE University, Italy)  
Salvatore Andrea Sciuto (University of ROMA TRE, Italy)  
Fabiano Bini (Sapienza University of Rome, Italy)  
Franco Marinozzi (Sapienza University of Rome, Italy)

**PS1-10: Comparison of vision-based and sensor-based Systems for Joint Angle Gait Analysis**

Maria Kyrarini (University of Bremen, Germany)  
Xingchen Wang (University of Bremen, Germany)  
Axel Graeser (University of Bremen, Germany)

**PS1-11: A novel approach for features extraction in physiological signals**

Gloria Cosoli (Università Politecnica delle Marche, Italy)  
Luigi Casacanditella (Università Politecnica delle Marche, Italy)  
Filippo Pietroni (Università Politecnica delle Marche, Italy)  
Andrea Calvaresi (Università Politecnica delle Marche, Italy)  
Gian Marco Revel (Università Politecnica delle Marche, Italy)  
Lorenzo Scalise (Università Politecnica delle Marche, Italy)

**PS1-12: Impedance Plethysmography System With Inertial Measurement Units for Motion Artefact Reduction: Application to Continuous Breath Activity Monitoring**

Emanuele Piuze (Sapienza University of Rome, Italy)  
Andrea Capuano (Sapienza University of Rome, Italy)  
Stefano Pisa (Sapienza University of Rome, Italy)  
Paolo Cappa (Sapienza University of Rome, Italy)  
Stefano Rossi (University of Tuscia, Italy)  
Fabrizio Patanè (Niccolò Cusano University, Italy)  
Nicola Giaquinto (Politecnico di Bari, Italy)  
Giuseppe D'Aucelli (Politecnico di Bari, Italy)

## Friday, May 8

### **PS1-13: Measurement of Vehicle Acceleration in Studies of Older Drivers from GPS Position and OBDII Velocity Sensors**

Bruce Wallace (Carleton University, Canada)  
Mike Rockwood (Carleton University, Canada)  
Rafik Goubbran (Carleton University, Canada)  
Frank Knoefel (Bruyere Research Institute, Canada)  
Shawn Marshall (Ottawa Hospital, Canada)  
Michelle Porter (University of Manitoba, Canada)

### **PS1-14: Nano-Structured Polypyrrole as a Low-Cost Substrate for Glucose Biosensing Applications in Rural Health**

Daluwathu Preethichandra (Central Queensland University, Australia)  
Mala Ekanayake (Central Queensland University, Australia)

### **PS1-15: Smart textiles for wearable sensor networks: review and early lessons**

Krisjanis Nesenbergs (Institute of Electronics and Computer Science, Latvia)  
Leo Selavo (Institute of Electronics and Computer Science, Latvia)

### **PS1-16: Sensors in LTCC-technology with embedded microfluidic features, for medical applications**

Romeo Ciobanu ("Gheorghe Asachi" Technical University of Iasi, Romania)  
Cristina Schreiner ("Gr.T. Popa" University of Medicine and Pharmacy of Iasi, Romania)

### **PS1-17: Microsensors and Energy Harvesting for Thermotherapy: Design and Characterization**

Aime' Lay-Ekuakille (University of Salento, Italy)  
Giovanni Pagliara (University of Salento, Italy)  
Patrizia Vergallo (University of Salento, Italy)  
Zia Ur Rahman (Andhra University, India)  
D. V. Rama Koty Reddy (Andhra University, India)  
Sergio Casciaro (National Council of Research, Institute of Clinical Physiology, Italy)  
Francesco Conversano (National Council of Research, Institute of Clinical Physiology, Italy)

### **PS1-18: An Efficient Home-Based Risk of Falling Assessment Test Based on Smartphone and Instrumented Insole**

Johannes C. Ayena (University of Quebec at Chicoutimi, Canada)  
Landry D. Chapwouo T. (University of Quebec at Chicoutimi, Canada)  
Martin J-D Otis (UQAC, REPARTI CENTRE, Canada)  
Bob-A.J. Menelas (University of Quebec at Chicoutimi, Canada)

### **PS1-19: Characterization of Therapeutic Ultrasound Devices for Rehabilitation and Physical Medicine**

Giovanni Durando (Istituto Nazionale di Ricerca Metrologica, Italy)  
Claudio Guglielmone (Istituto Nazionale di Ricerca Metrologica, Italy)  
M. V. Actis (AO Città della Salute e della Scienza CTO Hospital, Italy)  
G. Massasa (AO Città della Salute e della Scienza CTO Hospital, Italy)

### **PS1-20: Study on the influence of wireless communication technology on sensitive medical equipment**

Catalina Luca (Medical and Pharmaceutical University "Grigore T. Popa" Iasi, Romania)  
Doru Andritoi (Medical and Pharmaceutical University "Grigore T. Popa" Iasi, Romania)  
Calin Corciova (Medical and Pharmaceutical University "Grigore T. Popa" Iasi, Romania)  
Radu Ciorap (Medical and Pharmaceutical University "Grigore T. Popa" Iasi, Romania)

## Friday, May 8

### **PS1-21: Three-Dimensional Gesture Interactive System Design of Home Automation for Physically Handicapped People**

Yu-Cheng Fan (National Taipei University of Technology, Taiwan)  
Hung-Kuan Liu (National Taipei University of Technology, Taiwan)

### **PS1-22: An innovative measurement system based on MEMs for telerehabilitation**

Gregorio Andria (Politecnico di Bari, Italy)  
Anna Maria Lucia Lanzolla (Polytechnic of Bari, Italy)  
G. Cavallo (Evolvo s.r.l., Italy)  
G. Russo (Fondazione San Raffaele Cittadella della Carità, Italy)  
M. Parabita ((Fondazione San Raffaele Cittadella della Carità, Italy)  
R. Antonelli Incalzi (Fondazione San Raffaele Cittadella della Carità, Italy)  
M. Benvenuto (Istituto Scientifico Biomedico EuroMediterraneo, Italy)

### **PS1-23: A novel approach for design and testing digital m-health applications**

Gregorio Andria (Politecnico di Bari, Italy)  
Anna Maria Lucia Lanzolla (Polytechnic of Bari, Italy)  
G. Cavallo (Evolvo s.r.l., Italy)  
G. Russo (Fondazione San Raffaele Cittadella della Carità, Italy)  
M. Parabita ((Fondazione San Raffaele Cittadella della Carità, Italy)  
R. Antonelli Incalzi (Fondazione San Raffaele Cittadella della Carità, Italy)  
M. Benvenuto (Istituto Scientifico Biomedico EuroMediterraneo, Italy)

### **PS1-24: New FEM 3D model for arm-cuff interface simulation**

Rinaldo Vallascas (University of Cagliari, Italy)  
Mariangela Usai (University of Cagliari, Italy)

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**12:30 - 13:00**

**Award ceremony in the memory of Prof. De Benedetti**

**Room:** Room 1 (Salone d'Onore)

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**13:00 - 14:30**

**Friday Lunch**

**Room:** Sala delle Colonne

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**14:30 - 16:00**

**Bus transfer to the University of Gastronomic Science, Pollenzo**

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**16:00 - 16:30**

**Plenary lecture**

**Room:** Pollenzo conference room

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### **Mechanical and electrical characterization of fibrous nano-materials in medicine**

Anthimos Georgiadis, Leuphana University Lüneburg, Germany

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**16:30 - 17:45**

**Round table - "International network in metrology for patient health care"**

A. Georgiadis, R. Goubran, C. Gulotta, M. Inguscio, B. Karaboce

**Room:** Pollenzo conference room

**Chair:** P. Vassiliou

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## Friday, May 8

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**17:45 - 18:00**

**Preview of MeMeA2016 in Benevento, Italy**

**Room:** Pollenzo conference room

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**18:00 - 19:00**

**Wine & Cheese tour at the University of Gastronomic Science, Pollenzo**

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**19:00 - 21:00**

**Gala Dinner - Albergo dell'Agenzia, Pollenzo**

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**21:00 - 23:00**

**Bus transfer to Torino**

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# Saturday, May 9

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**09:00 - 10:40**

**S1.1: Bioengineering and rehabilitation - Monitoring of rehabilitation**

**Room:** Room 1 (Salone d'Onore)

**Chairs:** Rafik Goubran (Carleton University, Canada), Mauro Serpelloni (University of Brescia, Italy)

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**Fuzzy Sliding Mode Control of an Upper Limb Exoskeleton for Robot-assisted Rehabilitation**

Qingcong Wu (Southeast University, P.R. China)

Xingsong Wang (Southeast University, P.R. China)

Fengpo Du (Southeast University, P.R. China)

Qing Zhu (Southeast University, P.R. China)

**Needle Detection by Electro-Localization for a Needle EMG Exam Robotic Simulator**

Siyu He (Chiba University, Japan)

Jose Gomez-Tames (Chiba University, Japan)

Wenwei Yu (University of Chiba, Japan)

**Power Harvesting Integrated in a Knee Implant for Autonomous Sensors Implanted in Human Body**

Daniele Marioli (University of Brescia, Italy)

Emilio Sardini (University of Brescia, Italy)

Mauro Serpelloni (University of Brescia, Italy)

**Using a Seminorm for Wavelet Denoising of sEMG Signals for Monitoring During Rehabilitation with Embedded Orthosis System**

Manuel Schimmack (Leuphana University of Lueneburg, Germany)

Andrea Hand (Leuphana University of Lueneburg, USA)

Paolo Mercorelli (Leuphana University of Lueneburg, Germany)

Anthimos Georgiadis (Leuphana University of Lueneburg, Germany)

**Improving Classification of Sit, Stand, and Lie in a Smartphone Human Activity Recognition System**

Nicole Capela (University of Ottawa, Canada)

Edward Lemaire (Ottawa Hospital Research Institute, Canada)

Natalie Baddour (University of Ottawa, Canada)

# Saturday, May 9

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**09:00 - 10:40**

## **S2.1: Embedded systems - Medical and Instrumentation uncertainty**

**Room:** Room 2 (Stanza dello Zodiaco)

**Chairs:** Alessandro Depari (University of Brescia, Italy), Abdulmotaleb El Saddik (University of Ottawa, Canada)

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## **A configurable biopotentials acquisition module suitable for fetal electrocardiography studies**

Gianluca Barabino (University of Cagliari, Italy)

Danilo Pani (University of Cagliari, Italy)

Alessia Dessi (University of Cagliari, Italy)

Luigi Raffo (University of Cagliari, Italy)

## **A smartphone-enhanced pill-dispenser providing patient identification and in-take recognition**

Claudio Crema (University of Brescia, Italy)

Alessandro Depari (University of Brescia, Italy)

Alessandra Flammini (University of Brescia, Italy)

Mirko Lavarini (University of Brescia, Italy)

Emiliano Sisinni (University of Brescia, Italy)

Angelo Vezzoli (University of Brescia, Italy)

## **Ultrasound and Mocap to Improve Non Invasive Hip Joint Center Calculation**

Swati Upadhyaya (University of Ottawa, India)

Won-Sook Lee (University of Ottawa, Canada)

Chris Joslin (Carleton University, Canada)

## **Genomic based personalized chemotherapy analysis to support decision systems for breast cancer**

Aydin Saribudak (The City College of the CUNY, New York, USA)

Stephen Gundry (Patent and Trademarks Office, USA)

Jianmin Zou (The City College of the CUNY, New York, USA)

M. Umit Uyar (The City College of the CUNY, New York, USA)

## **Measurement Issues in Probing Depth Evaluation of Periodontal Pockets**

Gianfranco Genta (Politecnico di Torino, Italy)

Giulio Barbato (Politecnico di Torino, Italy)

Raffaello Levi (Politecnico di Torino, Italy)

Matteo Erriu (Università degli Studi di Cagliari, Italy)

Francesca Pili (Università degli Studi di Cagliari, Italy)

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**09:00 - 10:40**

## **S3.1: Special Session: Metrology in Biosciences**

**Room:** Room 3 (Stanza della Caccia)

**Chairs:** Anthimos Georgiadis (Leuphana University Lueneburg, Germany), Mariapaola Sassi (Istituto Nazionale di Ricerca Metrologica, Italy)

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## **Mechanical Characterisation and Modelling of Electrospun Materials for Biomedical Applications**

Katarzyna Polak-Kraśna (Leuphana University Lueneburg, Germany)

Anthimos Georgiadis (Leuphana University Lueneburg, Germany)

Pirjo Heikkilä (VTT Technical Research Centre of Finland, Finland)

## Saturday, May 9

### **Coplanar Micro-Strips/Electrospun sensor system to Measure the Electronics Properties of the Polyethylene Oxide (PEO) Electrospun**

Carlos Fuhrhop (Leuphana University Lueneburg, Germany)

Anthimos Georgiadis (Leuphana University Lueneburg, Germany)

### **Flow cytometer for reference measurements of blood cell concentrations with low uncertainty**

Martin Kammel (Physikalisch-Technische Bundesanstalt, Germany)

Andreas Kummrow (Physikalisch-Technische Bundesanstalt, Germany)

Manuela John (Physikalisch-Technische Bundesanstalt, Germany)

Stephan Reitz (Physikalisch-Technische Bundesanstalt, Germany)

Klaus Witt (Physikalisch-Technische Bundesanstalt, Germany)

Jörg Neukammer (Physikalisch-Technische Bundesanstalt, Germany)

### **Reproducible measurements of human mesenchymal stem cells counting and proliferation in 3D scaffolds for Regenerative Medicine**

Carla Divieto (Istituto Nazionale di Ricerca Metrologica, Italy)

Mariapaola Sassi (Istituto Nazionale di Ricerca Metrologica, Italy)

### **Targeted Quantitation of HMGB1 Protein by label-free Mass Spectrometry Technique**

Marcello Manfredi (University of Piemonte Orientale, Italy)

Simona Martinotti (University of Piemonte Orientale, Italy)

Mauro Patrone (University of Piemonte Orientale, Italy)

Mariapaola Sassi (Istituto Nazionale di Ricerca Metrologica, Italy)

Elia Ranzato (University of Piemonte Orientale, Italy)

Emilio Marengo (University of Piemonte Orientale, Italy)

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**10:40 - 12:10**

### **PS2: Poster Session 2**

**Room:** Stanza dei Gigli

**Chairs:** Luca De Vito (University of Sannio, Italy), Maria Riccio (University of Sannio, Italy)

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### **PS2-1: A Modular Mobile Exergaming System With an Adaptive Behavior**

Ali Karime (University of Ottawa, Canada)

Basim Hafidh (University of Ottawa, Canada)

Wail Gueaieb (University of Ottawa, Canada)

Abdulmotaleb El Saddik (University of Ottawa, Canada)

### **PS2-2: Low Power Wearable System for Vital Signs Measurement in All Day Long Applications**

Alessandro Dionisi (University of Brescia, Italy)

Daniele Marioli (University of Brescia, Italy)

Emilio Sardini (University of Brescia, Italy)

Mauro Serpelloni (University of Brescia, Italy)

### **PS2-3: A Smartphone-Based Indoor Localization System for Visually Impaired People**

Stefano Basso (University of Padova, Italy)

Guglielmo Frigo (University of Padova, Italy)

Giada Giorgi (University of Padova, Italy)

### **PS2-4: Smart Environments using Near-Field Communication and HTML5**

Luke Russell (Carleton University, Canada)

Rafik Goubran (Carleton University, Canada)

Felix Kwamena (Carleton University, Canada)

## Saturday, May 9

### **PS2-5: An innovative framework for rare neurodegenerative diseases analysis**

Vitoantonio Bevilacqua (Politecnico di Bari, Italy)  
Gianluca Grimaldi (Politecnico di Bari, Italy)  
Davide Semeraro (Politecnico di Bari, Italy)  
Sergio Simeone (Politecnico di Bari, Italy)  
Marianna Delussi (Bari Aldo Moro University, Italy)  
Marina de Tommaso (Bari Aldo Moro University, Italy)

### **PS2-6: Very Low Field MRI: a fast system compatible with Magnetoencephalography**

Angelo Galante (L'Aquila University, Italy)  
Nadia Catallo (L'Aquila University, Italy)  
Piero Sebastiani (ITA S.r.l., Italy)  
Antonello Sotgiu (ITA S.r.l., Italy)  
Raffaele Sinibaldi (G. D'Annunzio University, Italy)  
Cinzia De Luca (G. D'Annunzio University, Italy)  
Allegra Conti (G. D'Annunzio University, Italy)  
Vittorio Pizzella (G. D'Annunzio University, Italy)  
Gian Luca Romani (G. D'Annunzio University, Italy)  
Stefania Della Penna (G. D'Annunzio University, Italy)

### **PS2-7: Efficient Techniques to Enhance Nearfield Imaging of Human Head for Anomaly Detection**

Muhammad Naveed Tabassum (King Saud University, Saudi Arabia)  
Ibrahim Elshafey (King Saud University, Saudi Arabia)  
Mubashir Alam (King Saud University, Saudi Arabia)

### **PS2-8: A New Risk Assessment Methodology for Dermoscopic Skin Lesion Images**

Maria João Vasconcelos (Fraunhofer Portugal AICOS, Portugal)  
Luís Rosado (Fraunhofer Portugal AICOS, Portugal)  
Márcia Ferreira (Portuguese Institute of Oncology, Portugal)

### **PS2-9: Receiver Operating Characteristic: A Tool for Cell Confluence Estimation**

Giampaolo E. D'Errico (Istituto Nazionale di Ricerca Metrologica, Italy)

### **PS2-10: 3D Face Detection using IPC Based Depth and Intensity images**

Ammar Chouchane (Université de Biskra Algérie, Algeria)  
Mebarika Belahcene (Université de Biskra Algérie, Algeria)  
Salah Bourennane (Ecole Centrale Marseille, France)

### **PS2-11: Quantitative detection of Escherichia coli and measurement of urinary tract infection diagnosis possibility by use of a portable, handheld sensor**

Shilun Feng (Buskerud and Vestfold University College, Norway)  
Lars Roseng (Buskerud and Vestfold University College, Norway)  
Tao Dong (Buskerud and Vestfold University College, Norway)

### **PS2-12: Yield-oriented Biopotential Amplifier Design for PCB-based Active Dry Electrodes**

Carlos Eduardo Teixeira (Federal University of Itajuba, Brazil)  
Luis H. C. Ferreira (Federal University of Itajuba, Brazil)

### **PS2-13: A preliminary study on quality of knee strength measurements by means of Hand Held Dynamometer and Optoelectronic System**

Andrea Ancillao (Sapienza University of Rome, Italy)  
Stefano Rossi (University of Tuscia, Italy)  
Fabrizio Patanè (Niccolò Cusano University, Italy)  
Paolo Cappa (Sapienza University of Rome, Italy)

## Saturday, May 9

### **PS2-14: Metrological Properties Evaluation Of A Chest Wall Simulator During Simulated Quiet Breathing**

Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)  
Francesca De Leo (Università Campus Bio-Medico di Roma, Italy)  
Emiliano Schena (University Campus Bio-Medico of Rome, Italy)  
Paola Saccomandi (University Campus Bio-Medico of Rome, Italy)  
Sergio Silvestri (University Campus Bio-Medico of Rome, Italy)

### **PS2-15: The effects of the vibratory stimulation of the neck muscles for the evaluation of stepping performance in Parkinson's Disease**

Luigi Iuppariello (University of Naples Federico II, Italy)  
Giovanni D'Addio (S. Maugeri Foundation, Italy)  
Maria Romano (University of Naples Federico II, Italy)  
Paolo Bifulco (University of Naples Federico II, Italy)  
Bernardo Lanzillo (S. Maugeri Foundation, Italy)  
Francesco Lullo (S. Maugeri Foundation, Italy)  
Fernanda Gallo (S. Maugeri Foundation, Italy)  
Mario Cesarelli (University of Naples Federico II, Italy)

### **PS2-16: Non-contact Assessment of Muscle Contraction: Laser Doppler Myography**

Sara Casaccia (Università Politecnica delle Marche, Italy)  
Lorenzo Scalise (Università Politecnica delle Marche, Italy)  
Luigi Casacanditella (Università Politecnica delle Marche, Italy)  
Enrico Tomasini (Polytechnic University of Marche, Italy)  
John Rohrbaugh (Washington University in Saint Louis, Italy)

### **PS2-17: A chemo-optical approach for recognising early degradation in cartilage from NIR absorbance measurements**

Minsi Chen (University of Derby, United Kingdom)  
Cameron Brown (University of Oxford, United Kingdom)

### **PS2-18: Study on the use of AFM to make traceable measurements of lipoproteins size distribution**

Alessia Demichelis (Istituto Nazionale di Ricerca Metrologica, Italy)  
Carla Divieto (Istituto Nazionale di Ricerca Metrologica, Italy)  
Leonardo Mortati (Istituto Nazionale di Ricerca Metrologica, Italy)  
Mariapaola Sassi (Istituto Nazionale di Ricerca Metrologica, Italy)  
Guido Sassi (Politecnico di Torino, Italy)

### **PS2-19: Uncertainty in cell confluency measurements**

Guido Sassi (Politecnico di Torino, Italy)  
Stefano Pavarelli (Istituto Nazionale di Ricerca Metrologica, Italy)  
Carla Divieto (Istituto Nazionale di Ricerca Metrologica, Italy)  
Mariapaola Sassi (Istituto Nazionale di Ricerca Metrologica, Italy)

### **PS2-20: Development and characterization of porous magnesium bioresorbable implants**

Emma Paola Angelini (Politecnico di Torino, Italy)  
Bruno De Benedetti (Politecnico di Torino, Italy)  
Daniele Fulginiti (Politecnico di Torino, Italy)  
Sabrina Grassini (Politecnico di Torino, Italy)  
Franco Ferraris (Politecnico di Torino, Italy)  
Marco Parvis (Politecnico di Torino, Italy)

## Saturday, May 9

### **PS2-21: Low-cost wearable measurement system for continuous real-time pedobarography**

Simone Corbellini (Politecnico di Torino, Italy)  
Chiara Ramella (Politecnico di Torino, Italy)  
Carmelo Fallauto (Politecnico di Torino, Italy)  
Marco Pirola (Politecnico di Torino, Italy)  
Stefano Stassi (Politecnico di Torino, Italy)  
Giancarlo Canavese (Politecnico di Torino, Italy)

### **PS2-22: Investigating the On-board Data Processing for IMU-based Sensors in Motion Tracking for Rehabilitation**

Pasquale Daponte (University of Sannio, Italy)  
Luca De Vito (University of Sannio, Italy)  
Gianluca Mazzilli (University of Sannio, Italy)  
Sergio Rapuano (University of Sannio, Italy)  
Carmine Sementa (University of Sannio, Italy)

### **PS2-23: NIRS assessment of brain hemodynamics**

Valentina Agostini (Politecnico di Torino, Italy)  
Daniele Paradiso (Politecnico di Torino, Italy)  
Filippo Molinari (Politecnico di Torino, Italy)  
Daniele Rimini (Politecnico di Torino, Italy)  
William Liboni ("Un Passo Insieme" ONLUS Foundation, Valdellatorre, Torino, Italy)  
Marco Knaflitz (Politecnico di Torino, Italy)

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**12:10 - 12:30**

**Closing session - Best poster award**

**Room:** Room 1 (Salone d'Onore)

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**12:30 - 14:00**

**Brunch**

**Room:** Sala delle Colonne

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**15:00 - 19:00**

**Touristic tour**

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