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Welcome message from the IEEE RTSI 2017 General Chairs

It is our great pleasure to welcome you to the Third Edition of the International Forum on Research and Technologies for Society and Industry (RTSI) that is taking place in Modena, Italy, from Monday September 11th until Wednesday September 13th, 2017. The RTSI is the flagship conference of the IEEE Italy Section and represents the annual gathering of researchers and industry professionals in the field of electrical, electronic, and information science and engineering.

The theme chosen for the 2017 edition of the International Forum on Research and Technologies for Society and Industry - RTSI is "Innovation to shape the future", a challenge based on three areas of great interest and relevance: Smart Mobility, Industry 4.0, Smart Healthcare. Undoubtedly, innovation in electrical, electronic, and information science and engineering has fundamentally transformed our society in recent decades and the pace of change can only be described as disruptive. Not only technologies but also economies and societies are continuously shaped by innovation. Grounded on these evidences, the core purpose of RTSI is to foster technological innovation and excellence in the fields of electrical, electronic, and information science and engineering.

Specifically, the main purposes of the event are:

- to promote and to strengthen partnerships and cooperation between academia and industry;
- to increase the public’s understanding and awareness of how engineering and technology can positively affect quality of life;
- to promote discussion between research community and government bodies about effective and successful research policies;
- to disseminate advancements, discoveries and applications;
- to discuss ideas and to promote cooperation between researchers working in different research areas.

RTSI includes panels, technical sessions, tutorials, and exhibitions, as reported in detail in the technical program. We are proud that some national academic societies in these fields meet during the forum as co-located events.
In addition to the stimulating program of the conference, Modena, with its tourist attractions, the quality of its cuisine, and historical monuments, is an unforgettable place. We hope you get a chance to visit this beautiful city.

We would like to give a warm welcome to all the participant to RTSI and look forward to meeting you over the three days of the forum.

Enjoy RTSI 2017 @MODENA!
Warmest Regards,

Tiziana Tambosso  Luigi Rovati
Welcome message from the IEEE RTSI 2017 Technical Program Committee Chair

The Technical Program of the third edition of RTSI is very rich: it includes 19 technical sessions with 109 contributed papers, 16 invited talks and keynote speakers, four tutorials on very hot topics and 3 panels in which industries and universities debate on topics like: Smart Mobility, Industry 4.0, and Smart Healthcare. In addition the program includes Young Professional Events, a meeting with Innovative Startup and for the first time a meeting of the Women in Engineering Affinity Group.

Other special events are:

The IEEE Student Branch Meeting organized by the IEEE Italy Section SB coordinator with the objective to bring together the Italian Student Branches sharing their best practices and also offering the students the opportunity to follow an international and interdisciplinary conference;

The Industries Meeting of IEEE Italy Section with the objective to inform all participants of the initiatives that IEEE Region 8 (Europe, Africa and Middle East) and IEEE Italy Section are promoting in favor of industries and discuss with participants new ideas and proposals of common interest;

I would like to thank all technical sponsors for their support and promotion, the track chairs and session chairs for their essential work of organization and management of the technical sessions, all the reviewers who assured a high quality of papers. Special thanks are also due to the chairs of the tutorial, panels and YP Event for their valuable work.

Last but not least, a special thank to the organizing team of Modena University whose effective contribution and enthusiastic work ensured the realization of this event.

Hope you all can enjoy RTSI 2017!

With my best regards,

Bernardo Tellini
Program Committees

General Chairs:
Luigi Rovati, University of Modena and Reggio Emilia
Tiziana Tambosso, IEEE Italy Section Chair

Steering Committee Chairs:
Ermanno Cardelli, IEEE Italy Section Past-Chair
Dario Petri, IEEE Italy Section National Association Liaison Committee Coordinator

Steering Committee:
Pasquale Daponte Research Association GMEE
Paolo Ciancarini, Research Association GRIN
Paolo Bassi, Research Association SIEM
Alfredo Testa, Research Association GUSEE
Maria Chiara Carrozza, Research Association GNB
Alberto Tenconi, Research Association CMAEL
Fabio Villone, Research Association ET
Ali Hessami, UK&Ireland Session Chair

Technical Program Committee Chair:
Bernardo Tellini, IEEE Italy Section Vice-Chair

Track Chairs
Marko Bertogna, University of Modena and Reggio Emilia
Dajana Cassioli (COM/VT Chapter chair)
Leopoldo Angrisani, (IM Chapter chair)
Cesare Fantuzzi University of Modena and Reggio Emilia
Sergio Cerutti, (EMB Chapter chair)
Paulo de Carvalho, University of Coimbra (Portugal)

Technical Session Chairs
Marco Di Felice, University of Bologna
Luciano Bononi, University of Bologna
Antonio Iodice, University of Napoli Federico II
Ferdinando Nunziata, University of Napoli Parthenope
Francesco Riganti Fulginei, University of Roma 3
Riccardo Scorretti, Université Claude Bernard Lyon 1 (CNRS)
Rita Cucchiara, University of Modena and Reggio Emilia
Roberto Vezzani, University of Modena and Reggio Emilia
Giambattista Gruosso, Politecnico of Milano
Rosario Schiano Lo Moriello, University of Napoli Federico II
Roberto Minerva, EIT Digital
Domenico Asprone, University of Napoli Federico II
Leopoldo Angrisani, University of Napoli Federico II
Annamaria Cucinotta, University of Parma
Luca Vincetti, University of Modena and Reggio Emilia
Cristian Secchi, University of Modena and Reggio Emilia
Cesare Fantuzzi, University of Modena and Reggio Emilia
Mosè Gallo, Università Telematica Pegaso
Agusti Solanas, Rovira i Virgili University, Catalonia, Spain
Soufiene Djahel, Manchester Metropolitan University, UK
Sonia Bergamaschi, University of Modena and Reggio Emilia
Giovanni Simonini, University of Modena and Reggio Emilia
Sergio Cerutti, Politecnico of Milano
Enzo Pasquale Scilingo, University of Pisa
Fabio Babiloni, University of Roma La Sapienza
Anna Maria Bianchi, Politecnico of Milano
Silvana Quaglini, University of Pavia
Roberto Tagliaferri, University of Salerno

Technical Program Committee
Adrian Lutey Università degli Studi di Parma
Agusti Solanas Rovira i Virgili University
Alberto Greco University of Pisa
Alessandro De Gloria University of Genoa
Alessandro Salvini Roma Tre University
Alessio Di Simone University of Naples, Federico II
Alfonso Damiano University of Cassino and Southern Lazio
Ali Sari University Lyon 1
Amelie Gyrard Ecole des Mines de Saint Etienne
Amit Sheth Wright State University
Andrea Buono Parthenope University of Naples
Andrea Palazzi University of Modena and Reggio Emilia
Andreas J. Kassler Karlstad University
Anna M. Bianchi Politecnico di Milano
Antoni Martínez-Ballesté Universitat Rovira i Virgili
Antonino Laudani University of Roma Tre
Antonio Faba University of Perugia
Antonio Iodice Università di Napoli Federico II
Antonio Lanata University of Pisa
Antonio Lanzotti University of Naples Federico II
Antonio Skarmeta University of Murcia
Antonio Viscioni University of Brescia
Armando Marino The Open University
Asma Perveen Nazarbayev University
Bernardo Tellini University of Pisa
Carla Seatzi University of Cagliari
Carlo Augusto Grazia University of Modena and Reggio Emilia
César Teixeira University of Coimbra
Cesare Fantuzzi University of Modena and Reggio Emilia
Claudio Babiloni University of Rome La Sapienza
Costantino Grana University of Modena and Reggio Emilia
Costantino Menna University of Naples, Federico II
Cristian Secchi University of Modena and Reggio Emilia
Davide Abati University of Modena and Reggio Emilia
Davide Brunelli University of Trento
Davide Castellano Università degli Studi di Napoli Federico II
Domenico Beneventano University of Modena and Reggio Emilia
Domenico Velotto German Aerospace Center (DLR)
Donato Amitrano University of Naples Federico II
Elena Colombini University of Modena and Reggio Emilia
Enrico Natalizio Université de Technologie de Compiègne
Enzo Pasquale Scilingo University of Pisa
Ermanno Cardelli University of Perugia
Fabio Babiloni University of Rome Sapienza
Fabrizia Caiazzo University of Salerno
Fabrizio Esposito University of Salerno
Fabrizio Pancaldi University of Modena and Reggio Emilia
Farid Nait-Abdesselam Paris Descartes University
Federico Baronti University of Pisa
Fei Gao University of Technology of Belfort-Montbéliard
Ferdinando Nunziata Università di Napoli Parthenope
Francesco Bonavolontà Università di Napoli Federico II
Francesco Masulli University of Genova
Francesco Morabito University Mediterranea of Reggio Calabria
Francesco Riganti Fulginei Roma TRE University
Francisco Falcone Universidad de Comillas, Navarra
Gabriele Maria Lozito Roma Tre University
Gabriel-Miro Muntean Dublin City University
Gaetano Bellanca University of Ferrara
Gaetano Valenza University of Pisa
Gerardo Di Martino University of Naples, Federico II
Giambattista Grusso Politecnico di Milano
Gianfranco Dalla Betta University of Trento
Gianluca Gatto Università di Cagliari
Giovanni Romagnoli University of Parma
Giovanni Simonini University of Modena and Reggio Emilia
Giovanni Vecchiato University of Rome
Giuseppe Fiorelli CINECA
Giuseppe Ruggeri University of Reggio Calabria
Giuseppe Serra University of Modena and Reggio Emilia
Giuseppe Tomasso University of Cassino
Giuseppe Tradio University of Calabria
Guido Borghi University of Modena and Reggio Emilia
Hassine Moungla University of Paris Descartes
Irina Tal Dublin City University
JaeSeung Song Sejong University
Jiri Petracek Brno University of Technology
John Holmes University of Pennsylvania
Kashif Kifayat Liverpool John Moores University
Kaushik Chowdhury Northeastern University
Koustabh Dolui Fondazione Bruno Kessler
Laura Astolfi University of Rome La Sapienza
Leopoldo Angrisani University of Naples Federico II
Lorenzo Rosa Swinburne University of Technology
Luca Bascetta Politecnico di Milano
Luca Bedogni University of Bologna
Luca Gagliardelli University of Modena and Reggio Emilia
Luca Mainardi Polytechnic University of Milan
Luciano Bononi University of Bologna
Silvana Quaglini Università di Pavia
General Information

Registration
The registration fee includes admission to RTSI technical and special sessions, Tutorials, Panels, Exhibition, Coffee Breaks, Lunch and Happy Hour, and Welcome Reception.

Location and Opening Times
The Check-In is located in the foyer (second floor, building 25). It will be open every day from 8am to 7pm.

Presentation Upload
Oral presentations are organized in sessions scheduled in specific lecture rooms, indicated in the programme together with the time of presentation of each contribution including discussion and change-over. The oral sessions are scheduled in four 2-hours time blocks per day. Please note that the duration given to your oral presentation includes 3 minutes for questions and discussion (e.g. a 15-minute talk should be 12 minutes of presentation + 3 minutes of discussion).

The oral presentations are not organized centrally. Therefore, the authors are kindly asked to upload their presentations directly in the respective lecture room 30 minutes prior to the time block of the session. A lecture room assistant will be available if you need help.

We recommend PowerPoint Presentation for all speakers with a slide ratio 4:3. It is also possible to use PDF, Word and Excel files for your presentation.

We prefer h264 Video in mp4 file container. It is also possible to use (.wmv), (.avi) or (.mov). If you are using PowerPoint 2007 or older please do not forget to submit any videos as separate files as Power Point will not have embedded them into the presentation.

There is no Internet available on the presentation computers.

The computers in the presentations rooms will have Microsoft Windows 8 with PowerPoint 2013 installed.

Proceedings of RTSI 2017
Conference registrants will have access to the full proceedings of accepted authors and invited speakers.

The book of accepted proceedings will be made available to all attendees thanks to a password protected link that will expire once the conference ends.

Wireless Connectivity
Free WiFi standard service is offered through eduroam (with limited bandwidth and download volume).
Map

Campus of engineering
“Enzo Ferrari”

Rooms

P1.1 → Building 25, first floor
P2.1 → Building 25, second floor
P2.2 → Building 25, second floor
P2.3 → Building 25, second floor
P2.4 → Building 25, second floor

Foyer → Building 25, second floor
Lunch area → Building 25, ground floor
“Sala Eventi” → Building 52
<table>
<thead>
<tr>
<th>Time</th>
<th>Smart Mobility</th>
<th>Industry 4.0</th>
<th>Smart Healthcare</th>
<th>Tutorial</th>
<th>Special events</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.45 - 10.30</td>
<td>Welcome Session, Sala Eventi (building 52)</td>
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<tr>
<td>10.30 - 12.30</td>
<td>M1 - Electric and Magnetic Devices for smart mobility applications (I) Room P2.2 building 25</td>
<td>I1 - IoT Challenges, Technologies and Applications Room P2.3 building 25</td>
<td>H1 - Advances in Medical Informatics for Health Care Applications (I) Room P2.1 building 25</td>
<td>Tutorial 1 Smart product and Smart Productions in the 4.0 Industrial revolution Room P2.4 building 25</td>
<td>Student Branch meeting Room P1.1 building 25</td>
</tr>
<tr>
<td>12.30 - 13.00</td>
<td>Exhibition &amp; YP Event Time, Social Area</td>
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<tr>
<td>13.00 - 14.00</td>
<td>Lunch, Lunch area</td>
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<tr>
<td>14.00 - 16.00</td>
<td>Panel 1: Smart Mobility, Sala Eventi (building 52)</td>
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<tr>
<td>16.00 - 16.30</td>
<td>Coffee Break, Social Area</td>
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<tr>
<td>16.30 - 18.30</td>
<td>M2 - Electric and Magnetic Devices for smart mobility applications (II) Room P2.2 building 25</td>
<td>I2 - Smart Factory and Simulation of Industrial Processes and Systems Room P2.3 building 25</td>
<td>H2 - Advances in Medical Informatics for Health Care Applications (II) Room P2.1 building 25</td>
<td>Tutorial 2 Well-Being Technologies, Room P2.4 building 25</td>
<td>Student Branch meeting Room P1.1 building 25</td>
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<tr>
<td>19.00 - 20.00</td>
<td>Welcome Reception, Caffè Concerto - Piazza Grande, 26, Modena</td>
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<tr>
<td>20.00 - 21.00</td>
<td>Student Branch special party</td>
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M = Smart Mobility  
I = Industry 4.0  
H = Smart Healthcare
## Agenda — Tuesday, 12 September

<table>
<thead>
<tr>
<th>Time</th>
<th>Smart Mobility</th>
<th>Industry 4.0 &amp; Smart Healthcare</th>
<th>Smart Healthcare</th>
<th>Tutorial</th>
<th>Special Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30 - 10.30</td>
<td>M3 - Advanced remote sensing methods for a smarter and safer world (I) Room P2.2 building 25</td>
<td>H3 - Neural and Cognitive Engineering Room P2.3 building 25</td>
<td>H4 - Services, Applications and Solutions to Challenging Problems in Smart Healthcare Room P2.1 building 25</td>
<td>Tutorial 3 Magnetic Materials Modeling and Characterization for Electric Vehicles Room P2.4 building 25</td>
<td>Meeting with Industry Room P1.1 building 25</td>
</tr>
<tr>
<td>10.30-11.00</td>
<td>Coffee Break, Social Area</td>
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<tr>
<td>11.00-13.00</td>
<td>M4 - Advanced remote sensing methods for a smarter and safer world (II) Room P2.2 building 25</td>
<td>I3 - Laser Manufacturing (I) Room P2.3 building 25</td>
<td>H5 - E-Health and Personalised Medicine (I) Room P2.1 building 25</td>
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<td>13.00-14.00</td>
<td>Lunch, Lunch area</td>
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<tr>
<td>14.00-14.30</td>
<td>Exhibition &amp; YP Event Time, Social Area</td>
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<tr>
<td>14.30-16.30</td>
<td>I4 - Laser Manufacturing (II) Room P2.3 building 25</td>
<td>H6 - E-Health and Personalised Medicine (II) Room P2.1 building 25</td>
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<td>Special meeting - Innovative Start up Room P1.1 building 25</td>
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<tr>
<td>16.30-17.00</td>
<td>Coffee Break, Social Area</td>
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<tr>
<td>17.00-19.00</td>
<td>Panel 2: Industry 4.0, Sala Eventi (building 52)</td>
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<td>Special meeting - Innovative Start up Room P1.1 building 25</td>
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<tr>
<td>20.00-22.00</td>
<td>Social Dinner &amp; Award Ceremony, Agriturismo Rubbio, Str. Paganine, 133, 41100 Portile MO</td>
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M = Smart Mobility  
I = Industry 4.0  
H = Smart Healthcare
## Agenda — Wednesday, 13 September

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<tr>
<th>Time</th>
<th>Smart Mobility</th>
<th>Industry 4.0</th>
<th>Smart Healthcare</th>
<th>Tutorial</th>
<th>Special events</th>
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<tbody>
<tr>
<td>8.30 - 10.30</td>
<td>M5 - Smart mobility challenges: vehicle, technology and infrastructure Room P2.2 building 25</td>
<td>I5 - Digital Fabrication &amp; Digital Manufacturing (I) Room P2.3 building 25</td>
<td>H7 - Big Data Integration and IoT for Smart Healthcare Room P2.1 building 25</td>
<td>Tutorial 4 Ethical Considerations in System Design Room P2.4 building 25</td>
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<td>10.30-11.00</td>
<td>Coffee Break, Social Area</td>
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<tr>
<td>11.00-13.00</td>
<td>I6 - Digital Fabrication &amp; Digital Manufacturing (II) Room P2.3 building 25</td>
<td>H8 - Data-driven prevention and intervention for Health Room P2.1 building 25</td>
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<td>IEEE Italy Section WIE (Women In Engineering) Affinity Group meeting Room P1.1 building 25</td>
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<td>13.00-14.00</td>
<td>Lunch, Lunch area</td>
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<tr>
<td>14.00-15.30</td>
<td>Panel 3: Smart Healthcare, Sala Eventi (building 52)</td>
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<td>15.30-16.00</td>
<td>Closing Session, Sala Eventi (building 52)</td>
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<td>16.00-18.00</td>
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<td>ITALY SECTION EXCO with Coffee Break Room P2.1 building 25</td>
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</tbody>
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M = Smart Mobility  
I = Industry 4.0  
H = Smart Healthcare
Track 1: Smart Mobility

**M1 - Electric and Magnetic Devices for smart mobility applications (I)**

Chairs: Francesco Riganti Fulginei "UNIVERSITA DEGLI STUDI ROMA TRE, Italy" and Riccardo Scorretti "L'ECOLE CENTRALE de LYON, France"

Monday, 11 September, 10.30-12.15
Room P2.2 building 25

10.30
**INVITED**

**Solar Energy Harvest on Bicycle Helmet for Smart Wearable Sensors**
Daniele Bibbo "Roma Tre University, Italy", Silvia Conforto "University Roma Tre, Italy", Antonino Laudani "University of Roma Tre, Italy" and Gabriele Maria Lozito "Roma Tre University, Italy"

In this paper, the research towards the implementation of a prototype helmet for cyclists equipped with a distributed array of PV cells is presented. The work aims to create a power supply, either independent or auxiliary, for smart and wearable sensors. The implemented prototype has been characterized both in a controlled environment and on the field to assess the amount of generated useful energy. The system proposed in this paper can be used to produce energy to supply a smart sensor based device placed on the helmet; as an application, this could be used to send an alarm in case of an accident occurred to a cyclist, without placing heavy or dangerous battery on the head of the final user.

11.00

**A Method to Compute the Impact of Iron Parts and External Fields on the Low Frequency Magnetic Sensors in Smart Devices**
Alessandro Formisano, Andrea Gaetano Chiariello and Raffaele Martone "Universita' degli Studi della Campania Luigi Vanvitelli, Italy"

11.15

**Lightning Indirect Effect Protection in Avionic Environment**
Hari Rimal and Antonio Faba "University of Perugia, Italy"

11.30

**Design and Validation of a Contactless Charging System for Electric Bicycles**
Maurizio Paschero "Polo for Sustainable Mobility - Rome, Italy", Rosanna Pinto "ENEA, Italy", Emanuele Marchionne "University of Rome `'La Sapienza`, Italy", Antonello Rizzi "University of Rome `'La Sapienza`, Italy", Fabio Massimo Frattale Mascioli "La Sapienza University of Roma, Italy"

11.45

**A Matlab Simulink Model for the Study of Smart Grid - Grid-Integrated Vehicles Interactions**
Vincenzo Bonaiuto "University of Roma Tor Vergata, Italy", Fausto Sargeni "Universita di Roma Tor Vergata, Italy"
12.00

System-level modelling/analysis and LNA design in low-cost automotive technology of a V2X wireless transceiver

Sergio Saponara, Gabriele Ciarpi and Bruno Neri "University of Pisa, Italy"
M2 - Electric and Magnetic Devices for smart mobility applications (II)
Chairs: Francesco Riganti Fulginei "UNIVERSITA' DEGLI STUDI ROMA TRE, Italy" and Riccardo Scorretti "L'ECOLE CENTRALE de LYON, France"

Monday, 11 September, 16.30-18.00
Room P2.2 building 25

16.30
INVITED
Bit Loading Optimization for Smart Grid Energy Storage Management
Sara Carcangiu, Gianni Celli, Alessandra Fanni and Michele Garau "University of Cagliari, Italy", Augusto Montisci "University of Cagliari, Italy", Fabrizio Pilo "Dipartimento Di Ingegneria Elettrica Ed Elettronica, Italy"
A procedure for the optimization of the bit loading in a PLC system implementing OFDM modulation is presented. The optimization strategy aims to find the best compromise between the conflicting objectives of minimal Signal Power, maximal Bit Rate, and minimal Bit Error Rate. The optimization is performed off line by means of a Multi-Objective approach. A set of Pareto solutions is determined, among which the designer has to take the final choice on the basis of the custom requirements. The approach is used to optimize the communication within a distributed energy storage system, which exploits an available electrical car fleet. The power lines supplying the charging points are used for the communication, while the information concerns, for each car, the identification code, the charge state, the schedule of charging/discharging. A unique OFDM modulation is used to dialogue with the whole cars fleet, so that it has to be optimized taking into account the frequency response of all the involved power lines.

17.00
Transmission of bits by means of non-uniform states in nanomagnets
Anna Giordano "University of Messina, Italy", Michele Pompei "University of Perugia, Italy"

17.15
Phase locking of current-driven spin-Hall oscillators: a micromagnetic study
Anna Giordano "University of Messina, Italy", Michele Pompei "University of Perugia, Italy"

17.30
Dynamic Hysteresis Modelling of Soft Magnetic Materials for Automotive Applications
Simone Quondam Antonio and Michele Pompei "University of Perugia, Italy"

17.45
The AMLEV Technology Applied to Low Speed Urban Transportation Systems
Antonino Musolino, Rocco Rizzo, Luca Sani and Giovanni Lutzemberger "University of Pisa, Italy"
M3 - Advanced remote sensing methods for a smarter and safer world (I)

Chairs: Antonio Iodice "University of Napoli Federico II"

Tuesday, 12 September, 8.30-10.15
Room P2.2 building 25

8.30
Observations of Terra Nova Bay polynya by Radarsat-2: dual- and single-polarization methods
Ferdinando Nunziata "University of Napoli Parthenope, Italy", Andrea Buono "Universita' di Napoli Parthenope, Italy", Flavio Parmiggiani "ISAC CNR, Italy", Miguel Moctezuma-Flores "Universidad Nacional Autonoma de Mexico, Italy", Maurizio Migliaccio "Universita' Napoli Parthenope, Italy"

8.45
Semi-Automated Estimation of the Local Flood Depth on SAR Images
Abdelhakim Benoudjit and Raffaella Guida "University of Surrey, United Kingdom "Great Britain"

9.00
Multi-temporal assessment of building damage on a landslide-affected area by Interferometric data
Diego Di Martire, Donato Infante, Massimo Ramondini, Pierluigi Confuorto and Domenico Calcagnotto "University of Naples, Italy", Roberto Tomas "Universidad de Alicante, Spain", Giuseppe Centolanza and Javier Duro "Dares Technology, Spain"

9.15
High Resolution Remote Sensing data for environmental modelling: some case studies
Guido Benassai, Diana Di Luccio and Valeria Corcione "University Parthenope, Italy", Giorgio Budillon "Pathenope University of Naples, Italy", Maurizio Migliaccio "Universita' Napoli Parthenope, Italy", Raffaele Montella "University of Naples Parthenope, Italy"

9.30
Using GEOBIA for Feature Extraction from Multitemporal SAR Images: Preliminary Results
Donato Amitran "University of Naples Federico II, Italy", Francesca Cecinati "University of Bristol, United Kingdom "Great Britain"", Gerardo Di Martino and Antonio Iodice "University of Napoli Federico II, Italy", Pierre-Philippe Mathieu "European Space Agency, Italy", Daniele Riccio "University of Naples Federico II, Italy", Giuseppe Ruello "University of Napoli Federico II, Italy"

9.45
A Fuzzy Inference System for Power Systems
Alberto Carboni "Polytechnic of Milan, Italy", Enrico Ragaini "ABB, Italy", Alessandro M Ferrero "Polytechnic of Milan, Italy"

10.00
Design and Evaluation of Haptic Interface Systems for Motorbike Application Using Multibody Modelling
Stefano Moretti and Fabio Previdi "University of Bergamo, Italy", Fabio Todeschini and Andrea Testa "E-Novia, Italy"
M4 - Advanced remote sensing methods for a smarter and safer world (II)
Chairs: Ferdinando Nunziata “University of Napoli Parthenope, Italy”

Tuesday, 12 September, 11.00-12.30
Room P2.2 building 25

11.00
INVITED
A new look at maritime applications using multi-polarization SAR
Maurizio Migliaccio "Università di Napoli Parthenope, Italy"
Leading-edge enabling technologies have been specifically developed to design, build, and operate new generation SARs that guarantee flexible, multi-mode and multi-polarization acquisitions. However, a remote sensing system is not meant just for the space community as it has the capability to provide new value-added products, i.e., applications and enhanced operational services that when based on remotely sensed measurements can provide useful information for Earth Observation (EO) purposes. In this talk, the unique opportunities provided by new high-performance multi-polarization SARs in the context of maritime applications are reviewed. The main message is that, once a proper em model is available, multi-polarization SAR measurements offer an unprecedented level of scattering information on the observed scene that make possible an “intelligent” processing of the remotely sensed measurements aimed at providing simple and user-friendly output that can be used by non-expert users and policy-makers.

11.30
Monitoring waterline variation of the Monte Cotugno lake using dual-polarimetric SAR data
Emanuele Ferrentino "University of Napoli Parthenope, Italy", Ferdinando Nunziata "University of Napoli Parthenope, Italy", Maurizio Migliaccio "Università di Napoli Parthenope, Italy"

11.45
Coprime Synthetic Aperture Radars
Gerardo Di Martino and Antonio Iodice "University of Napoli Federico II, Italy"

12.00
Comparison of ship detectability between TerraSAR-X and Sentinel-1
Domenico Velotto and Björn Tings "German Aerospace Center (DLR), Germany", Carlos Bentes "Technische Universität München, Germany"

12.15
GNSS-R: A Useful tool for sea target detection in near real-time
Alessio Di Simone "University of Naples, Federico II, Italy", Antonio Iodice "University of Napoli Federico II, Italy", Daniele Riccio "University of Naples Federico II, Italy", Hyuk Park and Adriano Camps "Universitat Politècnica de Catalunya, Spain"
M5 - Smart mobility challenges: vehicle, technology and infrastructure

Chairs: Giambattista Grusso, "Polytechnic of Milano, Italy" and Rita Cucchiara, "University of Modena and Reggio Emilia, Italy"

Wednesday, 13 September, 8.30-10.30
Room P2.2 building 25

8.30
**Intelligent scheduling for in-car notifications**
Jonathan Wright "University of Cambridge, United Kingdom (Great Britain)", Quentin Stafford-Fraser "University of Cambridge & Telemarq Ltd, United Kingdom (Great Britain)", Marwa Mahmoud and Peter Robinson "University of Cambridge, United Kingdom (Great Britain)", Eduardo Dias and Lee Skrypchuk "Jaguar Land Rover, United Kingdom (Great Britain)"

8.45
**Accurate Cyber-Physical System Simulation for Distributed Visual Search Applications**
Danilo Martino "Polytechnic of Milan, Italy", Yun Shen "Polytechnic of Milan, P.R. China", Marco Paracchini and Marco Marcon "Polytechnic of Milan, Italy", Emanuele Plebani and Danilo Pietro Pau "STMicroelectronics, Italy"

9.00
**Development of sustainable transport in Smart Cities**
Irina Makarova and Ksenia Shubenkova "Kazan Federal University, Russia", Andrei Katunin "Orel State University, Russia", Vadim Mavrin and Aleksey Boyko "Kazan Federal University, Russia"

9.15
**An Integrated Methodology Model for Smart Mobility System applied to Sustainable Tourism**
Massimiliano Roda, Davide Giorgi, Gian Piero Joime, Luigi Anniballi and Marco London "University of Rome “La Sapienza”, Italy", Maurizio Pascher "Polo for Sustainable Mobility - Rome, Italy", Fabio Massimo Frattale Mascioli "La Sapienza University of Roma, Italy"

9.30
**Towards an Impact Study of Electric Vehicles on the Italian Electric Power System Using Simulation Techniques**
Michela Longo and Dario Zaninelli "Polytechnic of Milan, Italy", Nina Lutz "Massachusetts Institute of Technology, USA", Marco Pruckner "University of Erlangen-Nuremberg, Germany", Luca Daniel "MIT, USA"

9.45
**Look before you Leap:Exploring the challenges of technology and user experience in the Internet of Things**

10.00
**Application of Induction Power Recharge to Garbage Collection Service**
Lorenzo Berzi "University of Florence, Italy", Riccardo Barbieri "University of Firenze, Italy", Marco Pierini "University of Florence, Italy", Luca Pugi "University of Florence & Dip. Ingegneria Industriale, Italy", Alberto Reatti and Fabio Corti "University of Florence, Italy", Massimo Delogu "Univerisity of Florence, Italy"
Modeling of Electrical Vehicle for State of Charge evaluation in smart mobility scenario
Giambattista Gruosso and Diogo Bandeira "Polytechnic of Milan, Italy"
Track 2: Industry 4.0

1. IoT Challenges, Technologies and Applications
Chairs: Rosario Schiano Lo Moriello, "University of Napoli Federico II, Italy", Roberto Minerva, "EIT Digital", Marco di Felice "University of Bologna, Italy", Luciano Bononi "University of Bologna, Italy"

Monday, 11 September, 10.30-12.30
Room P2.3 building 25

10.30
Is WiFi suitable for energy efficient IoT deployments? A performance study
Federico Montori, Riccardo Contigiani and Luca Bedogni "University of Bologna, Italy"

10.45
LoRa Protocol Performance Assessment in Critical Noise Conditions
Leopoldo Angrisani and Pasquale Arpaia "University of Naples Federico II, Italy", Francesco Bonavolontà "University of Napoli Federico II, Italy", Mario Conti and Annalisa Liccardo "University of Naples Federico II, Italy"

11.00
On the Performance of 169 MHz WM-Bus and 868 MHz LoRa Technologies in Smart Metering Applications
Francesca Facchini and Giorgio M. Vitetta "University of Modena and Reggio Emilia, Italy", Alessandro Losi and Fabio Ruscelli "Meter Italia, Italy"

11.15
High sensitivity, low noise front-end for long range capacitive sensors for tagless indoor human localization
Javed Iqbal, Mihai T Lazarescu, Arslan Arif and Luciano Lavagno "Polytechnic of Torino, Italy"

11.30
IoT Module Improves Smart Environment Reliability
Tufan C. Karalar and Enver Derun Karabeyoglu "Istanbul Technical University, Turkey"

11.45
Which AQM fits IoT better?
Carlo Augusto Grazia, Natale Patriciello, Martin Klapez and Maurizio Casoni "University of Modena and Reggio Emilia, Italy"

12.00
An Industrial IoT Framework to Simplify Connection Process using System-Generated Connector
Le Kim Hung "EURECOM, France", Soumya Kanti Datta "EURECOM", Christian Bonnet "Institut Eurecom, France", Francois Hamon "GreenCityzen, France", Alexandre Boudonne "GreenCityZen, France"

12.15
Implementation and evaluation of the last will primitive in a semantic information broker for IoT applications
Alfredo D’Elia, Fabio Viola, Tullio Salmon Cinotti, Cristiano Aguzzi and Francesco Antoniazzi "University of Bologna, Italy"
I2 - Smart Factory and Simulation of Industrial Processes and Systems
Chairs: Cesare Fantuzzi "University of Modena and Reggio Emilia, Italy", Cristian Secchi "University of Modena and Reggio Emilia, Italy", Mosè Gallo "Pegaso University, Italy"

Monday, 11 September, 16.30-18.30
Room P2.3 building 25

16.30
OPEB: Open Physical Environment Benchmark for Artificial Intelligence
Hamid Mirzaei "University of California Irvine, USA", Mona Fathollahi "University of South Florida, USA" and Tony Givargis "University of California, Irvine, USA"

16.45
Flexible monitoring system for automated detection of bacterial growth in a commercial specimen processing platform
Paolo Bellitti, Michele Bona, Michela Borghetti, Emilio Sardini and Mauro Serpelloni "University of Brescia, Italy"

17.00
Man-CPS Interaction: an experimental assessment of the human behavior evolution
Silvestro Vespoli, Assunta Cammardella, Guido Guizzi and Giusy Visone "University of Napoli Federico II, Italy"

17.15
Testing an RFID receiving gate for improving process accuracy in fashion and apparel retail
Massimo Bertolini "University of Parma, Italy", Antonio Rizzi "University Parma, Italy", Giovanni Romagnoli and Andrea Volpi "University of Parma, Italy"

17.30
Deep Learning for Virtual Metrology: Modeling with Optical Emission Spectroscopy Data
Matteo Terzi, Chiara Masiero, Alessandro Beghi, Marco Maggipinto and Gian Antonio Susto "University of Padova, Italy"

17.45
Modelling and Simulation of a Convective Low Temperature Sludge Dryer with Multilayer Belt
Alessandro Beghi "University of Padova, Italy", Paolo Franceschetti "Santex Rimar Group & Solwa srl, Italy", Mirco Rampazzo "University of Padova, Italy", Enrico Sisti "Vis Engineering, Italy", Carlo Alberto Algarvia and Michele Lionello "University of Padova, Italy"

18.00
Load Swing Reduction in Manually Operated Bridge Cranes
Stefano Moretti "University of Bergamo, Italy", Yamuna Maccarana "University of Bergamo", Fabio Previdi and Michele Ermidoro "University of Bergamo, Italy"
I3 - Laser Manufacturing (I)

Chairs: Annamaria Cucinotta "University of Parma, Italy", Luca Vincetti "University of Modena and Reggio Emilia, Italy"

Tuesday, 12 September, 11.00-12.45
Room P2.3 building 25

11.00
INVITED

Inhibited Coupling Fibres for High Power Ultra Fast Laser Beam Delivery
Luca Vincetti "University of Modena and Reggio Emilia, Italy" and Fetah Benabid "University of Limoges, France"
Free space beam delivery has long been the only option to transport high energy and/or ultra-short laser pulses. The more robust and flexible technique to deliver laser beams based on conventional optical fibres suffers from pulse-energy upper limit due to the intrinsic catastrophic material damage of the silica and short pulse temporal distortion. Recently a new king of hollow core fibres named Inhibited Coupling (IC) fibres has been proposed. These novel IC fibres exhibit broadband transmission, ultra-low dispersion, and a strongly reduced optical overlap with the surrounding silica allowing to overcome most of the limits of solid conventional optical fibres. In this paper we report on the latest results on the employment of IC to deliver high-power ultra-short laser pulses.

11.30
Laser microcutting of sheet metal for prototyping expandable stent-like structures in permanent and biodegradable alloys
Guendalina Catalano, Ali Gökhan Demir, Valentina Furlan and Barbara Previtali "Polytechnic of Milan, Italy"

11.45
Optimization of Laser Welding of Dissimilar Corrosion Resistant Alloys
Paolo Veronesi and Luca Lusvarghi "University of Modena, Italy", Michele Cavallini "Magneti Marelli, Italy", Rinaldo Rigon "Ecor Research, Italy", Elena Colombini and Roberto Giovanardi "University of Modena, Italy"

12.00
High resolution 3D printing of polymers by two-photon polymerization using Q-switched microchip laser
Dimitrii Perevoznik and Kestutis Kurselis "Laser Zentrum Hannover e. V., Germany", Roman Kiyan "Laser Zentrum Hannover, Germany", Boris Chichkov "Laser Zentrum Hannover e.V., Germany"

12.15
DREAM: Driving up Reliability and Efficiency of Additive Manufacturing
Corrado Scincalepore "INSTM, Italy", Federica Bondioli "University of Parma, Italy", Andrea Gatto, Silvio Defanti, Lucia Dentì and Elena Bassoli "University of Modena and Reggio Emilia, Italy"

12.30
Industry 4.0: hope, hype or revolution?
Lorenzo Bassi "Datalogic Srl, Italy"
I4 - Laser Manufacturing (II)

Chairs: Annamaria Cucinotta "University of Parma, Italy", Luca Vincetti "University of Modena and Reggio Emilia, Italy"

Tuesday, 12 September, 14.30-16.00
Room P2.3 building 25

14.30
IN VITED
How new laser development can help Laser Shock Peening penetration to widen industrial applications?

Laser Shock Peening, fatigue life, high intensity lasers, diode pumping Laser Shock Peening, fatigue life, high intensity lasers, diode pumping

Danijela Rostohar "HiLASE & HiLASE, Czech Republic"

Despite obvious benefits to fatigue behave of Laser Shock Peened components, this technology is still only apply in very limited cases in aviation and nuclear power industry. Limited number of lasers suitable for this treatment, their cost, size and working conditions are most limiting factor. In this paper will be proposed a new approach in the laser architecture which should overcome mentioned limitations of existing laser sources and as a consequence enable wider application of Laser Shock Peening.

15.00
Continuous and Pulsed Laser High Power Beam Combiner for Additive Manufacturing Applications

Marta Bassignana, Alessio Califano, Francesco Pescarmona and Andrea Braglia "OPI Photonics SRL, Italy", Maria Azzena and Guido Perrone "Polytechnic of Torino, Italy"

15.15
Laser hardening of steel sintered parts

Paolo Veronesi "University of Modena, Italy", Ramona Sola "University of Modena and Reggio Emilia, Italy", Elena Colombini and Roberto Giovanardi "University of Modena, Italy", Giovanni Parigi "STAV srl, Italy"

15.30
Improved performances of photonic crystal fibers for high power laser operation

Carlo Molardi "University of Parma, Italy", Lorenzo Rosa "Swinburne University of Technology, Australia & University of Modena and Reggio Emilia, Italy", Federica Poli, Stefano Selleri and Annamaria Cucinotta "University of Parma, Italy"

15.45
Validation of post-process characterization methods for Laser Shock Peened Materials

Jan Brajer "HiLASE, Czech Republic", Jan Madl "Czech Technical University in Prague, Czech Republic", Jan Kaufman "HiLASE, Czech Republic", Danijela Rostohar "HiLASE & HiLASE, Czech Republic", Zdenek Pitrmuc "Czech Technical University in Prague, Czech Republic", Tomas Mocek "HiLASE Project, Institute of Physics AS CR, Czech Republic"
I5 - Digital Fabrication & Digital Manufacturing (I)
Chair: Domenico Asprone "University of Napoli Federico II"

Wednesday, 13 September, 8.30-10.00
Room P2.3 building 25

8.30
INVITED
Additive manufacturing: from prototypes to products
Ferdinando Auricchio, "University of Pavia, Italy" and Simona Marconi, "University of Pavia, Italy"
Additive manufacturing, also known as 3D printing, is a disruptive technology that is spreading in many different fields, changing both design, distribution chains and economical paradigms. Additive manufacturing is formally defined as the process of joining materials to make objects from 3D virtual models, usually layer upon layer, as opposed to subtractive manufacturing methodologies. Additive manufacturing was born as a prototyping technology, confining its application only to the production of single or at least few copies of the final product, with the aim of evaluating its esthetic features and/or its functionality and then proceed to the manufacturing with traditional technologies. Thanks to the great evolution that materials and technologies knew in the last few years, additive manufacturing started to spread also as a production technology in many fields. Applications cover a wide range, moving from mechanics to civil engineering, architecture, medicine, food industry and many other fields.

9.00
Layered Silicate Reinforced Polylactic Acid Filaments for 3D Printing of Polymer Nanocomposites
Bartolomeo Coppola, Nicola Cappetti, Luciano Di Maio, Paola Scarfato and Loredana Incarnato "University of Salerno, Italy"

9.15
Pyro-EHD 3D printing at microscale
Sara Coppola "Institute of Applied Sciences & Intelligent Systems "E. Caianiello", Italy", Giuseppe Nasti, Veronica Vespini, Federico Olivieri, Vito Pagliarulo, Simonetta Grilli and Pietro Ferraro "ISASI CNR, Italy"

9.30
The Role of Materials and Products Characterization in the Additive Manufacturing Industry
Domenico Caputo, Paolo Aprea, Nicola Gargiulo and Barbara Liguori "University of Napoli Federico II, Italy"

9.45
Cyber-Physical System Integration for Industry 4.0: Modelling and Simulation of an Induction Heating Process for Aluminium-Steel Molds in Footwear Soles Manufacturing
Paolo Cicconi, Anna Costanza Russo, Michele Germani, Mariorosario Prist, Emanuele Pallotta and Andrea Monteriù "Università Politecnica delle Marche, Italy"
I6 - Digital Fabrication & Digital Manufacturing (II)
Chair: Leopoldo Angrisani "University of Napoli Federico II"

Wednesday, 13 September, 11.00-13.00
Room P2.3 building 25

11.00
INVITED
**Design for Additive Manufacturing: trends and opportunities**
Antonio Lanzotti, "University of Naples Federico II, Italy" and Massimo Martorelli, "University of Naples Federico II, Italy"
Additive Manufacturing (AM) techniques offer several technical and economic benefits compared to traditional manufacturing processes. They have the capability to produce complex and intricate shapes that are not feasible with traditional manufacturing processes. The geometric freedoms associated with AM provide new possibilities for the part design. Associated to topology optimization techniques and other methods able to generate complex shapes (e.g. three-dimensional lattices structures with specific mechanical, thermal, optical, and biological properties, used to produce high stiffness low weight structures), AM techniques, potentially, allow to save time, material and costs.

Although AM can be considered a convenient alternative to conventional manufacturing processes, it is agreed that parts should be redesigned for AM according to the new design guidelines of ISO/ASTM 52910:2017 and not simply reproduced using an AM process. This study presents the trends and the opportunities offered by Design for Additive Manufacturing (DfAM). It explores issues related to design and redesign for direct and indirect AM fabrication in different fields of application, highlighting the need for the development of DfAM expertise and education.

11.30
**Mechanical properties of Inconel 718 in Additive Manufacturing via Selective Laser Melting**
Fabrizia Caiazzo, Vittorio Alfieri, Gaetano Corrado and Paolo Argenio "University of Salerno, Italy"

11.45
**Study of the solid state joining of additive manufactured components**
Antonino Squillace, Andrea El Hassanin, Antonello Astarita, Carla Velotti, Fabio Scherillo and Luigi Carrino "University of Naples Federico II, Italy"

12.00
**An innovative embedded wireless sensor network system for the structural health monitoring of RC structures**
Costantino Menna "University of Naples, Federico II, Italy"; Leopoldo Angrisani "University of Naples Federico II, Italy"; Domenico Asprone "University of Naples, Federico II, Italy"; Francesco Fabbrocino "Università Pegaso, Italy"; Francesco Bonavolontà "University of Napoli Federico II, Italy"; Rosario Schiano Lo Moriello "University of Napoli Federico II, Italy"; Luca Gallucci "University of Naples Federico II, Italy"

12.15
**Rheological features of geopolymer systems for 3D-printed sustainable concrete**
Claudio Ferone "University of Naples Parthenope, RILEM Member, INSTM, Italian Society of Ceramic, Italy"; Francesco Messina "University of Naples Parthenope, RILEM Student Member, INSTM, Italian Society of Ceramics, Italy"; Giuseppina Roviello "University of Napoli Parthenope, Italy"; Raffaele Cioffi "University of Naples Parthenope, RILEM Member, INSTM, Italian Society of Ceramic, Italy"; Laura Ricciotti "University of Napoli Parthenope, Italy"
Track 3: Smart Healthcare

H1 - Advances in Medical Informatics for Health Care Applications (I)
Chair: Silvana Quaglini "University of Pavia, Italy"

Monday, 11 September, 10.30-12.15
Room P2.1 building 25

10.30
**INVITED**
*Geomatics for health*
Vittorio Casella "University of Pavia, Italy"

11.00
**Designing a HL7 Compatible Personal Health Record for Mobile Devices**
Yasaman Aliakbarpoor, Sara Comai and Giuseppe Pozzi "Polytechnic of Milan, Italy"

11.15
**An Assistive Mobile System Supporting Blind and Visual Impaired People when Outdoor**
Francesco Masulli, Stefano Rovetta "University of Genoa, Italy", Toni Valls Mataró "Association Trescucarachas, Italy", Alberto Cabri and Carlo Traverso "Universita' di Genova, Italy", Elisabetta Capris and Simone Torretta "David Chiossone Onlus, Italy"

11.30
**An advanced system to support cognitive rehabilitation in multiple sclerosis**
Mauro Gaspari and Floriano Zini "University of Bologna, Italy", Debora Castellano "Delia Gennari ONLUS, Italy", Federica Pinardi "IRCCS, Neuroscience, Bellaria Hospital, Bologna, Italy", Sergio Stecchi "University of Bologna, Italy"

11.45
**Predicting clinical outcomes in patients with traumatic bleeding: a secondary analysis of the CRASH-2 dataset**
Gianluca Roveda, Moses Koledoye and Enea Parimbelli "University of Pavia, Italy", John Holmes "University of Pennsylvania Perelman School of Medicine, USA"

12.00
**Development of a Health Geomatics analysis framework to evaluate cardiac arrests in Lombardy**
Giulia Marelli "Polytechnic of Milan, Italy", Carolina Muñoz "Universidad de San Buenaventura, Colombia", Piero Brambilla, Giovanni Sesana and Andrea Pagliosa "Azienda Regionale Emergenza Urgenza - AREU, Italy", Maria Brovelli and Enrico G Caiani "Polytechnic of Milan, Italy"
H2 - Advances in Medical Informatics for Health Care Applications (II)
Chair: Roberto Tagliaferri "University of Salerno, Italy"

Monday, 11 September, 16.30-18.15
Room P2.1 building 25

16.30
INVITED
Modeling Care Pathways through BPMN and DMN
Carlo Combi, "University of Verona, Italy"
Business Process (BP) technology has emerged as one of the leading technologies in modeling, redesigning, and executing organisational processes in many different application domains. Among them, the representation and management of care pathways have been attracting a growing interest. Care pathways refer to planning and coordination of care processes related to specific groups of patients in a given setting. The goal in defining and following care pathways is to improve the quality of care in terms of patient satisfaction, costs reduction, and medical outcome. Thus, care pathways are a promising methodological tool for standardizing care and decision-making. Business process management techniques can successfully be used for representing organizational aspects of care pathways in a standard, readable, and accessible way, whilst supporting process development, analysis, and re-engineering. In this talk, I will discuss some methodological issues related to the integrated design of care pathways and related decisions, while considering proper representation and management of organizational and clinical information. I will discuss how Business Process Model and Notation (BPMN) and Decision Model and Notation (DMN) can be combined for supporting intertwined aspects of decision-intensive care pathways. As a proof-of-concept the proposed methodology has been applied to design care pathways related to Chronic Obstructive Pulmonary Disease (COPD) in the region of Veneto, in Italy.

17.00
Detection and Management of Side Effects in Patients with Head and Neck Cancer
Elisa M Zini and Giordano Lanzola "University of Pavia, Italy", Silvana Quaglini "University of Pavia, Italy"

17.15
Clinical Timelines Development from Textual Medical Reports in Italian
Natalia Viani "University of Pavia, Italy", Valentina Tibollo, Carlo Napolitano and Silvia Priori "IRCCS Istituti Clinici Scientifici Maugeri, Pavia, Italy", Riccardo Bellazzi and Lucia Sacchi "University of Pavia, Italy"

17.30
BIE-PlnCS: Brain Injury Evaluation with Pupillometry based on INfrared Camera System
Chiara Di Vece, Filippo Bracco and Luca Cerina "Polytechnic of Milan, Italy", Marco D Santambrogio "Polytechnic of Milan & MIT, Italy"

17.45
Application of an automatic ulcer segmentation algorithm
Eros Pasero and Cristina Castagneri "Polytechnic of Torino, Italy"

18.00
An improved imaging system for hyperspectral analysis of the human iris
Luca Di Cecilia, Francesco Marazzi and Luigi Rovati "University of Modena and Reggio Emilia, Italy"
Computational modelling of non-invasive brain stimulation for neural and cognitive engineering
Paolo Ravazzani "Consiglio Nazionale delle Ricerche, Institute of Electronics, Computer and Telecommunication Engineering IEIIT CNR, Milano, Italy"

Brain neuronal activity can be modulated by non-invasive brain stimulation (NIBS), via electric currents induced by an externally generated electric or magnetic field. NIBS is now considered an elective tool for the diagnosis of central motor pathway damages, for neurorehabilitation from brain injuries and a treatment option for pain, psychiatric, neurodegenerative and cognitive disorders. Despite this, NIBS is under-investigated in relation to other clinical interventions, particularly for what concerns the knowledge about the actual distributions of the electric fields and current densities induced in the target brain areas. This paper aims to address these issues, boosting the translation of computational bio-electromagnetics approaches into valuable information for diagnosis and therapy.

Assessment of the capability to target cerebellar sub-regions with High-Definition transcranial Direct Current Stimulation
Serena Fiocchi "Consiglio Nazionale delle Ricerche, Italy", Emma Chiaramello "CNR IEIIT Institute of Electronics, Computer and Telecommunication Engineering, Italy", Valeria Gazzola "Netherlands Institute for Neuroscience, The Netherlands", Judith Suttrup "University of Amsterdam, The Netherlands", Paolo Ravazzani "CNR, Italy", Marta Parazzini "IEIIT CNR, Italy"

A Wearable Device for Blind People to Restore Color Perception
Riccardo Cavadini, Luca Cerina and Marta Bracco "Polytechnic of Milan, Italy", Marco D Santambrogio "Polytechnic of Milan & MIT, Italy"

Towards a method for the objective assessment of cognitive workload
Andrea Malagoli "University of Modena and Reggio Emilia, Italy", Matteo Corradini and Paola Corradini "University of Modena and Reggio Emilia, Italy", Todd Schuett "Kongsberg Norcontrol, Norway", Sergio Fonda "University of Modena and Reggio Emilia, Italy"

Integrated Data Analysis for the Quantification of Emotional Responses During Video Observation
Pierluigi Reali, Debora Bettiga, Alessandra Mazzola, Lucio Lamberti and Margherita Pillan "Polytechnic of Milan, Italy", Sergio Cerutti "Polytechnic of Milan, Italy", Anna M. Bianchi "Polytechnic of Milan, Italy"

EEG analysis of brain activity in Attention Deficit Hyperactivity Disorder during an Attention task
Allwin Alex "Rhein-Waal University of Applied Sciences, Kleve, Germany", Stefania Coelli "Polytechnic of Milan, Italy", Laura Ponzini "University of Milan, Italy", Erika Buzzi and Maria Canevini "University of Milan, A. O. San Paolo, Italy", Anna M. Bianchi "Polytechnic of Milan, Italy"
A complex network-based approach to detecting and characterizing ictal states in patients with Childhood Absence Epilepsy
Paolo Lo Giudice "University Mediterranea of Reggio Calabria, Italy", Nadia Mammone "Mediterranean University of Reggio Calabria, Italy", Francesco Morabito, Davide Strati and Domenico Ursino "University Mediterranea of Reggio Calabria, Italy"
H4 - Services, Applications and Solutions to Challenging Problems in Smart Healthcare

Chairs: Sonia Bergamaschi "University of Modena and Reggio Emilia, Italy" and Agustí Solanas, "Rovira i Virgili University, Spain"

Tuesday, 12 September, 8.30-10.30
Room P2.1 building 25

8.30

INVITED

Trends and Challenges in Smart Healthcare Research: A Journey from Data to Wisdom

Agustí Solanas "Rovira i Virgili University, Spain", Fran Casino "Universitat Rovira i Virgili, Spain", Edgar Batista "Rovira i Virgili University, Spain" Robert Rallo "Pacific Northwest National Laboratory, USA"

Smart Healthcare is a relatively new context-aware healthcare paradigm influenced by several fields of knowledge, namely medical informatics, communications and electronics, bioengineering, ethics and so on. Thus, many challenging problems are related to smart healthcare but in many cases they are explored individually in their respective fields and, as a result, they are not always known by the smart healthcare research community working in more specific domains. The aim of this article is to identify some of the most relevant trends and research lines that are going to affect the smart healthcare field in the years to come. To do so, the article considers a systematic approach that classifies the identified research trends and problems according to their appearance within the data life cycle, this is, from the data gathering in the physical layer (lowest level) until their final use in the application layer (highest level). By identifying and classifying those research trends and challenges, we help to pose questions that the smart healthcare community will need to address. Consequently, we set a common ground to explore important problems in the field, which will have significant impact in the years to come.

9.00

A Fog-Computing architecture for Preventive Healthcare and Assisted Living in Smart Ambients

Luca Cerina, Sara Notargiacomo, Matteo Greco and Luca Paccani "Polytechnic of Milan, Italy", Marco D Santambrogio "Polytechnic of Milan & MIT, Italy"

9.15

Visual evaluation of health warning cues in anti smoking PSAs images

Dario Rossi, Anton Giulio Maglione, Enrica Modica, Isotta Venuti and Ambra Brizi, Fabio Babiloni and Giulia Cartocci "University of Rome Sapienza, Italy"

9.30

Neuroelectrical Indices evaluation during Antismoking Public Service Announcements on a young population

Enrica Modica, Dario Rossi, Ambra Brizi, Giulia Cartocci, Anton Giulio Maglione and Isotta Venuti and Fabio Babiloni "University of Rome Sapienza, Italy"

9.45

Assistive Robotic Walker Parameter Identification for Estimation of Human Thrust without Force Sensors

Marco Andreetto and Stefano Divan "University of Trento, Italy", Daniele Fontanelli "University of Trento, Italy", Luigi Palopoli "University of Trento, Italy" and Antonino Sferlazza "University of Palermo, Italy"
Exergaming for balance training, transparent monitoring, and social inclusion of community-dwelling elderly
Francesca Lunardini "Polytechnic of Milan, Italy", Nicola Basilico "University of Milan, Italy", Emilia Ambrosini "Polytechnic of Milan, Italy", Jacopo Essenziale and Renato Mainetti "University of Milan, Italy", Alessandra Pedrocchi "Polytechnic of Milan, Italy", Katia Daniele, Maura Marcucci and Daniela Mari "Fondazione IRCCS Cà Granda – Ospedale Maggiore Policlinico, Italy", Simona Ferrante "Polytechnic of Milan, Italy" and Nunzio Alberto Borghese "University of Milan, Italy"

Achieving ecological validity in mobility assessment: Validating a wearable sensor technology for comprehensive gait assessment
Mostafa Mohammadi "ETH Zurich, Switzerland & Polytechnic of Milan, Italy", Navrag Singh, Marco Rudolf Hitz and Stefan Orter "ETH Zurich, Switzerland", Carlo Frigo "Polytechnic of Milan, Italy" and William Taylor "ETH Zurich, Switzerland"
H5 - E-Health and Personalised Medicine (I)

Chairs: Sergio Cerutti "Polytechnic of Milano, Italy" and Enzo Pasquale Scilingo, "University of Pisa, Italy"

Tuesday, 12 September, 11.00-13.00
Room P2.1 building 25

11.00

INVITED

Linking Excellence in Biomedical knowledge and Computational Intelligence Research for personalized management

Paulo de Carvalho, "University of Coimbra, Portugal"

In order to handle the challenges induced by the chronic disease burden, the EU health systems are undergoing a paradigm shift from reactive care to preventive care and from in-hospital to home care. Prevention systems support and motivate users in adopting healthy lifestyles in order to prevent or delay manifestations of disabling chronic diseases. Disease management systems handle the care of patients with chronic disease, combining expertise from different areas, and integrating new technologies to offer the patient better and more cost effective care. In this context, personalizing health and care systems (PHC) have a central role in supporting the paradigm shift by assisting in the provision of continuous and personalised services to empower patients and professionals in managing their health. Today's personal health systems miss adequate integration of clinical evidence and knowledge from holistic clinical practice and biomedical research required to support truly holistic management of chronic diseases and their co-morbidities. Current solutions are designed using the “one fits all” principal lacking a truly personalization/precision by capturing and adapting to the patients’ phenotype and individualized treatment or context needs. Data processing is at the core of personal health where acquired data is turned into meaning and action. In order to pave the way from personal to personalised systems, PHC require intelligent algorithms to treat and correct data obtained from uncontrolled conditions, to efficiently integrate multimodal and multi-scale data, to be self-adapting (moving from population-based to patient-specific adaptations) and interpretable, and to integrate clinical and biomedical evidence at their genesis. In this talk the goal is to introduce and discuss the LiNK approach, i.e., a strategy outlined to link competences in intelligent processing in order to create a research ecosystem to address two central scientific and technical challenges for PHC deployment: (1) infusion of clinical evidence biomedical knowledge in PHC solutions and (2) moving PHC solutions from personal to personalized services, i.e., services adapted to the specific user needs and characteristics.

11.30

Multiparametric prediction with application to early detection of cardiovascular events

Diogo Nunes "Universidade de Coimbra, Portugal", Jorge Henriques "University of Coimbra, Portugal", Teresa Rocha "Instituto Politécnico de Coimbra, Portugal", Paulo Carvalho "University of Coimbra, Portugal"

11.45

Comparison of an interpretable data-driven approach with state of the art classifiers: application to cardiovascular risk assessment

Diana Mendes "Universidade de Coimbra, Portugal", Simão Paredes and Teresa Rocha "Instituto Politécnico de Coimbra, Portugal", Paulo Carvalho and Jorge Henriques "University of Coimbra, Portugal", João Morais "Hospital de Santo André, Leiria, Portugal"
12.00
Management of mobile Health Projects in Developing Countries: An Empirical Study
Ali Zalzala "Community Tracks, United Kingdom "Great Britain"", Abhimanyu Roy "Institute of Management Technology, Ghaziabad, India"

12.15
Customization of domestic environment and physical training supported by Virtual Reality and Semantic Technologies: a use-case
Davide Baldassini, Vera Colombo and Daniele Spoladore "National Research Council, Italy", Sara Arlati "Polytechnic of Milan, Italy", Marco Sacco "National Research Council, Italy"

12.30
An mHealth App counseling Patients and General Practitioners about Multiple Myeloma
Giordano Lanzola, Rosangela Boninsegna, Eleonora Losiouk and Elisa M Zini "University of Pavia, Italy", Virginia Ferretti and Alessandro Corso "IRCCS Policlinico San Matteo, Italy", Silvana Quaglini "University of Pavia, Italy"

12.45
e-Health Solutions for Better Care: Characterization of Health Apps to Extract Meaningful Information and Support Users' Choices
Alessia PagliaLonga "CNR IEIIT - CNR Institute of Electronics, Computer and Telecommunication Engineering", Francesco Pincioli, Riccardo Barbieri, Enrico G Caiani and Marco Riboldi "Polytechnic of Milan, Dipartimento di Elettronica, Informazione e Bioingegneria "DEIB", Gabriella Tognola "CNR IEIIT - CNR Institute of Electronics, Computer and Telecommunication Engineering, Italy"
H6 - E-Health and Personalised Medicine (II)

Chairs: Sergio Cerutti "Polytechnic of Milano, Italy" and Paulo de Carvalho, "University of Coimbra, Portugal"

Tuesday, 12 September, 14.30-16.30
Room P2.1 building 25

14.30  
**INVITED**

**Central and autonomic nervous system dynamics during multiperceptual affective elicitation**

Enzo Pasquale Scilingo, "University of Pisa, Italy"

The talk will focus on exploring central and autonomic nervous system dynamics for the assessment of mood and emotional states. Several concepts, some of which are currently sparse over different manuscripts, will be illustrated in order to bring out a clear breakthrough in the field of affective computing, mood assessment, biomedical engineering, biomedical signal processing, and data acquisition. Some personalized methodologies able to characterize the affective state of a subject by means of the analysis of a wide spectrum of central (EEG) and peripheral biosignals such as Heart Rate Variability, Electrodermal Response, Respiration Activity, Eye Gaze information, will be described. Moreover, these patterns of biosignals are processed during the presentation of affective stimuli conveyed through different perceptual channels, i.e. visual, auditory, tactile and olfactory, pointing out the crucial role of nonlinear dynamics and the strict interconnection between brain and heart.

15.00  
**Robust Carotid Pulse Detection Using Accelerometry and Electrocardiography**

Bernardo Silva "Universidade de Coimbra, Portugal", Jens Muehlsteff "Philips Research, The Netherlands", Ricardo Couceiro "Universidade de Coimbra, Portugal", Jorge Henriques "University of Coimbra, Portugal", Christiane Pelker "UKE Eppendorf University Hospital Hamburg, Italy", Christian Meyer "UKE Eppendorf University Hospital Hamburg, Germany", Paulo Carvalho "University of Coimbra, Portugal"

15.15  
**On the viability of ECG features for seizure anticipation on long-term data**

Adriana Leal "University of Coimbra, Portugal", Maria Ruano "University of Algarve, Portugal", Jorge Henriques, Paulo Carvalho and César Teixeira "University of Coimbra, Portugal"

15.30  
**Measuring autonomic involvement related to seizure onset in Focal Cortical Dysplasia Type II**

Anna M. Bianchi, Anna Dabraio, Stefania Coelli "Polytechnic of Milan, Italy", Lino Nobili, Chiara Campana, Annalisa Rubino "Ospedale Niguarda, Milano, Italy"

15.45  
**Recognition of Affective Haptic stimuli Conveyed by different Fabrics using EEG-based Sparse SVM**

Alberto Greco, Mimma Nardelli, Matteo Bianchi, Gaetano Valenza and Enzo Pasquale Scilingo "University of Pisa, Italy"

16.00  
**Bioimpedance sensing in wearable systems: from hardware integration to model development**

Stefano Rossi "STMicroelectronics, Italy", Chiara Mancarella and Chiara Mocenni "University of Siena, Italy", Luigi Della Torre "STMicroelectronics, Italy"
16.15

**HUG enomics: a support to personalized medicine research**

Lorenzo Di Tucci, Giulia Guidi, Sara Notargiacomo, Luca Cerina and Alberto Scolari "Polytechnic of Milan, Italy", Marco D Santambrogio "Polytechnic of Milan & MIT, Italy"
**H7 - Big Data Integration and IoT for Smart Health Care**
Chair: Giovanni Simonini "University of Modena and Reggio Emilia, Italy"

Wednesday, 13 September, 8.30-10.25
Room P2.1 building 25

8.30
**INVITED**

**Atrial fibrillation: what technologies for a clinical screening?**
Giuseppe Boriani, "University of Modena and Reggio Emilia, Italy"
Atrial fibrillation is a disease, associated with adverse outcomes (stroke, heart failure, death), with an increasing prevalence that will result in 2030 in Europe in around 15 million subjects affected and 200,000 new cases per year. Atrial fibrillation can be asymptomatic in up to 40% of cases but its detection, even if asymptomatic, is crucial for instituting antithrombotic prophylaxis for preventing stroke. This work is focused on the analysis of data from patients with and without atrial fibrillation aiming to evaluate cheap monitoring tools (using devices designed for area of wellness) as well as medical certified devices, coupled with mHealth Apps, and assess the potential clinical performance of “low cost” strategies for detecting atrial fibrillation, in comparison with the gold standard of continuous electrocardiographic (ECG) monitoring, which is a sophisticated and costly tool.

8.50
**My Smart Age with HIV: an innovative mobile and IoMT framework for patients empowerment**
Mirko Orsini and Marco Pacchioni "DataRiver Srl, Italy", Andrea Malagoli "University of Modena and Reggio Emilia, Italy", Giovanni Guaraldi "University of Modena and Reggio Emilia, Italy"

9.05
**A Telemonitoring Service Supporting Preterm Newborns Care in a Neonatal Intensive Care Unit**
Eleonora Losiouk and Giordano Lanzola "University of Pavia, Italy", Alfonso Galderisi and Daniele Trevisanuto "University of Padova, Italy", Garry Steil "Harvard Medical School, USA", Andrea Facchinetti "University of Padua, Italy", Claudio Cobelli "University of Padua, Italy"

9.20
**The Italian FSHD Registry: an enhanced data integration and analytics framework for Smart Health Care**
Mirko Orsini, Enrico Calanchi and Luca Magnotta "DataRiver Srl, Italy", Luca Gagliardelli, Monica Govi, Fabiano Mele and Rossella Tupler "University of Modena and Reggio Emilia, Italy"

9.35
**Smart product and Smart Productions in the PV-OWL - Pharmacovigilance surveillance through semantic Web-based platform for continuous and integrated monitoring of drug-related adverse effects in open data sources and Social media**
Carlo Piccinni "University of Bologna, Italy", Mirko Orsini "DataRiver Srl, Italy", Elisabetta Poluzzi "University of Bologna, Italy", Sonia Bergamaschi "University of Modena and Reggio Emilia, Italy"

9.50
**PC4HC: Personalized Communication for Health Care**
Matteo Generali, Monia Gazzano and Matteo Dolla "DO XEE, Italy"
Augmented Personalized Health: How Smart Data with IoTs and AI is about to Change Healthcare

Amit Sheth "Kno.e.sis, Wright State University, Ohio, USA"

Healthcare as we know it is in the process of going through a massive change - from episodic to continuous, from disease focused to wellness and quality of life focused, from clinic centric to anywhere a patient is, from clinician controlled to patient empowered, and from being driven by limited data to 360-degree, multimodal personal-public-population physical-cyber-social big data driven. While ability to create and capture data is already here, the upcoming innovations will be in converting this big data into smart data through contextual and personalized processing such that patients and clinicians can make better decisions and take timely actions for augmented personalized health. This paper outlines current opportunities and challenges, with a focus on key AI approaches to make this a reality. The broader vision is exemplified using three ongoing applications (asthma in children, bariatric surgery, and pain management) as part of the Kno.e.sis kHealth personalized digital health initiative.
H8 - Data-driven prevention and intervention for Health
Chairs: Sergio Cerutti “Polytechnic of Milano, Italy” and Paolo Paolini “Polytechnic of Milano, Italy”

Wednesday, 13 September, 11.00-13.00
Room P2.1 building 25

This Session is promoted by City4Age, a European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 689731.

11.00
INVITED
Health Prevention for the Aging Population in Smart Cities: the City4Age Project
Paolo Paolini “Polytechnic of Milano, Italy”
Identifying behavior changes that may lead to critical or pre-critical conditions is the goal of prevention in case of “mild” diseases like MCI and frailty. The session calls for papers that deal with all connected aspects, like: modelling of the behaviors to monitor and/or influence; technologies for prevention and intervention and their deployment; use of data from smart-cities; socio-economic aspects of prevention/intervention via technologies; persuasion and intervention to modify negative behaviors; how to provide the medical staff with qualitative information, etc.

11.30
Technology-enhanced intervention fostering behaviour changes
Nicoletta Di Blas and Paolo Paolini “Polytechnic of Milan, Italy”, Diego Peruselli and Giulia Plotti “HOC-LAB Polytechnic of Milan, Italy”

11.45
An architecture for combining open-data with sensors’ data for effective prevention of MCI and frailty in elderly people
Silvia de los Rios, Miguel Paramo Castrillo and Patricia Abril-JImenez “Universidad Politecnica de Madrid, Spain”, Juan Montalva “Universidad Politècnica de Madrid, Spain”, Maria Fernanda Cabrera-Umpierrez and Maria Teresa Arredondo “Life Supporting Technologies; Technical University of Madrid, Spain”

12.00
Data driven MCI and frailty prevention: geriatric modelling in the City4Age project
Giovanni Ricevuti and Letizia Venturini “University of Pavia, Italy”, Sergio Copelli and Franco Mercalli “MultiMed Engineers srls, Italy”, Giuseppe Nicolardi “Università del Salento, Italy”

12.15
An interactive environment for managing detected data towards geriatric prevention
Vladimir D. Urošević “Belit Ltd. Belgrade, AMIS "Association for Medical Informatics of Serbia", Belgrade, Serbia”, Paolo Paolini “Polytechnic of Milan, Italy”, Christos Tatsiopoulos "Independent Researcher, Greece"

12.30
Activity Recognition Approaches for Smart Cities
Aitor Almeida “DeustoTech - Deusto Institute of Technology, Spain”, Gorka Azkune "Deusto Tech, Spain"

12.45
An IoT-aware System for Elderly Monitoring
Luca Mainetti, Vincenzo Mighali, Luigi Patrono, Piercosimo Rametta and Maria Laura Stefanizzi “University of Salento, Italy"
Tutorials

Tutorial 1 - Smart product and Smart Productions in the 4.0 Industrial revolution
Lecturers: Sergio Terzi, Maurizio Fiasché, Giambattista Gruosso "Polytechnic of Milano, Italy"

Monday, 11 September, 10.30-12.30
Room P2.4 building 25

Summary:
In a period of great change, such as the one outlined by the so-called fourth industrial revolution it is necessary to deepen the central role of the smart product in intelligent productions. The product with the smart door if data and information that need a detailed analysis and at the same time to increase the communication with the traditional systems of automation.

Purpose of the tutorial is to tie a thin thread through these three aspects: smart product, machine learning, and collaborative machines. All presenting a formalization of the architecture and some very interesting case studies.

The title of the lessons will be:

Smart Products: An enabler of Industry 4.0
Smart Products are among us and they constitute the basic enablers of the ongoing 4.0 revolution, within and outside industrial contexts. But for being effective, they should be properly modeled, designed and defined. This presentation (30 minutes) aims to introduce the concept of Smart Product, the need of the relative design and importance of a proper business model definition. The presentation will be also based on several empirical evidences, in particular from the Italian context.

Machine Learning and Information Processing in Industry 4.0: Challenges and cases of study
In the last 20 years ICT (Information Communication Technologies) became more and more pervasive in our life. Similarly in industrial systems, new technologies, wireless communication protocols and data mining techniques play a key role both as enablers for new production and business processes and contributing as actual component of products’ value chain.

In this context classical and novel Machine Learning and Computational Intelligence (CI) techniques, among which Artificial Neural Networks (ANN), which have been developed exactly to extract (hidden) information from data for pattern recognition, classification and prediction issues, find a natural field of application. Such techniques have a huge potential to provide a clear improvement of many transformation processes, as well as to services such as logistic, personnel training and marketing. New technological directions will be outlined in open and new projects for designing smart, sustainable and robust manufacturing systems in the factory of the future.

Automation 4.0: New trends and case study
Intelligent machines require a new way of thinking about automation architectures. It prompted increasing cooperation and this implies the use of reconfigurable and distributed software. Fieldbuses and integration with the cloud will bring significant benefits in this new way of thinking about automation. In this tutorial we will discuss the major architectures applied to significant case studies. The outlined landscape will be useful to understand in a deeper way the potential of the architecture 4.0.
**Tutorial 2 - Well-Being Technologies**
Lecturer: Francesco Masulli "University of Genoa, Italy"

Monday, 11 September, 16.30-18.30
Room P2.4 building 25

The World Economic Forum has calculated that mental illnesses will represent the costliest diseases globally in the next two decades, exceeding the cost of cancer, diabetes, and chronic obstructive pulmonary diseases combined. Additionally, neuro-degenerative diseases that include multiple sclerosis, Alzheimer's disease, Parkinson's disease and associated disability and dementia are fast becoming one of the leading challenges for health-care systems due to rapidly ageing demographics. In the last two decades in many states the cost for chronic diseases, often linked to bad lifestyles, has become one of the largest items of government spending. By a complementary point of view, some researchers in Economics propose the Gross National Happiness to describe the standard of living of a country, instead of using Gross Domestic Product. This tutorial is about the "Well-Being Technologies", a term that concerns the synergistic usage of technologies such as m-Health, wearable and ambient sensors, (Serious) Game Design, Gamification, IoT, Virtual Reality, Computational Intelligence, and Data Mining to the design of systems supporting the development of wellness and human potential, in the frame of the Positive Psychology approach. "Well-Being Technologies" is then a synonym of "Positive Computing" and also of "Orange Technologies". Systems based on Well-Being Technologies can contribute to the change of people's mindset, improving their mood and wellness, to the early diagnosis of cognitive illness and to the cognitive rehabilitation. I'll present also some on-going research projects of my research group on the dyslexia and on the monitoring of physical and social activity of fragile people, and some new research directions.

**Tutorial 3 - Magnetic Materials Modeling and Characterization for Electric Vehicles**
Lecturer: Antonio Faba, "University of Perugia, Italy"

Tuesday, 12 September, 8.30-10.30
Room P2.4 building 25

The energy crisis and the environmental problems make the electric vehicles (EVs) the future trend of the transportation systems. Market penetration of the EVs has been increasing drastically in the recent years and so the interest about this technology is becoming very diffuse. Many research and industrial activities are focused on the efficiency and reliability improvement of these vehicles. One of them is about the energy conversion systems that involve static power converters and electrical motors. This tutorial is focused on the modeling and characterization of the magnetic materials used in the latter in order to stimulate research activities and dedicated studies about the optimized design of electrical motors. The electrical motors involved in the electrical vehicles are usually inverted-fed. The magnetic cores are usually laminated, in consideration of the frequency range of the current and voltage. The presence of wave-modulation devices, such as power static converters, makes critical the distribution of the amplitude spectrum vs frequency, and, in addition, the more modern static power switching devices operates at increasing work frequency and at high values of magnetic induction and specific power, in order to maximize the magnetic material usage. For the reasons above the magnetic losses in the magnetic core represent a considerable part of the total energy consumption. It is very important, therefore, to compute with high accuracy the magnetic losses in...
order to correctly design and optimize the electrical components with the high efficiency degree required, also in consideration of the expected increasing of the system endurance. The tutorial will be presented in three parts, an introduction about electrical machines and power converters used in the modern electric vehicles and hybrid vehicles, an overview about the magnetic materials involved in these applications and finally some case study about the evaluation of the power losses in the iron cores under different excitation waveforms.

**Tutorial 4 - Ethical Considerations in System Design**

Lecturer: A G Hessami "R&D and Innovation at Vega Systems, UK"

Wednesday, 13 September, 8.30-10.30
Room P2.4 building 25

This Tutorial will cover the current focus within the Engineering Institutions on the ethical consideration and a development of a process for ethical assurance in product and service development. The work of the UK Royal Academy of Engineering and the IEEE Standards P7000 will be presented as a basis for raising awareness and providing a systematic framework for the innovators, researchers and technologists as well as small and large enterprises involved in technology innovation and development.
Panels

Panel 1 - Smart Mobility
Future Smart Mobility Applications: Technological and Ethical issues

Monday, 11 September, 14.00-16.00
"Sala Eventi" building 52

The automotive market is facing a series of unprecedented challenges spanning multiple technological domains: electric power-train, connected vehicles, advanced driving assistance, up to autonomous driving technologies. Each of these challenges has the potential of revolutionizing the market, opening up opportunities to new players that were traditionally focusing on different domains. Tesla, Google, Apple, Uber are just the surface of an ecosystem that is being created to support these new technologies. Smarter, cleaner and more reliable systems are being developed to power up the vehicles that we will be riding in the future, along with the infrastructural support required to support such systems. In this panel, experts from leading companies in the automotive and infrastructure utility domain will share their view about how to face the challenging problems the automotive industry will be exposed to in the near future, stimulating the discussion on technological and ethical aspects involved in this transition. Test cases, industrial roadmaps, and pilot projects, like Modena’s Automotive Smart Area, will be presented to provide a view on ongoing efforts to develop the technological and infrastructural support required by next-generation automotive applications.

14.00 - F. Caleno "ENEL Spa, Italy"
14.10 - G. Mauri "RSE - Ricerca sul Sistema Energetico, Italy"
14.20 - F. Galliano "General Motors, Italy"
14.30 - M. N. Chivu "Maserati, Italy"
14.40 - D. Fontana "Magneti Marelli, Italy"
14.50 - V. Murdocco "Centro Ricerche Fiat, Italy"
15.00 - G. Tamburrini "University of Napoli Federico II, Italy"
15.10 - Open Discussion
Panel 2 - Industry 4.0: live transformation and best practices

Tuesday, 12 September, 17.00-19.00
"Sala Eventi" building 52

"Industry 4.0" identifies a set of innovative technologies for the manufacturing industry aiming to enhance machine quality and achieve better production by introducing new features such as advanced interaction between man and robot, intelligent maintenance and big data management. As usually happen in new technologies, it is now very important to move from prototypes and generic overviews into real and sound applications that show the impact and effectiveness of Industry 4.0 concepts into commercial validate systems. This workshop aims to present and discuss effective industrial applications to describe how, through success stories, the 4.0 industry technologies actually translate into concrete cases.

17.00  
Industry 4.0: key enabling technologies, policies and opportunities  
L. Angrisani "University of Napoli Federico II, Italy" and C. Fantuzzi "University of Modena and Reggio Emilia, Italy"

17.05  
Product driven assembly line  
M. Crippa Bosch Rexroth, Italy

17.20  
Live monitoring of Automatic Guided Vehicle fleets  
F. Monica "Elettric 80 S.p.A., Italy"

17.35  
Building our future onto the four pillars of Digital Transformation: a case of success  
S. Bodini "Fasternet, Italy"

17.50  
Test4Industry: Test and Measurement Systems for Industry 4.0  
A. Stellato "TME S.r.l., Italy"

18.05  
Applications of Bayesian Network based algorithms in Industry 4.0 context  
P. Agnoli "Pangea Formazione, Italy"

18.20  
Streparava case: Process data to improve product quality and ensure traceability  
A. Ferrari "Streparava S.p.A"

18.35  
Academic Labs vs Industry 4.0: initiatives and best practises  
P. Arpaia"University of Napoli Federico II, Italy" and M. Pellicciari "University of Modena and Reggio Emilia, Italy"

18.50 - Open Discussion
Panel 3 - Smart Healthcare
Towards Smart Healthcare implementations through Advanced Technologies: the role of Industries in the Biomedical District in Mirandola

Wednesday, 13 September, 14.00-15.30
"Sala Eventi" building 52

The panel involves three major multinational Companies in the area of medical technologies and devices, as well as the Tecnopolo-Mirandola. All of them are active in the Mirandola Biomedical District with important roles played in research & development inside this territory and in the relevant transfer activity into the market. Particular emphasis will be dedicated to the innovation in this theme and to the role played by the expected changes in Health Care and how new and smart systems and devices might contribute to its development. Are Research Centers and Companies ready to reply to the challenges of a quickly changing concept of Health Care, from a centralised module to a rather distributed one? The central role of the Patient has to be better focused, in order to maintain clearly the vision that we conceive and we build technologies for patients and not to adapt patients to technologies and the technology driving forces.

14.00 - S. Cerutti "Polytechnic of Milan, Italy"
14.15 - A. Tomasi "Technopole of Mirandola and University of Modena and Reggio Emilia, Italy"
14.30 - G. Gavioli "BBraun, Italy"
14.45 - L Frattini, "Medtronic-Bellco, Italy"
15.00 - G. Mari "RigeneranD"
15.15 - Open Discussion
Meeting with Industries

Tuesday, 12 September, 8.30-10.30
Room P1.1, building 25

Objective
This is the second meeting of IEEE Italy Section with Italian Industries with the objective to inform all participants of the initiative that IEEE Region 8 (Europe, Africa and Middle East) and IEEE Italy Section is promoting in favour of industries. Moreover, the final discussion it is time for brainstorming in order to gain new ideas and initiatives of common interest.

Topics of the discussion
- What the Big industries would like to see?
- What competencies are required by the big industry to sustain growth, innovation and competition?
- How can IEEE ease connect students and PhD with industry?
- Standards: which fields are of interest of Italian industry? Who is interested to contribute to influence and design them?
- Training and education: IEEE offer a lot of webinar, we assume they are well known. Is the Italian context asking for something specific/proprietary?

8.30 - Introduction (Chair: P. Erratico)
8.40 - Engaging industry corporations and startups in Region 8 (M. Antoniou)
9.00 - Italy Section Action for Industry: what’s the news? (T. Tambosso)
9.20 - IEEE-Industry Partnership - the UK&Ireland Experience (A. Hessami)
9.45 - Discussion (Moderator: P. Erratico)
Special meeting

**Innovative enterprises in Italy an insight for technological advances**

Tuesday, 12 September, 13.30-19.00
Room P1.1, building 25

13.30 - Registration

14.00 - Welcome and Introduction: Tiziana Tambosso "IEEE Italy Section Chair"
Chair - Pietro Erratico "Industry Relation Committee Coordinator"

14.15 - Filippo Forni "Confindustria Modena, Italy" and Francesco Baruffi "Fondazione Democenter-Sipe, Italy"
The registration system of the Italian Chambers of Commerce.
Recent Italian Laws on startup and innovative enterprises.
IPR (Intellectual Property Rights) for start up
SMEs as start up: laws and economic and financial supports.
The activity and services of Associations and Foundations related to start up and innovative enterprises.

15.00 - Patrizia Tambosso "Tambosso Associates Consultancy Co."
Innovative enterprise project – How to develop it
A Business Plan (BP) for startup and innovative enterprises
Competitive analysis and market research
Research and development expenses

15.45 - Ruggero Frezza "M31"
Financing a startup or an innovative enterprise
Venture Capital
Public support for innovative enterprises

16.30 - Coffee Break (Social Area)

17.00 - **Panel: Ingredients for a successful start-up**
Participants:
Alessandro Tioli (MIND), Massimo Dominici "RigeneRand", Carlo Guardiani "Renience",
Mirko Orsini "Data River", Gianluca Piazza "Adant", Andrea Padovani "MDLab"

18.45 - Conclusion