



**IEEE RFID-TA 2022**

**12<sup>th</sup> Annual 2022**  
**IEEE International Conference**  
**on RFID Technology and Applications**

**IEEE RFID-TA 2022**

**September 12-14, 2022**  
**Hotel Regina Margherita**  
**Cagliari, Italy**

# Organized by



Università degli Studi di Cagliari

*Dee*

Dipartimento di Ingegneria elettrica  
ed elettronica

## Conference Venue

**Hotel Regina Margherita**

Viale Regina Margherita, 44

09124 Cagliari, Italy

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[www.hotelreginamargherita.com](http://www.hotelreginamargherita.com)

## Organizing Secretariat

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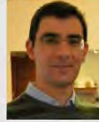
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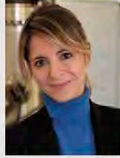


**Andrea Motroni**  
University of Pisa

# KEYNOTE SPEAKERS

## Keynote

Graphene integrated photonics for next-generation datacom and telecoms



Camilla COLETTI

Center for Nanotechnology Innovation @ NEST, Istituto Italiano di Tecnologia, P56127 Pisa, Italy

## Keynote

Design of novel paper-based devices for smart analysis



Fabiana ARDUINI

Department of Chemical Science and Technologies, University of Tor Vergata, Rome, Italy

## Keynote

Backscatter communication without a carrier



Joshua R. SMITH

Milton and Delia Zeuschel Professor in Entrepreneurial Excellence, Room CSE 582,  
Paul G. Allen School of Computer Science & Engineering, University of Washington

## SPONSORS TALK

Voyantic: “RAIN Tag ICs - The Past,  
the Present and the Future”

Jesse TUOMINEN

CTO at Voyantic, Helsinki, Uusimaa, Finland

LIVE Webinar: SIMULIA CST Studio Suite  
Technology Enhancement Highlights

Andrea MANELLA

EXEMPLAR Industry Process Consultant Specialist

# PROGRAM AT A GLANCE

## September 12, Monday

09:00-10:00	Registration		
10:00-11:45	<b>Workshop on Motion Capture &amp; Localization (CRFID)</b> Session Chairs: Alice Buffi (University of Pisa, Italy); Andrea Motroni (University of Pisa, Italy)	<b>Workshop on Flexible and Printable Electronics and Electromagnetics (CRFID)</b> Session Chairs: Luca Catarinucci (University of Salento, Italy); Riccarda Colella (University of Salento, Italy)	
11:45-12:15	Coffee Break		
12:15-12:45	<b>Keynote - Design of novel paper-based devices for smart analysis (Fabiana ARDUINI)</b>		
13:00-14:30	Lunch		
14:30-16:00	<b>Opening Ceremony</b>		
16:00-16:30	Coffee Break		
16:30-18:00	<b>The next Backscattering communications for IoT: from ambient sources to 5G-6G infrastructures</b> Session Chairs: Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy); Sahbi Baccar (ESIGELEC, France)	<b>Advanced Antennas and Propagation for RFID</b> Session Chairs: Andrea Michel (University of Pisa, Italy); Ian Pratt (Hangzhou Scientia-IoT Ltd., China)	Poster Session
18:00-18:30			
19:00-21:00	Welcome Cocktail		

## September 13, Tuesday

09:00-11:30	<b>Event: The RFID Industry meets Academia</b> Session Chairs: Sara Amendola (RadioSense, Roma, Italy), Jesse Tuominen (Voyantic, Espoo, Finland)		
11:30-12:00	Coffee Break		
12:00-13:30	<b>Research and experience on RFID projects</b> Session Chairs: Luca Catarinucci (University of Salento, Italy); Benoit Poussot (University Gustave Eiffel, France);	<b>Advanced UHF RFID Tags and Reader Antennas for Sensing and Communication in Metallic Environments of IoT</b> Session Chairs: Alice Buffi (University of Pisa, Italy); Francesco Chietera (University of Salento, Italy)	
13:30-15:00	Lunch		
15:00-15:30	<b>Keynote - Graphene integrated photonics for next-generation datacom and telecoms (Camilla COLETTI)</b>		
15:30-16:00	Sponsors Talk - Voyantic		
16:00-16:20	Coffee Break		
16:20-17:20	<b>Webinar by Exemplar: SIMULIA CST - @Technology Enhancement Highlights</b>		
17:20-18:35	<b>RFID for Healthcare and Wearable Applications I</b> Session Chairs: Gaetano Marrocco (University of Roma Tor Vergata, Italy); Giulio Maria Bianco (University of Roma Tor Vergata, Italy)	<b>Wireless Power Transfer Enabling the IoT Energy Harvesting</b> Session Chairs: Francesca Benassi (University of Bologna, Italy); Johanna Virkki (Tampere University, Finland)	
19:45	Bus departure from Conference Hotel to SOCIAL DINNER at "La Marinella" Restaurant		

## September 14, Wednesday

09:00-10:15	<b>RFID for Healthcare and Wearable Applications II</b> Session Chairs: Gaetano Marrocco (University of Roma Tor Vergata, Italy); Giulio Maria Bianco (University of Roma Tor Vergata, Italy)	<b>RF Labels for Wireless Identification and Sensing</b> Session Chairs: Filippo Costa (University of Pisa, Italy); Jan C Balzer (University of Duisburg-Essen, Germany)
10:15-10:45	Coffee Break	
10:45-11:30	<b>Artificial Intelligence for RFID</b> Session Chairs: Andrea Motroni (University of Pisa, Italy); Riccardo Colella (University of Salento, Italy)	<b>Data Processing for RFID</b> Session Chairs: Andrea Ria (CNR, Pisa, Italy); Jean-Marc Laheurte (Université Gustave Eiffel & ESYCOM Lab, France)
11.30-12:00	Keynote - Backscatter communication without a carrier (Joshua R. SMITH)	
12:00-13:30	Awards and Closing Ceremony	
13:30-14:30	Lunch	

# PROGRAM

## September 12 - Monday

### Castello Room

#### 10:00-11:45 Workshop on Motion Capture & Localization (CRFID)

Session Chairs: Alice Buffi (University of Pisa, Italy) and Andrea Motroni (University of Pisa, Italy)

- 10:00-10:15 **Retail Robots with UHF-RFID Moving Antennas enabling 3D Localization**  
Fabio Bernardini, Andrea Motroni, **ALICE BUFFI** and Paolo Nepa (University of Pisa, Italy); Paolo Tripicchio (Scuola Superiore Sant'Anna, Italy); Salvatore D'Avella (Sant'Anna School of Advanced Studies & Mechanical Intelligence Institute, Italy); Luca Del Col (Partitalia, Italy); Alfredo Salvatore (Sensor ID, Italy)
- 10:15-10:30 **Exploiting the Orientation of Trilateration UHF RFID Tags in Robot Localization and Mapping**  
Emidio Di Giampaolo (University of L'Aquila, Italy); Francesco Martinelli (Università di Roma Tor Vergata, Italy); **FABRIZIO ROMANELLI** (Università Degli Studi di Roma Tor Vergata, Italy)
- 10:30-10:45 **Tag Localization by Handheld UHF RFID Reader and Optical Markers**  
**ARISTIDIS RAPTOPOULOS CHATZISTEFANOU** and Antonis G Dimitriou (Aristotle University of Thessaloniki, Greece)
- 10:45-11:00 **RFID based Gait Speed Measurement using Doppler Shift**  
**KAI HUANG**, Jintao Zhang, Yicheng Chu and Yongtao Ma (Tianjin University, China)
- 11:00-11:15 **UHF-RFID AoA Positioning with Multiple Arrays on Agricultural Machinery**  
**ANDREA MOTRONI**, Paolo Nepa and Alice Buffi (University of Pisa, Italy); Marco Pirozzi, Luciano Di Donato, Laura Tomassini and Alessandra Ferraro (INAIL, Italy)
- 11:15-11:30 **Considering polarization mismatch in modeling the RFID phase offset variability for tag localization**  
Emidio Di Giampaolo (University of L'Aquila, Italy); Francesco Martinelli (Università di Roma Tor Vergata, Italy); **FABRIZIO ROMANELLI** (Università Degli Studi di Roma Tor Vergata, Italy)
- 11:30-11:45 **A Fast Method for 3D Localization in SAR RFID System**  
**YICHENG CHU**, Yongtao Ma, Kai Huang and Yanxi Fu (Tianjin University, China)

### Villanova Room

#### 10:00-11:45 Workshop on Flexible and Printable Electronics and Electromagnetics (CRFID)

Session Chairs: Luca Catarinucci (University of Salento, Italy) and Riccardo Colella (University of Salento, Italy)

- 10:00-10:15 **Flexible and Wireless Multi-Sensor Thermometer based on Dual-Heat-Flux Model**  
**NICOLETTA PANUNZIO** and Gaetano Marrocco (University of Rome Tor Vergata, Italy)
- 10:15-10:30 **A fast method to design and characterize the performance of UHF RFID tags**  
**YANN HOUËIX**, Almudena Rivadeneyra, Diego P Morales and Noel Rodríguez (University of Granada, Spain); Jose F Salmeron (Technical University Munich, Germany); Carmen Moraila (University of Granada, Spain)
- 10:30-10:45 **Enhanced Radar Cross-section for W-Band Corner reflectors using Ceramic Additive Manufacturing**  
**KAI-DANIEL JENKEL**, Benedikt Sievert, Andreas Rennings, Masoud Sakaki and Daniel Erni (University of Duisburg-Essen, Germany); Niels Benson (Institute for Nanostructures and Technology (NST), University of Duisburg-Essen, Germany)



- 10:45-11:00 **Flexible epidermal device for the RFID-based potentiometric sensing of skin parameters**  
**FRANCESCA NANNI** (University of Rome Tor Vergata, Italy); Luca Fiore (Tor Vergata, Italy); Fabiana Arduini and Gaetano Marrocco (University of Rome Tor Vergata, Italy)
- 11:00-11:15 **3D Printed Passive Beam-Guiding and Manipulating Devices for the Terahertz Frequency Range**  
Tobias Kubiczek and Xuan Guo (University of Duisburg-Essen, Germany); Yixiong Zhao (Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme IMS, Germany); Xuan Liu and Masoud Sakaki (University of Duisburg-Essen, Germany); Niels Benson (Institute for Nanostructures and Technology (NST), University of Duisburg-Essen, Germany); **JAN C BALZER** (University of Duisburg-Essen, Germany)
- 11:15-11:30 **3D Printing of Antenna Conductive Elements through Fused Filament Techniques**  
**FRANCESCO P. CHIETERA** and Riccardo Colella (University of Salento, Italy); Giacomo Muntoni (University of Cagliari, Italy); Giovanni Andrea Casula (Università di Cagliari, Italy); Giorgio Montisci (University of Cagliari, Italy); Luca Catarinucci (University of Salento, Italy)
- 11:30-11:45 **Experimental Characterization of Laser Induced Graphene (LIG) Antennas for S-band wearable applications in 5G**  
**ALESSIO MOSTACCIO** and Gianni Antonelli (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy); Eugenio Martinelli (Roma Tor Vergata University, USA); Gaetano Marrocco (University of Rome Tor Vergata, Italy)
- 11:45-12:15 **Coffee Break**
- 12:15-12:45 **Keynote - Design of novel paper-based devices for smart analysis (Fabiana ARDUINI)**
- 13:00-14:30 **Lunch**
- 14:30-16:00 **Opening Ceremony**
- 16:00-16:30 **Coffee Break**
- 16:00-18:30 **Poster Session (in Coffee Break Room)**

## Castello Room

- 16:30-18:00 **The next Backscattering communications for IoT: from ambient sources to 5G-6G infrastructures**  
Session Chairs: Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy) and Sahbi Baccar (ESIGELEC, France)
- 16:30-16:45 **Delta RCS Expression of Linear Time-Variant Transponders based on Polarization Modulation**  
**NICOLAS BARBOT** (University Grenoble Alpes, Grenoble INP, LCIS, France)
- 16:45-17:00 **A compact, self-powered ambient backscatter device operating in 900 MHz GSM band**  
**ARNAUD VENA** (University of Montpellier & Institut d'Electronique Et Des Systèmes (IES), France); Neel Samat (University of Montpellier, France); Brice Sorli (University of Montpellier & IES, France); Jean Podlecki (IES, Université Montpellier, Lebanon)
- 17:00-17:15 **Double-gain backscatter modulation based on chirp spread spectrum signals**  
**MARC LAZARO** (Rovira i Virgili University, Spain); Antonio Lazaro, David Girbau and Ramon Villarino (Universitat Rovira i Virgili, Spain)
- 17:15-17:30 **Ambient backscatter communications using LTE cell specific reference signals**  
Kalle Ruttik, Xiyu Wang, **JINGYI LIAO** and Riku Jäniti (Aalto University, Finland); Dinh-Thuy Phan-Huy (Orange, France)
- 17:30-17:45 **Low-cost SDR based backscatter receiver and demodulator**  
**RICARDO TORRES** (Departamento de Eletrónica Telecomunicações e Informática, Universidade de Aveiro & Instituto de Telecomunicações, Portugal); Ricardo Correia (Instituto de Telecomunicações & University of Aveiro, Portugal); Nuno Borges Carvalho (University of Aveiro/IT Aveiro, Portugal)
- 17:45-18:00 **5G Ambient Backscatter Communications: Achievable Range and Power Levels in an Urban Environment**  
**SAHBI BACCAR** (ESIGELEC, France); Mariem Lefki (Normandie Univ, UNIROUEN, ESIGELEC, IRSEEM, France); Hanen Shall (ISTIC, University of Carthage, France); Mohamed Ghorbel (ATMS, Tunisia); Moncef Kadi (IRSEEM/ESIGELEC, France)

- 16:30-18:00 **Advanced Antennas and Propagation for RFID**  
 Session Chairs: Andrea Michel (University of Pisa, Italy); Ian Pratt (Hangzhou Scientia-IoT Ltd., China)
- 16:30-16:45 **Improving the directional performance of off-the-shelf UHF RFID antennas**  
**IAN PRATT** (Hangzhou Scientia-IoT Ltd., China); Xiaonan Hui (Zhejiang University, China)
- 16:45-17:00 **RFID Tag Design with high read range performance for Dual band Applications in UHF Range**  
**AARTI BANSAL** (Chitkara University, Rajpura, India); Surbhi Sharma and Rajesh Khanna (Thapar University, India)
- 17:00-17:15 **Slot-fed Dual-Port Patch Antenna for Compact Harmonic Transponders**  
**LEONARDO BALOCCHI**, Valentina Palazzi, Luca Roselli and Stefania Bonafoni (University of Perugia, Italy)
- 17:15-17:30 **UHF RFID Reader Sensitivity Requirements Due to Poor Tag Matching**  
 Rui Chen and Shuai Yang (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain)); **MICHAEL J CRISP** (University of Cambridge, United Kingdom (Great Britain))
- 17:30-17:45 **Compact long-range ceramic RFID tag for on-metal and non-metal applications**  
**DMITRY DOBRYKH** (ITMO University, Russia & Tel Aviv University, Israel); Ildar Yusupov and Alexey Slobazhanyuk (ITMO University, Russia); Dmitry Filonov (Moscow Institute of Physics and Technology, Russia); Pavel Ginsburg (Tel Aviv University, Israel)
- 17:45-18:00 **Design Considerations on a UHF RFID Smart Gate Antenna for the Detection of Tags Embedded into Boots**  
**ANDREA MICHEL**, Francesco Lisi, Giuliano Manara and Paolo Nepa (University of Pisa, Italy)
- 19:00-21:00 **Welcome Cocktail**

## September 13 - Tuesday

### Castello Room

- 09:00-11:30 **Event: The RFID Industry meets Academia**  
 Session Chairs: Sara Amendola (Radio6ense, Rome, Italy) and Jesse Tuominen (Voyantic, Espoo, Finland)

Contribution Title	Speaker and Company
09:00-09:15 The Virtual Proof of Concept - Using simulations to develop high performance and fault tolerant UHF RFID systems	Volker Schönig, KATHREIN SOLUTIONS
09:15-09:30 Unusual RFID sensors: from microscale up to large distributed systems	Sara Amendola, RADIO6ENSE
09:30-09:45 UHF RFID IC with sensing capabilities, key enabling technology for Industry 4.0	Sofia Benouakta and Thomas Besson, ASYGN
09:45-10:00 Flexible integrated circuits enable smart packaging in ultra-high volumes	Brian Cobb, PragmatIC
10:00-10:15 Testing and encoding RFID inlay in production	Jesse Tuominen, VOYANTIC
10:15-10:30 How the passive RFID sensors can help address some of the Food industry challenges	Arthur H. MacDougall, EM MICROELECTRONIC
10:30-10:45 Thinking Inside the Box - Miniaturized Battery-Free Temperature and Humidity Probes for Pharmaceutical Moisture Analysis	Scrivens Garry, PFIZER
10:45-11:00 Connected RFID solutions for the future of healthcare	François Germain, LINXENS
11:00-11:15 Reader Performance in the Field	Sven Hofmann, RACE RESULTS
11:15-11:30 Discussion panel with the participants of the Industrial Session	

- 11:30-12:00 **Coffee Break**

### 12:00-13:30 Research and experience on RFID projects

Session Chairs: Luca Catarinucci (University of Salento, Italy) and Benoit Poussot (University Gustave Eiffel, France)

- 12:00-12:15 **Long-term Monitoring of Soil Surface Deformation with RFID**  
**ARTHUR CHARLÉTY** (Université Grenoble Alpes, France); Mathieu Le Breton (Université Grenoble Alpes & Géolithe, France); Laurent Baillet (Université Grenoble Alpes, France); Eric Larose (Université Grenoble Alpes, CNRS, France)
- 12:15-12:30 **RFID based implant for knee prosthesis 2.0**  
**ARNAUD VENA** (University of Montpellier & Institut d'Electronique et Des Systèmes (IES), France); Stephan Cahuzac and Sylvain Dutrieux (Bonetog, France); Brice Sorli (University of Montpellier & IES, France); Stéphane Naudi (Bonetog, France)
- 12:30-12:45 **RFID for Food Industry 4.0 - Current Trends and Monitoring of Fruit Ripening**  
**ALESSIO MOSTACCIO** (University of Rome Tor Vergata, Italy); Giulio M. Bianco (University of Rome Tor Vergata, Italy); Sara Amendola (University of Rome Tor Vergata & Radio6ense srl, Italy); Gaetano Marrocca (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi (University of Rome Tor Vergata, Italy)
- 12:45-13:00 **Exploitation of Harmonic Signals Backscattered by Conventional UHF RFID Tags**  
**ALLANE DAHMANE** (Grenoble INP - LCIS, France); Nicolas Barbot (University Grenoble Alpes, Grenoble INP, LCIS, France); Yvan Duroc (University Claude-Bernard Lyon 1, France); Smail Tedjini (University Grenoble Alpes, France)
- 13:00-13:15 **Simulation of RFID Systems in ROS-Gazebo**  
**ABDUSSALAM ALI ALAJAMI** and Guillem Moreno (University of Pompeu Fabra, Spain); Rafael Paus (Universitat Pompeu Fabra, Spain)
- 13:15-13:30 **RFID-based Respiration Monitoring using Temperature Sensing**  
**NICOLETTA PANUNZIO** and Gaetano Marrocca (University of Rome Tor Vergata, Italy)

## Villanova Room

### 12:00-13:30 Advanced UHF RFID Tags and Reader Antennas for Sensing and Communication in Metallic Environments of IoT

Session Chairs: Alice Buffi (University of Pisa, Italy) and Francesco Chietera (University of Salento, Italy)

- 12:00-12:15 **Parasitic Elements Loaded Coplanar Dual-Band Dual-polarized 2/3/4/5G Base Station Antenna**  
**YECONG LIN**, Sai-Wai Wong and Yejun He (Shenzen University, China); Kam-weng Tam (University of Macao, Macao)
- 12:15-12:30 **Orthogonal E-shaped Patches with Hemi-isotropic Pattern for Metal-mountable Tag Antenna**  
**ENG HOCK LIM** (Faculty of Engineering and Science, UTAR, Malaysia); Muthukannan Muruges and Pei Song Chee (Universiti Tunku Abdul Rahman, Malaysia)
- 12:30-12:45 **Design of a Compact On-Metal RFID Tag with a Pair of Planar Inverted-L Antennas (PILAs)**  
 Jun Ian Tan (Universiti Tunku Abdul Rahman, Malaysia); Yong Hong Lee (Universiti Tunku Abdul Rahman, Malaysia);  
**ENG HOCK LIM** (Faculty of Engineering and Science, UTAR, Malaysia)
- 12:45-13:00 **A UHF RFID tag antenna sensor using stepped impedance defected microstrip structure**  
 Wai Son Kuan, **CHI-HOU CHIO** and Kam-weng Tam (University of Macau, Macao); Huawei Lin (University of Macau, China); Paulo Olavo Lima Neves Oliveira and Lwena Susana Benrós Delgado (University of Macau, Macao)
- 13:00-13:15 **3D Printed RFID Sensor Based Structural Health Monitoring for Distributed Solar Photovoltaic**  
 Paulo Olavo Lima Neves Oliveira, Lwena Susana Benrós Delgado, Kam-weng Tam, **CHI-HOU CHIO** and Wai Son Kuan (University of Macau, Macao); Huawei Lin (University of Macau, China); Cheng Teng (University of Macau, Macao); Ngai Kong (Crosstech Innovation Group Limited, China); Eng Hock Lim (Faculty of Engineering and Science, UTAR, Malaysia)
- 13:15-13:30 **A UHF band quasi-circular-polarization patch antenna design for RFID smart metal-shelf applications**  
**CHIA-MEI PENG** (Feng Chia University & Jinwen University of Science and Technology, Taiwan); I-Fong Chen (Jinwen University of Science and Technology, Taiwan)

13:30-15:00 Lunch

15:00-15:30 **Keynote** - Graphene integrated photonics for next-generation datacom and telecoms (Camilla COLETTI)

15:30-16:00 **Sponsors Talk** - Voyantic

16:00-16:20 **Coffee Break**

16:20-17:20 **Webinar by Exemplar: SIMULIA CST - @Technology Enhancement Highlights**

## Castello Room

### 17:20-18:35 RFID for Healthcare and Wearable Applications I

Session Chairs: Gaetano Marrocco (University of Rome Tor Vergata, Italy) and Giulio Maria Bianco (University of Rome Tor Vergata, Italy)

17:20-17:35 **RFPose-GAN: Data Augmentation for RFID based 3D Human Pose Tracking**  
Chao Yang, Ziqi Wang and **SHIWEN MAO** (Auburn University, USA)

17:35-17:50 **Towards a Hybrid UHF RFID and NFC Platform for the Security of Medical Data from a Point of Care**  
**GIULIO M. BIANCO** (University of Roma Tor Vergata, Italy); Emanuele Raso (University of Rome Tor Vergata, Italy); Luca Fiore (Tor Vergata, Italy); Alessia Riente and Adina Bianca Barba (University of Rome Tor Vergata, Italy); Carolina Miozzi (University of Rome "Tor Vergata", Italy & Radio6ense Srl, Italy); Lorenzo Bracciale (University of Roma "Tor Vergata", Italy); Fabiana Arduini (University of Rome Tor Vergata, Italy); Pierpaolo Loreti (University of Rome "Tor Vergata", Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy)

17:50-18:05 **Wireless Dopamine Sensing Brain Implant: The Concept and First Results**  
**NIKTA POURNOORI**, Stefanus Wirdatmadja, Toni Björninen and Lauri Sydänheimo (Tampere University, Finland); Merja Vuoltilainen (University of Helsinki, Finland); Leena Ukkonen (Tampere University, Finland)

18:05-18:20 **Respiration Monitoring using Doppler-Modulated Depolarizing Chipless Tags**  
**ASHKAN AZARFAR** (Grenoble INP, France); Nicolas Barbot (University Grenoble Alpes, Grenoble INP, LCIS, France); Etienne Perret (Grenoble INP - LCIS, France)

18:20-18:35 **Radio-pill for wireless monitoring of physical parameters in micro-environments of pharma packaging**  
Donato Masi (University of Rome Tor Vergata, Italy); Sara Amendola (University of Rome Tor Vergata & Radio6ense srl, Italy); Nicola D'Uva (RADIO6ENSE srl, Italy); **CAROLINA MIOZZI** (University of Rome "Tor Vergata", Italy & Radio6ense Srl, Italy); Giulio M. Bianco and Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy)

## Villanova Room

### 17:20-18:35 Wireless Power Transfer Enabling the IoT Energy Harvesting

Session Chairs: Francesca Benassi (University of Bologna, Italy) and Johanna Virkki (Tampere University, Finland)

17:20-17:35 **Analysis of Low-Power Rectifiers Under Various Multitone Excitations and with Different Diodes**  
Simone Travarello (University of Bologna, Italy); Zhongqi He (Sichuan University, China); Diego Masatti (University of Bologna, Italy); Alessandra Costanzo (DEI, University of Bologna, Italy); Changjun Liu (Sichuan University, China); **FRANCESCA BENASSI** (University of Bologna, Italy)

17:35-17:50 **A Biomimetic Resonator for Fabric-Based Wireless Power Transfer, Harvesting, and Charging of Sensors**  
**Dieff Vital** (The University of Illinois Chicago, USA)

- 17:50-18:05 **Circuit Techniques for Efficient SWIPT**  
**FRANCESCA BENASSI**, Giacomo Paolini and Diego Masotti (University of Bologna, Italy); Alessandra Costanzo (DEI, University of Bologna, Italy)
- 18:05-18:20 **A 13.56 MHz Time-Division Wireless Power and Data Transfer System**  
**RAFFAELE SALVATI**, Luca Roselli, Valentina Palazzi and Lorenzo Copparoni (University of Perugia, Italy)
- 18:20-18:35 **Miniaturized Triple Band Antenna Applied to Implantable Medical Devices Communications**  
**VINICIUS MAGNO UCHOA LIMA OLIVEIRA** (University of Aveiro & Instituto de Telecomunicações, Portugal); Nuno Borges Carvalho (University of Aveiro/IT Aveiro, Portugal)

19:45 **Bus departure from Conference Hotel to SOCIAL DINNER at "La Marinella" Restaurant**

## September 14 - Wednesday

### Castello Room

- 09:00-10:15 **RFID for Healthcare and Wearable Applications II**  
 Session Chairs: Gaetano Marrocco (University of Rome Tor Vergata, Italy) and Giulio Maria Bianco (University of Rome Tor Vergata, Italy)
- 09:00-09:15 **Minimally Invasive Antennas into Aortic Valve Prostheses for RFID-based Trans-Cardiac Links**  
**FEDERICA NACCARATA** (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi and Roberto Verzicco (University of Roma Tor Vergata, Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy)
- 09:15-09:30 **Validation of a Mobile Robot-Integrated RFID and Machine Vision System for Elderly Care Environments**  
**MIRKA LEINO** (Satakunta University of Applied Sciences, Finland); Johanna Virkki (Tampere University, Finland); Pauli Valo, Tommi Lehtinen, Joonas Kortelainen and Sari Merilampi (Satakunta University of Applied Sciences, Finland)
- 09:30-09:45 **RFID-based Sensing and Reconstruction of Human Movements for Safety Monitoring of Workers**  
**RICCARDO COLELLA** (University of Salento, Italy); Maria Rosaria Tumolo (Institute for Research on Population and Social Policies, Italy); Linda Mannini (National Research Council (CNR), Italy); Saverio Sabina (Institute of Clinical Physiology, Italy); Vincenzo Molinaro and Alberto Ranavolo (INAIL, Italy); Carlo Giacomo Leo (Institute of Clinical Physiology, Italy); Pierpaolo Mincarone (National Research Council (CNR), Brindisi, Italy); Roberto Guarino (Institute of Clinical Physiology (IFC) National Research Council of Italy (CNR), Italy); Luca Catarinucci (University of Salento, Italy)
- 09:45-10:00 **Design and Experimentation of an Epidermal RFID-based Thermal Monitoring Sheet (R-TMS) for Microwave Hyperthermia**  
**FRANCESCO LESTINI**, Nicoletta Panunzio and Gaetano Marrocco (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy)
- 10:00-10:15 **Applying RFID Technology to Improve Hospital Logistics**  
**VINICIUS MAGNO UCHOA LIMA OLIVEIRA** (University of Aveiro & Instituto de Telecomunicações, Portugal)
- 10:15-10:45 **Coffee Break**

## Villanova Room

- 09:00-10:15 **RF Labels for Wireless Identification and Sensing**  
Session Chairs: Filippo Costa (University of Pisa, Italy) and Jan C. Balzer (University of Duisburg-Essen, Germany)
- 09:00-09:15 **A Pressure Sensor based on Piezoresistive Loaded Electromagnetic Absorber**  
**SANDRA RODINI**, Simone Genovesi, Giuliano Manara and Filippo Costa (University of Pisa, Italy)
- 09:15-09:30 **Design and Manufacture of Resonant Chipless Tags in Millimeter Band**  
**RAYMUNDO AMORIM** and Nicolas Barbot (University Grenoble Alpes, Grenoble INP, LCIS, France); Romain Siragusa (Grenoble INP, France); Christophe Trehoult and Laurent Lyannaz (Centre Technique du Papier, France); Etienne Perret (Grenoble INP - LCIS, France)
- 09:30-09:45 **Experimental Assessment of Passive UHF-RFID Sensor Tags for Environment and Kinematic Data**  
Andrea Motroni (University of Pisa, Italy); **ANDREA RIA** (Italian National Council of Research (CNR), Italy); Lucano Strambini (Consiglio Nazionale delle Ricerche, Italy); Paolo Nepa (University of Pisa, Italy)
- 09:45-10:00 **Thin and flexible mm-wave chipless RFID tags**  
**FILIPPO COSTA** (University of Pisa, Italy); Yuting Zhao (Harbin University of Science and Technology); Francesca Soldi, Simone Genovesi and Giuliano Manara (University of Pisa, Italy)
- 10:00-10:15 **Miniaturised UHF RFID Tag Antenna Design for AC Current Sensing**  
Irfan Ullah (University of Southampton, United Kingdom); Benito Sanz-Izquierdo (University of Kent, United Kingdom); **JOHN BATCHELOR** (University of Kent, United Kingdom)

10:15-10:45 **Coffee Break**

## Castello Room

- 10:45-11:30 **Artificial Intelligence for RFID**  
Session Chairs: Andrea Motroni (University of Pisa, Italy) and Riccardo Colella (University of Salento, Italy)
- 10:45-11:00 **Prediction of UHF-RFID Tag Performance Utilizing Deep Learning Regression**  
**MIROSLAV LACH** (Technical University of Munich (TUM), Germany); Felix Rutz (Technical University Munich, Germany); Erwin Biebl (Technische Universität München, Germany)
- 11:00-11:15 **Application of Face Recognition Technology in Mobile Payment**  
**QINGYAN LIU** (LPU, China); Erlito Albina (Lyceum of the Philippines University Manila, Philippines)
- 11:15-11:30 **Balanced Neural Architecture Search and Optimization for Specific Emitter Identification**  
**MINGYANG DU** and Ping Zhong (National University of Defense Technology, China); Xiaohao Cai (University of Southampton, United Kingdom (Great Britain)); Daping Bi and Zhifei Li (National University of Defense Technology, China)

### 10:45-11:30 Data Processing for RFID

Session Chairs: Andrea Ria (CNR, Pisa, Italy) and Jean-Marc Laheurte (Université Gustave Eiffel & ESYCOM Lab, France)

### 10:45-11:00 Introduction of statistics in the analysis of an RFID link in a high density context

Aiman Mughal, **SHERMILA MOSTARSHEDI** and Benoit Poussot (University Gustave Eiffel, France); Jean-Marc Laheurte (Université Gustave Eiffel & ESYCOM Lab, France)

### 11:00-11:15 Phase Noise Suppression for Backscatter Communication with Tunable Delay Matching Block

Sicheng Yu (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain)); **MICHAEL J. CRISP** (University of Cambridge, United Kingdom (Great Britain))

### 11:15-11:30 Anti-Collision Phase Extraction in RFID Systems

**HAO TANG**, Yan Zhou, Wenfei Song, Lili Chang and Rui Chen (Xidian University, China)

### 11:30-12:00 Keynote - Backscatter communication without a carrier (Joshua R. SMITH)

### 12:00-13:30 Awards and Closing Ceremony

### 13:30-14:30 Lunch









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