Politecnico di Bari

INFN Istituto Nazionale di Fisica Nucleare Sezione di Bari

IEEE

IEEE COMPONENTS, PACKAGING AND MANUFACTURING TECHNOLOGY SOCIETY

IEEE IWASI 2017

7th IEEE International Workshop on Advances in Sensors and Interfaces

June 15-16, 2017

Vieste (FG), Italy

Technical Program

June 15, 2017 – Thursday

8:30	**Welcome and Opening Remarks**
	Daniela De Venuto - General Chair IWASI 2017 **Eugenio Di Sciascio** - Rector of the Politecnico di Bari **Mauro de Palma** - Director of the National Institute of Nuclear Physics (INFN), Bari **Leonardo Di Gioia** – Apulia Region Representative **Giuseppe Nobiletti** - Vieste Mayor
9:00	**Opening Speech** **Chair: Eugenio Di Sciascio** (Politecnico di Bari, Italy)
	Alberto L. Sangiovanni-Vincentelli – University of California at Berkeley, US & **Benedetto Vigna** – ST Microelectronics, Italy **AUTONOMOUS VEHICLES: A PLAYGROUND FOR SENSORS**
10:00	**Session I: Neural Interfaces** **Chair: Roland Thewes** (TU Berlin, Germany)
10:00	**Jan M. Rabaey** - University of California at Berkeley, US **HUMAN-CENTRIC COMPUTING – THE CASE FOR HYPER-DIMENSIONAL APPROACH**
10:30	**Stefano Vassanelli** – University of Padova, Italy **WIRING BRAIN AND ARTIFICIAL NEURONS THROUGH NEURAL INTERFACES AND MEMRISTIVE SYNAPSES: THE FIRST STEPS**
11:00	**Coffee Break, Exhibition and Poster Session I**
11:30	**Session I: Neural Interfaces** **Chair: Roland Thewes** (TU Berlin, Germany)
11:30	**ACTIVATION OF BOTTOM-UP AND TOP-DOWN AUDITORY PATHWAYS BY US SENSORS BASED INTERFACE** Daniela Menniti, Maria Giovanna Bianco, Salvatore Andrea Pullano, Rita Citraro, Emilio Russo, Giovambattista De Sarro and Antonino S. Fiorillo
11:45	**DESIGN AND CHARACTERIZATION OF A 65NM CMOS WIRELESS RFID READER FOR ECOG TAG** Daniela De Venuto and Jan Rabaey
12:00	**Session II: From Physical to Virtual sensor platforms** **Chair: Linda Milor** (Georgia Inst. of Technology,US)
12:00	**Franco Fummi** – University of Verona, Italy **CYBER-PHYSICAL VIRTUAL PLATFORMS: TECHNIQUES FOR SENSORS INTEGRATION**
12:30	**Georges Gielen**– KU Leuven, Belgium **DRIFT MITIGATION IN INTEGRATED SENSOR INTERFACES**

13:00	**DEEPEMOTE: TOWARDS MULTI-LAYER NEURAL NETWORKS IN A LOW POWER WEARABLE MULTI-SENSORS BRACELET** Michele Magno, Michael Pr Pritz, Philipp Mayer and Luca Benini
13:15	**EXPRIVIA SPA** Dr. Giovanni Sebastiano
13:20	**COOPERATIVE SEMANTIC SENSOR NETWORKS FOR PERVASIVE COMPUTING CONTEXTS** Michele Ruta, Floriano Scioscia, Agnese Pinto, Filippo Gramegna, Saverio Ieva, Giuseppe Loseto and Eugenio Di Sciascio
13:30	**Lunch**
14:30	**Session III: Flexible large-area sensors and their interfaces** **Chair: Eugenio Cantatore** (Eindhoven University of Technology, NL)
14:30	**Luisa Torsi** – University of Bari, Italy **LABEL-FREE PROTEIN ELECTRONIC DETECTION WITH AN ELECTROLYTE-GATED ORGANIC FIELD-EFFECT TRANSISTOR-BASED IMMUNOSENSOR**
15:00	**Naveen Verma**– Princeton University, US **COVERING OUR WORLD WITH SENSORS**
15:30	**FLEXIBLE PRESSURE AND PROXIMITY SENSOR SURFACES MANUFACTURED WITH ORGANIC MATERIALS** Marco Fattori, Eugenio Cantatore
15:45	CRYOGENIC CMOS INTERFACES FOR QUANTUM DEVICES Fabio Sebastiano, Harald A.R. Homulle, Jeroen P.G. van Dijk, Rosario Incandela, Bishnu Patra, Milad Mehrpoo, Masoud Babaie, Andrei Vladimirescu and Edoardo Charbon
16:00	**CHARACTERIZATION OF MODIFIED WORKING ELECTRODES FOR SENSING APPLICATIONS** Brigitte Holzer, Kyriaki Manoli, Nicoletta Ditaranto, Eleonora Macchia and Luisa Torsi
16:15	**CMOS BASED OPTICAL BIO SENSING** Srinivas Velugotla, David Cumming, Mohammed A Al-Rawhani, Boon Chong Cheah, Christos Giagkoulovits, Bence Nagy and James Beeley
16:30	**Coffee Break, Exhibition and Poster Session I**

17:00	**Session IV: Innovative detectors for astronomy and high energy physics** **Chair: Mauro de Palma** (INFN Bari, Italy)
17:00	**Duccio Abbaneo** – CERN Geneve, Switzerland **FRONTIER TRACKING DETECTORS FOR HL-LHC**
17:30	**DEVELOPMENT OF THE PIXEL MODULE FOR THE UPGRADE OF THE ALICE INNER TRACKING SYSTEM** Gabriele Fiorenza
17:45	**CALIBRATION, BIAS AND MONITORING SYSTEM FOR THE VFAT3 ASIC OF THE CMS GEM DETECTOR** P. Aspell, M. Dabrowski, G. De Lentdecker, De Robertis, M. Idzik, A. Irshad, F. Licciulli, F. Loddo, H. Petrow, J. Rosa, T. Tuuva.
18:00	**DESIGN OF A MULTI-CHANNEL READ-OUT ASIC FOR GAS ELECTRON MULTIPLIER DETECTORS** Fabio Ciciriello, Francesco Corsi, Giuseppe De Robertis, Giulietto Felici, Flavio Loddo, Cristoforo Marzocca, Gianvito Matarrese and Antonio Ranieri
18:15	**DEVELOPMENT OF A 16-CHANNEL MATRIX OF PHOTODETECTION SENSORS FOR MEDICAL AND ASTROPHYSICAL APPLICATIONS** Francesco Giordano
18:30	**Social Event**

# Pos. (Suggested)	Poster Session I
P 1 (S. 11:00)	**COMPARISON OF ELECTRODE TECHNOLOGIES FOR DRY AND PORTABLE EEG ACQUISITION** Mark O'Sullivan, Jonatan Poveda Pena, Andrea Bocchino, Conor O'Mahony, Daniel Costello, Emanuel Popovici and Andriy Temko
P 2 (S. 11:00)	**THREE-DIMENSIONAL MODELING AND ANALYSIS OF ANTENNAS IN COCHLEAR IMPLANTS** Maria-Alexandra Paun and Vladimir-Alexandru Paun
P 3 (S. 11:00)	**MULTISCALE GRANGER CAUSALITY ANALYSIS BY À TROUS WAVELET TRANSFORM** Sebastiano Stramaglia, Iege Bassez, Luca Faes and Daniele Marinazzo
P 4 (S. 11:00)	**A COMPLEX EVENT PROCESSING (CEP)-BASED AID SYSTEM FOR FIRE AND DANGER MANAGEMENT** Marina Mongiello, Luigi Patrono, Tommaso di Noia, Francesco Nocera, Angelo Parchitelli, Ilaria Sergi and Piercosimo Rametta
P 5 (S. 16:30)	**ELECTROCHEMICAL ORGANIC TRANSISTOR IMMUNO-SENSOR OPERATING AT THE FEMTO-MOLAR LIMIT OF DETECTION** Eleonora Macchia, Matteo Ghittorelli, Fabrizio Torricelli and Luisa Torsi
P 6 (S. 16:30)	**DESIGN AND PERFORMANCE OF TRIPLE-GEM DETECTORS FOR THE PHASE I MUON SYSTEM UPGRADE OF THE CMS EXPERIMENT AT LHC** Rosamaria Venditti
P 7 (S. 16:30)	**CHARACTERIZATION OF THE OUTER BARREL MODULES FOR THE ALICE ITS UPGRADE** Francesco Barile

June 16, 2017 – Friday

9:00	**Session V: Energy efficient sensing systems** **Chair: Michele Magno** (ETHZ, CH)
9:00	**Luca Benini** – University of Bologna, Italy and ETHZ, Switzerland **PLENTY OF ROOM AT THE BOTTOM? MICROPOWER DEEP LEARNING FOR COGNITIVE CYBERPHYSICAL SYSTEMS**
9:30	**DUAL MODE PRESSURE SENSING FOR PROSTHETIC INTERFACES** Maurizio Rossi, Matteo Nardello, Leandro Lorenzelli and Davide Brunelli
9:45	**EXPLORING ARM MBED SUPPORT FOR TRANSIENT COMPUTING IN ENERGY HARVESTING IOT SYSTEMS** Domenico Balsamo, Ali Elboreini, Bashir Al-Hashimi and Geoff V. Merrett
10:00	**LOW-COST ANTENNA TECHNOLOGY FOR LPWAN IOT IN RURAL APPLICATIONS** Congduc Pham, Fabien Ferrero, Mamour Diop, Leonardo Lizzi, Ousmane Dieng and Ousmane Thiaré
10:15	**REAL-TIME MUSCLE FIBER CONDUCTION VELOCITY TRACKER FOR DIABETIC NEUROPATHY MONITORING** Giovanni Mezzina, Vito Leonardo Gallo, Daniela De Venuto
10:30	**ADAPTIVE SUPPLY VOLTAGE AND DUTY CYCLE CONTROLLER FOR YIELD-POWER OPTIMIZATION OF ICS** Soonyoung Cha and Linda Milor
10:45	**Coffee Break, Exhibition and Poster Session II**
11:15	**Session VI: Sensors for aerospace and harsh environment applications** **Chair: Mauro de Palma** (INFN Bari, Italy)
11:15	**Nicola Zaccheo** – Sitael, Italy **INNOVATIVE TECHNOLOGIES FOR A NEW GENERATION OF SMALL SATELLITES: SMART SENSORS FOR HIGH RELIABILITIES APPLICATIONS**
11:45	**PLANAR PHOTONIC GYROSCOPES FOR SATELLITE ATTITUDE CONTROL** Francesco Dell'Olio, Giuseppe Brunetti, Donato Conteduca, Nicola Sassanelli, Caterina Ciminelli, Mario N. Armenise

12:00	**TARGET FOLLOWING ON NANO-SCALE UNMANNED AERIAL VEHICLES** Daniele Palossi, Jaskirat Singh, Michele Magno and Luca Benini
12:15	**PERFORMANCE OF W-BAND FMCW DOPPLER RADAR FALCON-I AS SENSING SYSTEM OF ATMOSPHERE** Toshiaki Takano
12:30	**Session VII: High sensitivity sensors** **Chair: Andrei Vladimirescu** (UC Berkeley, US and ISEP, France)
12.30	**Kofi Makinwa** – Delft University of Technology, The Netherlands **NEXT GENERATION CMOS TEMPERATURE SENSORS**
13:00	**A 12μW NPN-BASED TEMPERATURE SENSOR WITH A 18.4PJ·K2 FOM IN 0.18μM BCD CMOS** Long Xu, Johan Huijsing and Kofi Makinwa
13:15	**ANALYSIS AND MODELING OF DRIFT-RESILIENT TIME-BASED RESISTIVE SENSOR INTERFACES** Jorge Marin, Elisa Sacco, Johan Vergauwen and Georges Gielen
13:30	**Lunch**
14:30	**Session VII: High sensitivity sensors** **Chair: Andrei Vladimirescu** (UC Berkeley, US and ISEP, France)
14:30	**LONG RANGE, HIGH SENSITIVITY, LOW NOISE CAPACITIVE SENSOR FOR TAGLESS INDOOR HUMAN LOCALIZATION** Javed Iqbal, Mihai T. Lazarescu, Osama B. Tariq and Luciano Lavagno
14:45	**EXPERIMENTAL CHARACTERIZATION OF AN AUTOFOCUS ALGORITHM BASED ON LIQUID LENS OBJECTIVE FOR IN-FOCUS IMAGING IN THE MACRO RANGE** Simone Pasinetti, Ileana Bodini, Matteo Lancini, Franco Docchio and Giovanna Sansoni

15:00	**Session VIII: Implantable and Wearable Medical Monitoring** **Chair: Giovanna Sansoni** (Università di Brescia, Italy)
15:00	**Chris Van Hoof** – IMEC Leuven – KU Leuven, Belgium **THE VIRTUAL PERSONAL HEALTH COACH: TECHNOLOGY AND DATA ANALYTICS JOIN FORCES TO DISRUPT PREVENTIVE HEALTH**
15:30	**Jun Otha** – NAIST Takayama, Ikoma, Japan **OPTICAL SENSOR AND INTERFACE TECHNOLOGIES FOR IMPLANTABLE BIOMEDICAL DEVICES**
16:00	**ELECTRO-OPTICAL DETECTOR FOR LAB-ON-CHIP APPLICATIONS** Giampiero de Cesare, Rita Asquini, Alessio Buzzin and Domenico Caputo
16:15	**DEVELOPMENT OF A MULTI-LEAD ECG WEARABLE SENSOR SYSTEM FOR BIOMEDICAL APPLICATIONS** Michele Caldara, Daniele Comotti, Luigi Gaioni, Andrea Pedrana, Matteo Pezzoli, Valerio Re and Gianluca Traversi
16:30	**Coffee Break, Exhibition and Poster Session II**
17:00	**Session VIII: Implantable and Wearable Medical Monitoring** **Chair: Giovanna Sansoni** (Università di Brescia, Italy)
17:00	**DIFFERENTIATING ESSENTIAL TREMOR AND PARKINSON'S DISEASE USING A WEARABLE SENSOR – A PILOT STUDY** Patrick Locatelli and Dario Alimonti
17:15	**DYNAMIC RANGE ENHANCEMENT FOR MEDICAL IMAGE PROCESSING** Gian Domenico Licciardo, Carmine Cappetta and Luigi Di Benedetto
17:30	**Session IX: Biochemical Sensors** **Chair: Giampiero de Cesare** (Università degli Studi di Roma "La Sapienza", Italy)
17:30	**AN ELECTROCHEMICAL SENSOR FOR QUANTITATIVE ANALYSIS OF RHESUS D ANTIBODIES IN BLOOD** Francesca Criscuolo, Irene Taurino, Tugba Kilic, Sandro Carrara and Giovanni De Micheli
17.45	**LAB-ON-GLASS SYSTEM FOR DNA TREATMENTS** Francesca Costantini, Giulia Petrucci, Nicola Lovecchio, Valeria Di Fiore, Giampiero de Cesare, Augusto Nascetti, Domenico Caputo, Albert Ruggi, Lorena Tedeschi, Claudio Domenici, Pisana Placidi and Andrea Scorzoni

18:00	**BACTERIAL CONCENTRATION DETECTION USING A PORTABLE EMBEDDED SENSOR SYSTEM FOR ENVIRONMENTAL MONITORING** Marco Grossi, Carola Parolin, Beatrice Vitali and Bruno Riccò
18:15	**EXPERIMENTAL RESULTS ON LATERAL 4H-SIC UV PHOTODIODES** Luigi Di Benedetto, Gian Domenico Licciardo and Alfredo Rubino
18:30	**Best Paper Award and Closing Ceremony**

# Pos. (Suggested)	**Poster Session II**
P 1 (S. 10:45)	**A SUB-10MW REAL-TIME IMPLEMENTATION FOR EMG HAND GESTURE RECOGNITION BASED ON A MULTI-CORE BIOMEDICAL SOC** Simone Benatti, Giovanni Rovere, Jonathan Boesser, Fabio Montagna, Elisabetta Farella, Florian Glaser, Philipp Schonle, Thomas Burger, Schekeb Fateh, Qiuting Huang and Luca Benini
P 2 (S. 10:45)	**MULTITOUCH TOUCHLESS - A NEW APPROACH WITH OPTICAL PROXIMITY SENSING** Sebastian Freidank, Markus Detert and Sören Hirsch
P 3 (S. 10:45)	**WEARABLE PLATFORM FOR AUTOMATIC RECOGNITION OF PARKINSON DISEASE BY MUSCULAR IMPLICATIONS MONITORING** Valerio Francesco Annese, Vito Leonardo Gallo, Giovanni Mezzina, Vincenzo Scarola and Daniela De Venuto
P 4 (S. 10:45)	**A 0.9V 3RD-ORDER SINGLE-OPAMP ANALOG FILTER IN 28NM CMOS-BULK** Stefano D'Amico, Marcello De Matteis, Stefano Marinaci and Andrea Baschirotto
P 5 (S. 10:45)	**CHARACTERIZATION OF MEMS ACCELEROMETER SELF-NOISE BY MEANS OF PSD AND ALLAN VARIANCE ANALYSIS** Antonino D'Alessandro, Giovanni Vitale, Salvatore Scudero, Roberto D'Anna, Antonio Costanza, Adriano Fagiolini and Luca Greco

P 6 (S. 16:30)	**PORTABLE DETECTION SYSTEM FOR OCHRATOXIN A BY REAL TIME CHROMATOGRAPHY AND A-SI:H PHOTODIODES** Domenico Caputo, Augusto Nascetti, Corrado Fanelli, Giampiero de Cesare, Riccardo Scipinotti and Alessandra Ricelli
P 7 (S. 16:30)	**INTEGRATION OF ELECTROWETTING TECHNOLOGY INSIDE AN ALL-GLASS MICROFLUIDIC NETWORK** Nicola Lovecchio, Giulia Sacco, Giulia Petrucci, Valeria Di Fiore, Chiara Toti, Marco Nardecchia, Francesca Costantini, Augusto Nascetti, Giampiero de Cesare and Domenico Caputo
P 8 (S. 16:30)	**A RESONANT SENSOR FOR RELATIVE HUMIDITY MEASUREMENTS BASED ON A POLYMER-COATED QUARTZ CRYSTAL** Nicola Lamberti, Monica La Mura, Nicola Greco, Pasquale D'Uva and Valerio Apuzzo
P 9 (S. 16:30)	**OPTIMAL DESIGN OF A GABOR FILTER FOR MEDICAL IMAGING APPLICATIONS** Carmine Cappetta, Gian Domenico Licciardo and Luigi Di Benedetto