

2022 IEEE 7th Forum on Research and Technologies for Society and Industry Innovation (RTSI 2022)

**Paris, France
24-26 August 2022**



**IEEE Catalog Number: CFP22C29-POD
ISBN: 978-1-6654-9740-4**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22C29-POD
ISBN (Print-On-Demand):	978-1-6654-9740-4
ISBN (Online):	978-1-6654-9739-8
ISSN:	2687-6809

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2022 IEEE 7th Forum on Research and Technologies for Society and Industry Innovation (RTSI)

Electronics, Microelectronics & System Integration

<i>Sub-nJ Per Decision Schmitt Trigger Comparator for Neuromorphic Spike Detection in 55 nm Technology</i> João Sulzbach (Centralesupelec, France), Siqi Wang (Sorbonne University, France), Zalfa Jouni (Centralesupelec, France), Geoffroy Klisnick (Sorbonne University, France), Pietro M. Ferreira (Université Paris-Saclay CentraleSupélec, France), Aziz Benlarbi-Delai (Sorbonne University, Paris, France)	1
<i>Machine Learning Approach for SPR Based Photonic Crystal Fiber Sensor for Breast Cancer Cells Detection</i> Pankaj Verma (National Institute of Technology Kurukshetra, India), Amit Kumar (National Institute of Technology Kurukshetra, India), Poonam Jindal (NIT kKurukshetra, India)	7
<i>High Speed Comparator and Parity Generator in QCA Based on Optimal XOR Structure</i> Trailokya Nath Sasamal (Kurukshetra & National Institute of Technology, Kurukshetra, India), Gaurav Saini (NIT Kurukshetra, India), Vineet Jaiswal (NIT Kurukshetra, India)	13
<i>Foreground Static Error Calibration for Current Sources Using Backgate Body Biasing</i> Clément Beauquier (Telecom Paris, France), Antoine Frappé (University of Lille & JUNIA, France), Patricia Desgreys (LTCI-CNRS UMR 5141 - Institut Télécom - Télécom ParisTech, France), Chadi Jabbour (Telecom Paris, France), David Duperray (STMicroelectronics, France), Andreas Kaiser (ISEN-IEMN, France)	19
<i>Smart IoT - Implementation of Neuromorphic Circuits</i> Artur Piana (Université Paris-Saclay, CentraleSupélec, GeePs, France), Siqi Wang (Sorbonne University, France), João Sulzbach (Centralesupelec, France), Paolo Zaniboni (Université Paris-Saclay, CentraleSupélec, GeePs, France), Raphael El-Haddad (Université Paris-Saclay, CentraleSupélec, GeePs, France), Aziz Benlarbi-Delai (Sorbonne University, Paris, France), Geoffroy Klisnick (Sorbonne University, France), Pietro M. Ferreira (Université Paris-Saclay CentraleSupélec, France)	25

Communication Systems

<i>IoT Systems for Healthy and Safe Life Environments</i> Martina Capuzzo (University of Padova, Italy), Andrea Zanella (University of Padova & CNIT, Italy), Maddalena Zuccotto (University of Verona, Italy), Federico Cunico (University of Verona, Italy), Marco Cristani (University of Verona & Istituto Italiano di Tecnologia, Italy), Alberto Castellini (University of Verona, Italy), Alessandro Farinelli (University of Verona, Italy), Luciano Gamberini (University of Padova, Italy)	31
<i>Low Cost mmWaves Electromagnetic Spectrum Monitoring System for Education and Research Purpose</i> Rubén León (Universidad de las Fuerzas Armadas ESPE, Ecuador), Cyntia Rosero (Universidad de las Fuerzas Armadas ESPE, Ecuador), Galo Guarderas (Universidad de las Fuerzas Armadas ESPE, Ecuador), Alexis Tinoco-S (Escuela Superior Politécnica del Chimborazo ESPOCH, Ecuador), Fernando Lara (Escuela Politécnica Nacional, Ecuador)	38

Computer Engineering

<i>A Novel Cosine Transformed Chebyshev Chaotic Map Based Image Encryption</i> Atul Kumar (National Institute of Technology Kurukshetra, India), Mohit Dua (National Institute of Technology Kurukshetra, India)	43
<i>Detecting Replay Attack on Voice-Controlled Systems Using Small Neural Networks</i> Nadeen Ahmed (American University of Sharjah, United Arab Emirates), Jowaria Khan (American University of Sharjah, United Arab Emirates), Nouran Sheta (American University of Sharjah, United Arab Emirates), Rahma Tarek (American University of Sharjah, United Arab Emirates), Imran A. Zualkernan (American University of Sharjah, United Arab Emirates), Fadi Aloul (American University of Sharjah, United Arab Emirates)	50
<i>Computer-Aided Dementia Detection: How Informative are Your Features?</i> Edoardo Stoppa (Politecnico di Milano, Italy), Guido Walter Di Donato (Politecnico di Milano, Italy), Natalie Parde (University of Illinois Chicago, USA), Marco D Santambrogio (Politecnico di Milano & MIT, Italy)	55
<i>Decentralized Platforms: Goals, Challenges, and Solutions</i> Sergii Grybniak (Odessa Polytechnic National University, Ukraine), Yevhen Leonchuk (Odessa I. I. Mechnikov National University, Ukraine), Ruslan Oleksandrovych Masalskyi (Odessa I. I. Mechnikov National University, Ukraine), Igor Mazurok (Odessa I I Mechnikov National University, Ukraine), Oleksandr Nashyvan (Odessa National Polytechnic University, Ukraine), Ruslan Shanin (Odessa I. I. Mechnikov National University, Ukraine)	62
<i>ROH-BOT: An IoT Wearable and Inclusive Health Device for Remote Patient Monitoring With Different Alarm Systems</i> Claudia Agriesti (Politecnico di Milano, Italy), Maria Ida De Cinque (Politecnico di Milano, Italy), Filippo Carloni (Politecnico di Milano, Italy), Marco D Santambrogio (Politecnico di Milano & MIT, Italy)	68

Power & Energy

<i>Generalised Optimal Dispatch of Multiple Energy-Frequency Services to Thermostatic Loads</i> Vincenzo Trovato (University of Trento, Italy & Imperial College London, United Kingdom (Great Britain))	74
<i>Improving the Efficiency of the Electricity Distribution Network Through the Use of Smart Meters</i> Mouad Amrane (Mohammed V University, Morocco), Mohammed Ouassaid (Ecole Mohammadia d'Ingénieurs, Mohammed V University in Rabat, Morocco)	81
<i>Quantifying the Impact of Different Parameters on Optimal Operation of Multi-Microgrid Systems</i> Mahshid Javidsharifi (Aalborg University, Denmark), Hamoun Pourroshanfekr Arabani (Lund University, Sweden), Tamas Kerekes (Aalborg University & Department of Energy Technology, Denmark), Dezsó Sera (Queensland University of Technology, Australia), Josep M. Guerrero (Aalborg University, Denmark)	88
<i>Knowledge Discovery From the Statistical Analysis of On-Site Photovoltaic System Data</i> Gianfranco Chicco (Politecnico di Torino, Italy), Alessandro Ciocia (Politecnico di Torino, Italy), Andrea Mazza (Politecnico di Torino, Italy), Radu Porumb (Politehnica University of Bucharest, Romania), Filippo Spertino (Politecnico di Torino, Italy)	95

Special Session on Intelligence Artificial and the COVID'19 Crisis

<i>Impact Estimation of Emergency Events Using Social Media Streams</i> Giacomo Blanco (LINKS Foundation, Italy), Edoardo Arnaudo (Politecnico di Torino & LINKS Foundation, Italy), Dario Salza (LINKS Foundation, Italy), Claudio Rossi (LINKS Foundation, Italy)	102
--	-----

Special Session on Sensors for a smarter world

<i>The Environmental Sustainability of Measurements: A Practical Case-Study With the Wheatstone Bridge</i> Leopoldo Angrisani (University of Naples Federico II, Italy), Pasquale Arpaia (University of Naples Federico II, Italy), Mauro D'Arco (University of Naples Federico II, Italy), Egidio De Benedetto (University of Naples Federico II, Italy), Antonio Esposito (Università degli Studi di Napoli Federico II & Augmented Reality for Health Monitoring Laboratory (ARHEMlab), Italy), Monica Imbò (University of Naples Federico II, Italy)	109
---	-----

Control, Robotics & Signal Processing

<i>Real-Time Detection of Bio-Inspired Kilobots: A Comparison of Cloud vs. Local Resources</i> Zain Ali (Atlantic Technological University, Ireland), Kevin Meehan (Atlantic Technological University, Ireland), Jennifer Hyndman (Letterkenny Institute of Technology, Ireland), Thomas Dowling (Letterkenny Institute of Technology, Ireland)	116
<i>Savitzky-Golay Parameter Optimization by Using Linear Discriminant Analysis for FTIR Spectra</i> Dyah Kurniawati Agustika (The University of Warwick, United Kingdom (Great Britain) & Universitas Negeri Yogyakarta, Indonesia), Muhammad Rojib Nawawi (Universitas Negeri Yogyakarta, Indonesia), Rita Prasetyowati (Universitas Negeri Yogyakarta, Indonesia), Sri Hendrastuti Hidayat (IPB University, Indonesia), Doina D Iliescu (University of Warwick, United Kingdom (Great Britain)), Mark S Leeson (University of Warwick, United Kingdom (Great Britain))	123
<i>BrainTrack: A Replicable and Accessible Methodology for Customized Brain-Machine Interface Applications</i> Emma Crespi (Politecnico di Milano, Italy), Davide E Cerioli (Politecnico di Milano, Italy), Alice Gentili (Politecnico di Milano, Italy), Filippo Carloni (Politecnico di Milano, Italy), Marco D Santambrogio (Politecnico di Milano & MIT, Italy)	129
<i>Semi-Supervised Learning With Limited Data for Automatic Speech Recognition</i> Mikołaj Pudo (Warsaw University of Technology & Samsung R&D Institute Poland, Poland), Natalia Szczepanek (Samsung R&D Institute Poland, Poland), Bożena Łukasiak (Samsung Electronics, Poland), Artur Janicki (Warsaw University of Technology, Poland)	136

Antennas Design For Communication, Sensing And Characterization Methods

New Structural Biocomposite of Flax Laminate Materials for Antennas Applications

Adel Sennouni (IETR Rennes 1 University, France), Adnane Labdouni (IETR Rennes 1 University, France), Jean-Marie Floc'h (INSA of Rennes, France), Sébastien Guéret (GDS Composites, France), Franck Callebert (RID Depestele Groupe, France), Anne-Claude Tarot (University of Rennes1, IETR, France) 142

Demonstration of Wideband Polarization Conversion Using Novel Reflective Metasurfaces

Habiba Hafdallah Ouslimani (University Paris Nanterre & Energetic Mechanic Electromagnetic Lab, France) 148

Integration of Massive MIMO and Machine Learning in the Present and Future of Power Consumption in Wireless Networks: A Review

Sampson E Nwachukwu (University of Cape Town, South Africa), Maurine Chepkoech (University of Cape Town, South Africa), Kehinde Awodele (University of Cape Town, South Africa), Joyce Mwangama (University of Cape Town, South Africa), Albert A. Lysko (Council for Industrial and Scientific Research & University of Cape Town, South Africa), Chris Burger (NextGen Enterprises and Institutions, South Africa) 154

Special Session on Smart Medical Devices

Concept for Process Mining for Smart Medical Device Development

Anna Schidek (University of Applied Sciences Landshut, Germany), Holger Timinger (University of Applied Sciences Landshut, Germany) 161

Control, Robotics & Signal Processing

Gated Recurrent Unit Based Short-Term Network for Robot Swarm Motion Forecasting

Belkacem Khaldi (University of Biskra, Algeria), Harrou Fouzi (King Abdullah University of Science and Technology & KAUST, Saudi Arabia), Abdelkader Dairi (University of Oran 1 Ahmed Ben Bella, Algeria), Ying Sun (KAUST, Saudi Arabia) 168

Adult and Non-Adult Classification Using ECG

Azfar Adib (Concordia University, Canada), Wei-Ping Zhu (Concordia University, Canada), M. Omair Ahmad (Concordia University, Canada) 174

Convergent Approximate Message Passing by Alternating Constrained Minimization of Bethe Free Energy

Dirk Slock (EURECOM, France) 180

A Novel Fixed-Point Leaky Sign Regressor Algorithm Based Adaptive Noise Canceller for PLI Cancellation in ECG Signals

Mohammed Mujahid Ulla Faiz (University of Westminster, United Kingdom (Great Britain) & Presidency University, India), Izzet Kale (University of Westminster, United Kingdom (Great Britain)) 186

Power & Energy

Comparative Performance Study of Hybrid Si/SiC Insulated-Gate Bipolar Transistors

Nick Rigogiannis (Democritus University of Thrace, Greece), Aikaterini Kotsidimou (Democritus University of Thrace, Greece), Ioannis Arzanas (Democritus University of Thrace, Greece), Chaido Kyritsi (Democritus University of Thrace, Greece), Nick Papanikolaou (Democritus University of Thrace, Greece) 191

Resistive Load Influence on the Power and Bandwidth of Bistable Energy Harvesters

Quentin Demouron (Université Savoie Mont Blanc, France), Adrien Morel (Université Savoie Mont Blanc, France), David Gibus (Université Savoie Mont Blanc, France), Aya Benhemou (Université Savoie Mont Blanc, France), Adrien Badel (Université de Savoie, France) 198

Bifurcation and Stability Analysis of a Dual-Active-Bridge Dc-Dc Converter Working Under Non-Linear Control

Santolo Meo (Federico II University, Italy), Luisa Toscano (Federico II University, Italy), Pasquale Franzese (Università degli Studi di Napoli Federico II, Italy) 204