Neuronics Conference (Neuronics)

VALÈNCIA, Spain, 2024 February 21st - 23rd
Conference organizers: Sabina Spiga and Juan Bisquert

Conference Program

February 21st - Day 1 (Wednesday) 1	
08:15 - 09:15	**Registration**
09:15 - 09:30	**Opening**
	Session 1.1 Chair: Sabina Spiga
09:30 - 10:00 1.1-I1	Bilge Yildiz *(Massachusetts Institute of Technology (MIT), Department of Materials Science and Engineering (DMSE))* Time-dependent programming of electrochemical synapses enabled by nonlinear voltage kinetics
10:00 - 10:30 1.1-I2	Yoeri van de Burgt *(Institute for Complex Molecular Systems, Eindhoven University of Technology, NL)* On-chip learning with organic neuromorphic systems
10:30 - 11:00 1.1-I3	Simone Fabiano *(Laboratory of Organic Electronics, Department of Science and Technology, Linköping University, Norrköping SE-60174, Sweden)* Organic electrochemical neurons with ion-mediated spiking
11:00 - 11:30	**Coffee Break**
	Session 1.2 Chair: Martin Ziegler
11:30 - 12:00 1.2-I1	Valeria Bragaglia *(IBM Research Europe — Zurich, CH-8803 Rüschlikon, Switzerland)* Backend - CMOS Compatible Devices for Beyond CMOS
12:00 - 12:30 1.2-I2	bernabe linares-barranco *(Instituto de Microelectrónica de Sevilla, IMSE-CNM, CSIC and Univ. de Sevilla)* Spiking Hardware for Neuromorphic Sensing and Computing
12:30 - 13:00 1.2-I3	Xabier Iturbe *(Ikerlan)* NimbleAI: Perceiving a 3D world from a neuromorphic 3D silicon architecture
13:00 - 15:00	**Lunch**
	Session 1.3 Chair: Bilge Yildiz
15:00 - 15:15 1.3-O1	Noémie Bidoul *(Université catholique de Louvain (UCLouvain))*, Denis Flandre Bio-inspired Encoding of Heat Using VO2 Neuron Operated in Stochastic Bursting Regime
15:15 - 15:30 1.3-O2	Tímea Nóra Török, Roland Kövecs, László Pósa *(Department of Physics, Institute of Physics, Budapest University of Technology and Economics, Muegyetem rkp. 3, H-1111 Budapest, Hungary)*, Ferenc Braun, György Molnár, Nguyen Quoc Khánh, András Halbritter, János Volk Applying Neurodynamic Behavior of Mott Memristors for Auditory Sensing
15:30 - 15:45 1.3-O3	Dip Das *(Electronic & Electrical Engineering - University College London)*, Dovydas Joksas, Markus Hellenbrand, Judith MacManus-Driscoll, Tony Kenyon, Adnan Mehonic Altering Kinetics of Memimpedor Devices for Neuromorphic Computing
15:45 - 16:00 1.3-O4	Zhenming Yu *(Forschungszentrum Jülich, Germany)*, Ming-Jay Yang, Jan Finkbeiner, Sebastian Siegel, John Paul Strachan, Emre Neftci The Ouroboros of Memristors: Neural Networks Facilitating Memristor Programming
16:00 - 16:15 1.3-O5	Stefano Brivio *(CNR-IMM Unit of Agrate Brianza)*, Mrinmoy Dutta, Sabina Spiga Electrochemical Ag-based memristive devices as dynamical elements for neuromorphic computing
16:15 - 16:45	**Coffee Break**
	Session 1.4 Chair: Xabier Iturbe
16:45 - 17:00 1.4-O1	Arti Bisht *(CSIR-National Physical Laboratory, Dr. K. S. Krishnan Marg, Delhi 110012)*, Ajeet Kumar Highly Reproducible Quaternary Quantized Conductance States in Organic Resistive Switches for Multilevel Memory Applications
17:00 - 17:15 1.4-O2	Daniel Felder, Felix Schmitz *(DWI - Leibniz Institute for Interactive Materials)*, John Linkhorst, Matthias Wessling Simulating Self-Discharge of Organic Neuromorphic Devices in Spiking Neural Networks
17:15 - 17:30 1.4-O3	Mercedes Saludes *(Universidad Autónoma de Barcelona, Instituto de Microelectrónica de Barcelona, IMB-CNM (CSIC), Esfera UAB)*, Francesca Campabadal, Enrique Miranda, Mireia Bargalló Analysis of the Polarity-Dependent Catastrophic Damage in TiN/Ti/HfO2/W Memristors
17:30 - 17:45 1.4-O4	Aleksandra Koroleva *(Université Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France)*, César Magén, Céline Ternon, Elena-Ioana Vatajelu, Monica Burriel Tuning the synaptic properties of TiN/La2NiO4+δ/Pt memristive devices by post-deposition annealing

February 22nd - Day 2 (Thursday) 2	
	Session 2.1 Chair: Simone Fabiano
09:30 - 10:00 2.1-I1	Michele Giugliano *(SISSA International School for Advanced Studies & INFN, 34136 Trieste, Italy)* Listening to Neurons: progresses in neuron-electrode interfacing
10:00 - 10:30 2.1-I2	Yossi Mandel *(Bar-Ilan University, Israel)* Retinal prostheses for restoration of sight - current and future
10:30 - 11:00 2.1-I3	Orit Shefi *(Faculty of Engineering)* Nanoengineered Platforms for Neuronal Monitoring and Regeneration
11:00 - 11:30	**Coffee Break**
	Session 2.2 Chair: Bernabé Linares Barranco
11:30 - 12:00 2.2-I1	Daniele Ielmini *(Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano and IU.NET, Piazza L. da Vinci 32, 20133, Milano, Italy)* Embedded memory technologies for neuromorphic computing
12:00 - 12:30 2.2-I2	Martin Ziegler *(Micro- and Nanoelectronic Systems, Department of Electrical Engineering and Information Technology, TU Ilmenau, 98693, GERMANY)*, Claudia Lenk, Kalpan Ved, Vishal Gubbi, Kristina Nikiruy, Tzvetan Ivanov, Steve Durstewitz An Adaptive Acoustic Neuromorphic Auditory System
12:30 - 13:00 2.2-I3	Yuchao Yang *(Peking University)* Integrated Memristor Networks and Chips for Neuromorphic Computing
13:00 - 15:00	**Lunch**
	Session 2.3 Chair: Daniele Ielmini
15:00 - 15:15 2.3-O1	Felix Cüppers *(Forschungszentrum Jülich GmbH, PGI 7 &10, Jülich, Germany)*, Stephan Aussen, Rainer Waser, Susanne Hoffmann-Eifert Comparison of Two Different Classes of Memristive Devices for Neural Network Inference Tasks
15:15 - 15:30 2.3-O2	Zoltan Balogh *(Department of Physics, Institute of Physics, Budapest University of Technology and Economics, Muegyetem rkp. 3, H-1111 Budapest, Hungary)*, Anna Nyáry, Botond Sánta, János Gergő Fehérvári, Sebastian Werner Schmid, László Pósa, Miklós Csontos, András Halbritter Noise-Spectroscopy-Motivated Improvements in Memristor-Based Neuromorphic Applications: From Comprehensive Noise Analysis to Controlled Noise Manipulation Strategies
15:30 - 15:45 2.3-O3	Manuel Escudero *(CNR-IMM Unit of Agrate Brianza)*, Sabina Spiga, Stefano Brivio Reservoir Computing for Processing Data with a Memristive Tunable Chaotic Circuit
15:45 - 16:00 2.3-O4	Onur Toprak *(Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany)*, Florian Maudet, Tom Stumpp, Peter Jones, Roland Thewes, Veeresh Deshpande, Catherine Dubourdieu HfO2/GaOx Bilayer Resistive Switching Devices for Neural Activity Processing
16:00 - 16:15 2.3-O5	Patricio Ramirez, Sergio Portillo, Javier Cervera *(University of Valencia)*, Salvador Mafe, Juan Bisquert Synaptical Tunability of Multipore Nanofluidic Memristors
16:15 - 16:45	**Coffee Break**
	Session 2.4 Chair: Paolo Milani
16:45 - 17:00 2.4-O1	Konstantinos Rogdakis *(Department of Electrical & Computer Engineering, Hellenic Mediterranean University (HMU), Heraklion 71410, Crete, Greece)*, Emmanuel Kymakis Parallel volatile and non volatile memristive switching in mixed-halide perovskite synaptic transistors
17:00 - 17:15 2.4-O2	Antonio Guerrero *(Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain)* Effect of oxidized metallic buffer layers in halide 2D perovskite memristors
17:15 - 17:30 2.4-O3	Francesco Chiabrera *(Catalonia Institute for Energy Research (IREC)*, Philipp Langner, Paul Nizet, Alex Morata, Nerea Alayo, Albert T Tarancón An oxygen-ion all-solid-state synaptic transistor for analog computing
17:30 - 17:45 2.4-O4	Alexandr Marunchenko *(Chemical Physics and NanoLund, Department of Chemistry, Lund University, Box 124, Lund 22100, Sweden)*, Ivan Matchenya, Anton Khanas, Roman Podgornyi, Daniil Shirkin, Sergey Anoshkin, Alexey Yulin, Albert Nasibulin, Dmitry Krasnikov, Anatoly Pushkarev, Ivan Scheblykin, Andrey Zenkevich Optoelectrically-Driven Halide-Perovskite Single-Crystal Memristors with Biorealistic Response
20:30 - 22:30	**Social Dinner**

February 23rd - Day 3 (Friday) 3	
	Session 3.1 Chair: Valeria Bragaglia
09:30 - 10:00 3.1-I1	Emre Neftci *(Forschungszentrum Jülich and RWTH Aachen University, Germany)* Pre-training and Meta-learning for Memristor Crossbar Arrays
10:00 - 10:30 3.1-I2	Liza Herrera Diez *(Centre de Nanosciences et de Nanotechnologies, CNRS-Université Paris-Saclay, Palaiseau, France)* Magneto-Ionics: Advancing Non-Volatile Control of Magnetic Properties for Spintronics Applications
10:30 - 11:00 3.1-I3	Paolo Milani *(CIMAINA and Dipartimento di Fisica "A. Pontremoli", Università degli Studi di Milano)*, Bruno Paroli, Francesca Borghi, Marco Potenza The Receptron: a Neuromorphic Device for Classification and Pattern Recognition
11:00 - 11:30	**Coffee Break**
	Session 3.2 Chair: Juan Bisquert
11:30 - 12:00 3.2-I1	Francesca Santoro *(Institute of Biological Information Processing IBI-3, Forschungszentrum Juelich, Germany)* Organic electrochemical transistors building blocks in biohybrid synapses
12:00 - 12:30 3.2-I2	András Halbritter *(Department of Physics, Institute of Physics, Budapest University of Technology and Economics, Muegyetem rkp. 3, H-1111 Budapest, Hungary)*, Dániel Molnár, Tímea Nóra Török, Roland Kövecs, László Pósa, Péter Balázs, György Molnár, Nadia Jimenez Olalla, Zoltán Balogh, Juerg Leuthold, János Volk, Miklós Csontos Autonomous Neural Information Processing by a Dynamical Memristor Circuit
12:30 - 13:00 3.2-I3	Ivan Scheblykin *(Chemical Physics and NanoLund, Department of Chemistry, Lund University, Box 124, Lund 22100, Sweden)* Tracking convoluted charge carrier and defect dynamics in luminescent semiconductors
13:00 - 13:15	**Closing**