European Materials Research Society

2026 Spring Meeting

May 25 - 29
Strasbourg Convention Centre

View symposium details

SYMPOSIUM S

Material-related problems of neuromorphic technologies

Oral sessions : ROME - GROUND FLOOR
Poster sessions : ETOILE - FIRST FLOOR

Symposium Organizers:

Hans CHO, US Naval Research Laboratory (NRL), USA

Marina SPARVOLI, Universidade Federal do ABC (UFABC), Brazil

Nikolai A. SOBOLEV (Main organizer), Universidade de Aveiro, Portugal

Ronald TETZLAFF, Technische Universität Dresden, Germany

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Monday May 25

S01 Switching Mechanisms

Chairperson(s): SOBOLEV Nikolai a.

View session abstracts

08:30	2672	Diffusive valence change memory: nanoionic mechanisms and prospects for neuro-inspired computing **HELLWIG Johannes (Invited)**
09:00	789	Influence of thickness on the electrical and physical properties of Ge-rich GST layers used to engineer PCM **DIAKHATE Birame**
09:15	3153	Short-Term Synaptic Plasticity in TaOx-based VCM Devices at Sub-nanosecond Timescales **MUNIR Faisal**
09:30	3005	Material properties-driven analysis of the filament formation in oxygen-engineered yttria-based resistive memories **DUAN Yu**
09:45	1726	Electronic Pain Perception: CeO2-Based Diffusive Memristors for Olfactory Nociception **KUZHIMBATTIL Bhagyalakshmi**

Monday May 25

S02 Networks

Chairperson(s): HERON John

View session abstracts

10:30	51	Material Aspects of Resistive Switching in Nanogranular Matter **VAHL Alexander (Invited)**
11:00	2648	Reservoir computing with organic mixed ionic electronic conductors **KANTELBERG Richard**
11:15	1604	Aqueous Proton-Driven Reservoir Computing Using a Graphene Chemimemristor **TANG Senlin**
11:30	268	On-Chip Analog Signal Processing using MoS2 based Reservoir Computer **WEN Yingyi**
11:45	960	Retina-Inspired 2D Semiconductor NIR Sensor with PRO Architecture **XU Jian-Bin**

Monday May 25

S03 Memristors

Chairperson(s): VAHL Alexander

View session abstracts

14:30	2532	Switching Dynamics in Memristors **SPAGNOLO Bernardo (Invited)**
15:00	3166	Benchmarking stochasticity behind reproducibility: full cycle noise measurements and denoising strategies in memristive devices **HALBRITTER András Erno (Invited)**
15:30	1132	Threshold Switching Memristor-Based Capacitively Coupled Oscillators for Mixed Weight Modulation **CHEN Chi-Chien**
15:45	2700	Development of a tabletop AFM system for spatially resolved conductive noise measurement on memristive samples **FEHERVARI János Gergo**

Monday May 25

S04 Switching Dynamics

Chairperson(s): CSONTOS Miklós

View session abstracts

16:30	117	Temporal correlation effects in memristive devices on the sub-ns scale **Menzel Stephan (Invited)**
17:00	3009	Reconfigurable Multistate Optical Memory in Mixed Halide Perovskites **KOUWENHOVEN Marcel**
17:15	2966	VO2 oscillators and artificial neurons optimized for ultrafast operation **POLLNER Zsigmond**
17:30	2475	From short- to long-term stability in VCM based RRAM **WIEFELS Stefan (Invited)**
18:00	1330	An Elemental Phase-Change Memory Based on Germanium **ZELLWEGER Till**
18:15	1090	Material-Dependent Sneak-Path Effects and Scalability Limits in Neuromorphic Crossbar Arrays **LIM Donghyeok**

Tuesday May 26

S05 Organic Devices

Chairperson(s): RACKAUSKAS Simas

View session abstracts

08:30	2198	Critical charge transport networks in doped organic semiconductors **HOFACKER Andreas (Invited)**
09:00	2747	Using UV light to shift the Threshold Voltage in Organic Electrochemical Transistors **TEUERLE Laura**
09:15	2549	Memory Level Rewriting in Fiber-like Vertical Organic Electrochemical Transistors for Neuromorphic Applications **F. P. BARBOSA Henrique**
09:30	1425	Investigating Ion–Electron Coupling in n-Type Organic Mixed Ionic-Electronic Conductors through Device Architecture and Electrolyte Engineering **KIM Hye-Jung**
09:45	988	An Organic–Inorganic Y7C/SiO_2 Heterojunction Memristor with Highly Uniform Switching and Multilevel resistance States **PARK Kyung Jun**

Tuesday May 26

S06 Neuromorphic computing

Chairperson(s): HOFACKER Andreas

View session abstracts

10:30	3414	Reconfigurable Nonlinear Computing in Silicon **VAN DER WIEL Wilfred G. (Invited)**
11:00	3365	Liquid state memristors for in-memory and neuromorphic computing **PERSHIN Yuriy (Invited)**
11:30	3277	Probabilistic computing with organic electronics **CALVET Laurie (Invited)**

Tuesday May 26

S07 Vanadium oxide and related materials

Chairperson(s): VAN DER WIEL Wilfred g.

View session abstracts

13:45	2748	Neuromorphic memristive sensors based on vanadium dioxide **IONESCU AM Adrian (Invited)**
14:15	3203	Toward GHz operation of oscillating neural networks **CSONTOS Miklós**
14:30	3244	From Piezoelectric MEMS Signals to Neuromorphic Encoding Using Memristive Materials **VOLK János**

14:45	1112	Biologically Plausible Neuron Circuit Realizing Intrinsic Neuronal Plasticity and Spiking Pattern Modulation via Dual-Mode Mott Memristor **HSU Kai-Shin**
15:00	1297	Electrical Characterization of Sheet and Contact Resistances of VO2 Transmission Line Model (TLM) Structures with Ti/Au Electrodes **ZENG Xi**
15:15	726	Tuning of resistive-switching properties of VO2 **AMBROSI JALÓN David**
15:30	3417	Optoelectronic Reservoir Computing: Advancing Next-Generation Neuromorphic Hardware **DIAS Lília M. S.**
15:45	1079	Optimization of sputtered $_2$-MoO3 thin films for memristor application **TYAGI Ayushi**

Tuesday May 26

S08 Ferroelectric Devices and Photomemristors

Chairperson(s): IONESCU Mihai adrian

View session abstracts

16:30	2634	Picosecond ferroelectric dynamics, circuit-aware scaling, and charge-domain in-memory computing **HERON John (Invited)**
17:00	3175	Hf0.5Zr0.5O2/GaOx Ferroelectric Tunnel Junction with tunable GaOx conductivity **DUTTA Mrinmoy**
17:15	1685	Photomemristors for neuromorphic vision **TAN Hongwei**
17:30	1320	Ferroelectric properties of interface engineered HZO multilayers **MOHANDAS MOOLAYIL Sajmohan**
17:45	882	Automated Training and Neuromorphic Performance of Ferroelectric Crossbar Arrays Based on PZT and BTO Heterostructures on Silicon and STO **RENGIFO Miguel**
18:00	3120	Multilevel Resistance States Induced by Polarization Switching in Epitaxial Ferroelectric HfO2 Films **FINA Ignasi**

Wednesday May 27

S09 Theory and Modeling

Chairperson(s): CHO Hans

View session abstracts

08:30	2830	High-Order Ising Machines and Hopfield Neural Networks for Combinatorial Optimization **STRUKOV Dmitri (Invited)**
09:00	1296	Simulating Electro-Thermal Resistive Switching Dynamics in Strongly Correlated Thin-Film Devices for Neuromorphic Computing **GUÉNON Stefan**
09:15	1329	Mechanisms of creation of oxygen vacancies in amorphous Ga2O3 and Ta2O5 films **SHLUGER Alexander**
09:30	3396	Oxygen scavenging at a SiO2/Ta interface: a first-principles study **BURASCHI Margherita**
09:45	2154	Microscopic Origin of Dopant-Induced Destabilization of the Monoclinic Insulating Phase in Vanadium Dioxide: A DFT+U Study **TRIPATHI Shivam**

Wednesday May 27

S10 Unconventional Media I

Chairperson(s): STRUKOV Dmitri

View session abstracts

10:30	810	Spray-Coated ZnO Tetrapod Networks as a Reproducible Platform for Neuromorphic Computing **RACKAUSKAS Simas (Invited)**
11:00	2834	BEOL-Compatible Wafer-Scale Two-Terminal Floating-Gate Memory for Neuromorphic Computing **NGUYEN Minh Chien**
11:15	1290	Morphological properties of metallic nanowire networks for reservoir computing **SCHUMACHER Sebastian**
11:30	42	Cluster-type conductive path-based selector-less 1R memristor array for spiking neural networks **YOON Jung Ho**
11:45	2552	Solution processed Zinc Oxide Optoelectronic Memristors for Neuromorphic Applications **PARREIRA Carolina**

Wednesday May 27

SP03 Poster session 3

View session abstracts

13:45	01_1008	Thermo-Optoelectronic Synaptic Device for Neuromorphic Applications **GHOSH Sirsendu**
13:45	02_1432	Optical control of the polarization states in 2D $_2$-In2Se3/hBN/Graphene FET **GHOSH Prasenjit**

13:45	03_1459	Light-Programmable Neuromorphic Hardware: Materials Strategies for Bidirectional Plasticity **MEI Tingting**
13:45	04_1887	Memristive and optoelectronic dynamics of 3D ZnO tetrapod networks **SOBOLEV Nikolai A.**
13:45	05_1898	Polarization-Driven Resistive Switching Memristor Based on a Semiconductor/Ferroelectric Heterostructure for Brain-Inspired Neuromorphic Computing **GHOSH Santu Kumar**
13:45	06_2045	Synthesis of Amorphous-Crystalline Mixture Boron Nitride for balanced Resistive Switching Operation **AGGARWAL Pallavi**
13:45	07_2731	Gallium oxide-based photomemristor for neural circuit emulation under optical stimulation **SPARVOLI Marina**
13:45	08_2772	Photomemristive Response of Thin TiO_2 Films: Role of Oxygen Partial Pressure in the Electronic and Optical Properties **SPARVOLI Marina**
13:45	09_2829	ZnO nano-tetrapod networks: scalable deposition and functionalization for neuromorphic technologies **RACKAUSKAS Simas**
13:45	10_2985	VerilogA Implementation of a Physics-Based NiO RRAM Model for Neuromorphic Circuits **SAHU Chopali Chanchal**
13:45	11_3126	Influence of oxygen flow rate and power on properties of HfO_2 thin films deposited by RF magnetron sputtering **ANAMIKA Anamika**
13:45	12_3311	Optoelectronics Synaptic TFTs for Neuromorphic Vision Sensors **LEONARDO Diogo**
13:45	13_3367	Innovative tourmaline-based photomemristors deposited by electron beam **SPARVOLI Marina**
13:45	14_3392	Substrate-Morphology-Driven Strain Engineering of Mott Insulators for Neuromorphic Device Materials **SINGH Reetendra**
13:45	15_3393	Planar vs. Nonplanar Porphyrin–SWNT Networks for Light-Enhanced In-Materio Physical Reservoir Computing **USAMI Yuki**
13:45	16_3395	Resistive Switching in Functional Oxides: Thickness, Defects, and Interfacial Effects **ABHIMANYU SINGH Rana**
13:45	17_3405	Investigating low-temperature crystalline layered MoO3 films for memristor applications **TYAGI Ayushi**
13:45	18_3406	Investigation of Bottom Electrode Effects on Printed Hafnium Nanoparticle Memristors **LOHRKE Leonardo**
13:45	19_3412	In-Materio Encryption Using Nonlinear Ag NPs Devices and Reservoir Computing-Based Decryption **YAMASHITA Yuma**
13:45	20_3415	2D Memristor RF Switches for Scalable Reconfigurable Intelligent Surfaces at D-Band **MINGATES Tomás**

13:45	21_3416	Single-Atom Substitution in Keplerate Polyoxometalates for Reservoir-Dynamics Engineering in Physical Reservoir Computing **RAI Harshita**
13:45	22_605	Engineering High-Ionic-Mobility Interfaces to Expand Memristive Memory Windows **SAHU Debabrata**
13:45	23_737	Spray-Coated ZnO Tetrapod Networks as a Reproducible Platform for Neuromorphic Computing **GHOSHAL Sagarneel**
13:45	24_899	Optoelectronic Perovskite Synapses for Neuromorphic Computing and Reliability Analysis **GUPTA Govind**
13:45	25_943	An Organic–Inorganic Y7C/SiO2 Heterojunction Memristor with Highly Uniform Switching and Multilevel resistance States **ROY Abhishek**
13:45	26_983	Oxygen Defect State Modulation in Double-Layered ZnON/InGaZnO Photonic Synaptic Devices **LEE Yunsang**
13:45	27_1103	Oxygen Defect State Modulation in Double-Layered ZnON/InGaZnO Photonic Synaptic Devices **CHUNG Kwun-Bum**

Thursday May 28

S12 Heterostructures and thin films

Chairperson(s): SPARVOLI Marina

View session abstracts

08:30	2619	Solid-State Redox as a Design Principle: Intertwining Heterostructure and Function in Complex Oxides for Neuromorphic Electronics **ESPOSITO Vincenzo (Invited)**
09:00	1727	Memristive Switching Characteristics of RF Magnetron Sputtered CeOx/SnOx Thin-Film Devices **KALRA Amanpreet**
09:15	2644	Printed ZTO resistive switching devices towards 1T1R Architectures **MARTINS Raquel**
09:30	604	Low-Voltage and Highly Stable Pt/TiO2/MoO3/MoN-Based Resistive Switching Memory for Synaptic Applications **KHAN Amir Sohail**
09:45	3197	Defect engineering of hafnium oxide for tailored device performance in resistive random-access memory (RRAM) devices **PIROS Eszter**

Thursday May 28

S13 Unconventional Media II

Chairperson(s): MENZEL Stefan

View session abstracts

10:30	1709	Material intelligence: Material Physical Reservoir Devices for Highly Efficiency Intelligent Robot Systems **TANAKA Hirofumi (Invited)**
11:00	2763	Multicore memristor from electrically readable multiple domain walls in nanoscopic racetracks **JEON Jae-Chun**
11:15	1802	Material-Related Network Manipulations and Multiscale Functional Analysis of Neuromorphic Nanoparticle Networks via In Situ Electron Microscopy **GRONENBERG Ole**
11:30	3394	A Microfluidic Platform for Particle-Driven Dynamic Aqueous Reservoir Computing **XU Muzhen**
11:45	3408	Soft reconfigurable self-assembled materials for embodied computing **BORGHI Francesca**

Thursday May 28

S14 Reliability

Chairperson(s): TANAKA Hirofumi

View session abstracts

13:45	1909	Materials requirements for the transition from digital to analog memristors **ALFF Lambert (Invited)**
14:15	2329	Revealing Conductive Filament Structure and Electrochemical Failure Mechanisms in MIEC Analog Memristors **KOROLEVA Aleksandra**
14:30	432	Engineering High-Ionic-Mobility Interfaces to Expand Memristive Memory Windows **JOSÉ COSTA Diogo**
14:45	2111	Multi-technique study of resistive switching mechanisms in Au-seeded CuO thin-film based memristors **OZGA Monika**
15:00	2450	Impact of La doping on the filament stability and noise characteristics of HfO2-based RRAM revealed through a comparative study **LI Yingxin**
15:15	2986	Non-volatile oxygen-vacancy-driven synapse devices using solution-processed NiO devices **ROY Abhrajit**
15:30	1786	Ionic Relaxation and Temperature Effects in Multilevel Memristors for Reliable Neuromorphic Functionality **VARELA-DOMÍNGUEZ Noa**
15:45	3407	Printed High-Entropy Metal-Organic Framework (HE-MOF) Memristors **LIU Yan**

Thursday May 28

S15 2D Memristor Devices

Chairperson(s): SOBOLEV Nikolai a.

View session abstracts

16:30	87	Resistive switching in 2D MXenes: from fundamental studies to neuromorphic properties **VENTURA Joao (Invited)**
17:00	58	Ultra-thin memristors based on 2D inorganic and metal-organic frameworks for neuromorphic computing **MILICHKO Valentin**
17:15	2313	MoS_2 Nanogap Memristive Devices for Artificial Synapses and Temporal Pattern Recognition **SATHEESH BABU Roshni**
17:30	2258	Engineered growth of MoxW1-x52 nanofilms for memristive switching applications **JANGRA Vikas**
17:45	2807	Addressing Material Challenges in TMD-based Memristive Devices **VEERALINGAM Sushmitha**
18:00	1950	Multifunctional Graphene Circuit Enabling Compact and Variability-Resilient Hardware Neural Network **UDAYA MOHANAN Kannan**
18:15	844	Brain-Inspired Plasticity and Cognitive Learning in Iontronic Memtransistors of 2D Molybdenum Disulfide **SAHA Puranjoy**