

SYMPOSIUM E

Adaptive materials and devices for brain-inspired electronics

Symposium Organizers :

Adnan MEHONIC, University College London

Erika COVI, NaMLab gGmbH

Giuliana DI MARTINO, University of Cambridge

Ignasi FINA, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC)

Veeresh DESHPANDE, Helmholtz-Zentrum Berlin für Materialien und Energie

Selected contributions will be published in a focused issue
of Neuromorphic Computing and Engineering (IoP).

APL Materials

NEUROMORPHIC
Computing and Engineering

ACS APPLIED
ELECTRONIC MATERIALS

IOP Publishing

Intrinsic

Monday may 30

Organic and Halides 2 : Rohit John

09:00	Welcome and Introduction to the Symposium		13:45	INV Organic neuromorphic electronics and biohybrid systems	E 3.1
	Oxide-based Devices 1 : Adnan Mehonic			Yoeri van de Burgt Eindhoven University of Technology	
09:15	INV Metal-oxide memristors for sensory applications	E 1.1	14:15	Reconfigurable Memristors for Neuromorphic Computing	E 3.2
	Themis Prodromakis Centre for Electronics Frontiers, University of Southampton, UK			Rohit Abraham John (1,2) , Yiğit Demirağ (3), Giacomo Indiveri (3), Maksym V. Kovalenko (1,2) 1 Department of Chemistry and Applied Biosciences, Institute of Inorganic Chemistry, ETH Zürich, CH-8093 Zürich, Switzerland 2 Empa-Swiss Federal Laboratories for Materials Science and Technology, CH-8600 Dübendorf, Switzerland. 3 Institute of Neuroinformatics, University of Zurich and ETH Zurich, Zurich, 8057, Switzerland.	
09:45	In materia reservoir computing with self-organizing nanowire networks	E 1.2	14:30	Superionic Conductors and Its Application in Low Voltage Synaptic Transistors	E 3.3
	Gianluca Milano ¹ , Giacomo Pedretti ² , Kevin Montano ³ , Saverio Ricci ² , Shahin Hashemkhani ² , Luca Boarino ¹ , Daniele Ielmini ² , Carlo Ricciardi ³ ¹ Advanced Materials Metrology and Life Science Division, INRiM (Istituto Nazionale di Ricerca Metrologica), Strada delle Cacce 91, 10135 Torino, Italy. ² Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano and IU.NET, Piazza L. da Vinci 32, 20133, Milano, Italy. ³ Department of Applied Science and Technology, Politecnico di Torino, C.so Duca degli Abruzzi 24, 10129 Torino, Italy.			Arka Mukherjee, Bikas C Das School of Physics, Indian Institute of Science Education and Research Thiruvananthapuram (IISER TVM), Vithura, Trivandrum, Kerala 695551, India.	
10:00	Multimodal transistors with constant transconductance as analog ReLU activation functions	E 1.3	14:45	Discussion	
	Bestelink, E.*(1), Surekciogil Pesch, I.(1), Fustec, J.-C.(2), de Sagazan, O.(2), Mehonic, A.(3) & Sporea, R.A.(1). (1) Advanced Technology Institute, University of Surrey, Guildford, United Kingdom (2) University of Rennes1, IETR-UMR6164, Rennes, Brittany, France (3) Department of Electronic and Electrical Engineering, University College London, London, United Kingdom * lead presenter		15:00	Coffee	
10:15	Discussion				
10:30	Coffee				
	Organic and Halides 1 : Veeresh Deshpande				
10:45	Analysis of the distribution and retention of the quantum conductance states in Cu/SiO₂/W devices	E 2.1	15:15	Nanostructured Perovskite based Resistive RAM for Future Storage and Computing	E 4.1
	Florian Maudet (1), Onur Toprak(1), Veeresh Deshpande(1), Catherine Dubourdieu (1,2) 1.Institute Functional Oxides for Energy-Efficient Information Technology (EM-IFOX), Helmholtz-Zentrum Berlin für Materialien und Energie, Hahn-Meitner-Platz 1, 14109 Berlin, Germany 2.Freie Universität Berlin, Physical Chemistry, Arnimallee 22, 14195 Berlin Germany			Swapnadeep Poddar, Yuting Zhang, Zhiyong Fan* The Hong Kong University of Science and Technology	
11:00	Active crossbar using amorphous oxide semiconductor technology towards artificial neural networks hardware	E 2.2	15:30	Stability of quantized-conductance plateaus in memristors: toward understanding the mechanisms of resistive switching	E 4.2
	Maria Elias Pereira, Jonas Deuermeier, Pedro Barquinha, Rodrigo Martins, Elvira Fortunato and Asal Kiazadeh i3N/CENIMAT, Department of Materials Science, NOVA School of Science and Technology and CEMOP/JUNINOVA, NOVA University Lisbon, Campus de Caparica, 2829-516 Caparica, Portugal			Kharlanov, O.G.*(1), Shvetsov, B.S.(2), Rylkov, V.V.(2) & Minnekhanov, A.A.(2) (1) Faculty of Physics, Lomonosov Moscow State University, Russia (2) National Research Center "Kurchatov Institute", Russia	
11:15	1/f noise spectroscopy and noise tailoring of resistive switching devices	E 2.3	15:45	Frequency domain response of memristors, synapses and neurons	E 4.3
	A. Halbritter, B. Sánta, L. Pósa, T.N. Török, D. Molnár, Z. Balogh A. Halbritter, B. Sánta, L. Pósa, T.N. Török, D. Molnár, Z. Balogh: Department of Physics, Institute of Physics, Budapest University of Technology and Economics, Műegyetem rkp. 3., H-1111 Budapest, Hungary. A. Halbritter, B. Sánta, D. Molnár, Z. Balogh MTA-BME Condensed Matter Research Group, Műegyetem rkp. 3., H-1111 Budapest, Hungary L. Pósa: Institute of Technical Physics and Materials Science, Centre for Energy Research, Konkoly-Thege M. út 29-33, 1121 Budapest, Hungary			Juan Bisquert Institute of Advanced Materials, Universitat Jaume I, 12006 Castelló, Spain.	
11:30	Dendritic Computation: A case for its replication and a framework to work within. D. J. Mannon, A. Mehonic, A. J. Kenyon	E 2.4	16:00	Halide perovskite memristors as flexible and reconfigurable physical unclonable functions	E 4.4
	University College London (UCL)			Rohit Abraham John (1), Nimesh Shah (2), Sujaya Kumar Vishwanath (1), Si En Ng (1), Benny Febriansyah (3), Metikoti Jagadeeswararao (3), Chip-Hong Chang (2), Arindam Basu (2), Nripan Mathews (1, 3) 1 School of Materials Science and Engineering, Nanyang Technological University, Singapore, Singapore 2 School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, Singapore 3 Energy Research Institute @ NTU (ERI@N), Nanyang Technological University, Singapore, Singapore	
11:45	Direct Comparison of the SET Kinetics of Memristive Cells in Filamentary and Area-Mode	E 2.5	16:15	Discussion	
	Stephan Aussen, Felix Cüppers, Rainer Waser, Susanne Hoffmann-Eifert Peter Grünberg Institute (PGI 7), Forschungszentrum Jülich GmbH and JARA-FIT, Jülich, Germany, Peter Grünberg Institute (PGI 7), Forschungszentrum Jülich GmbH and JARA-FIT, Jülich, Germany, Peter Grünberg Institute (PGI 7), Forschungszentrum Jülich GmbH and JARA-FIT, Jülich, Germany and Institute of Electronic Materials (IWE II) and JARA-Fit, RWTH Aachen University, Aachen, Germany, Peter Grünberg Institute (PGI 10), Forschungszentrum Jülich GmbH and JARA-FIT, Jülich, Germany		16:30	Coffee	
12:00	Discussion				
12:15	Lunch				
				Neuromorphic Systems 1 : Rohit John	
			16:45	Numerical exploration of spiking neuron circuits in organic pOTFT technology	E 5.1
				Zonglong Li□, Paoline Coulson□, Benjamin Iñiguez□, Krunoslav Romanjek□, Laurie E. Calvet□ □ Center for Nanoscience an Nanotechnology, CNRS-Université Paris-Saclay, Palaiseau, France, □ Department of Electronic, Electrical and Automatic Control Engineering, University Rovirai Virgili, Tarragona, Spain, □ CEA-LITEN, 38000 Grenoble, France,	
			17:00	Memristive synapse coupling biological neuronal populations in real-time	E 5.3
				C. Dias 1, D. Castro 2, M. Aroso 2, J. Ventura 1 and P. Aguiar 2 1 IFIMUP, Departamento de Física e Astronomia, Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre s/n, 4169-007 Porto, Portugal 2 Neuroengineering and Computational Neuroscience Lab, Instituto Nacional de Engenharia Biomédica (INEB), Instituto de Investigação e Inovação em Saúde (i3S), Universidade do Porto, Rua Alfredo Allen, 208, 4200-135 Porto, Portugal	
			17:15	Discussion	

Tuesday may 31

Oxide-based Devices 2 : Giuliana di Martino

09:00	INV Prospects and challenges of area-dependent memristive devices for neuromorphic computing Regina Dittmann Peter-Grünberg-Institute (PGI-7), Research Center Jülich and JARA-FIT, 52428 Jülich, Germany	E 6.1
09:30	Hafnium-oxide-based Thin Films for Neuromorphic Resistive Switching Markus Hellenbrand, Hongyi Dou, Ming Xiao, Aiping Chen, Haiyan Wang, Quanxi Jia, Judith Driscoll Department of Materials Science and Metallurgy, University of Cambridge, UK, School of Materials Engineering, Purdue University, USA, Los Alamos National Laboratory, USA, Department of Materials Design and Innovation, University at Buffalo, USA	E 6.2
09:45	Ionic conductor materials for high-performance resistive switching memory devices Ming Xiao, Markus Hellenbrand, Zhuotong Sun, Judith L. MacManus-Driscoll Department of Materials Science & Metallurgy, University of Cambridge, CB3 0FS, United Kingdom	E 6.3
10:00	Origin of switchable polarization inside binary oxides Atif Jan(a), Giuliana Di Martino(a) (a) Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK	E 6.4
10:15	Discussion	
10:30	Coffee	
	Design for Energy-efficient Systems : Stefano Brivio	
10:45	INV In-memory computing based on phase-change memory Abu Sebastian IBM Research - Zurich	E 7.1
11:15	Filamentary-based TaOx/HfO2 memristive synapses T. Stecconi, Y. Popoff, D. Falcone, R. Guido, A. La Porta, F. Horst, B. J. Offrein and V. Bragaglia IBM Research GmbH-Zurich Research Laboratory, CH-8803 Rüschlikon, Switzerland	E 7.2
11:30	Exploring a memristor-based Chua circuit design including non-volatile tunable properties M. Escudero*(1), L. Pancioni(2), M. Forti(2), A. Tesi(3), F. Corinto(4), S. Spiga(1) and S. Brivio(1) (1) CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, 20864, Italy (2) Università degli Studi di Siena, Siena, 53100, Italy (3) Università degli Studi di Firenze, Florence, 50121, Italy (4) Politecnico di Torino, Turin, 10129, Italy	E 7.3
11:45	Formingless resistive switching memory crosspoint arrays for in-memory machine learning Saverio Ricci, Piergiulio Mannocci, Matteo Farronato, Shahin Hashemkhani, Daniele Ielmini Politecnico di Milano, Politecnico di Milano, Politecnico di Milano, Politecnico di Milano, Politecnico di Milano,	E 7.4
12:00	Discussion	
12:15	Lunch	
13:45	Plenary Talk	
15:00	Coffee	
	Optical Methods and Systems : Ignasi Fina	
15:15	Real-time in-situ optical tracking of oxygen vacancy migration in memristors Giuliana Di Martino(a), Angela Demetriadou(b), Weiwei Li(a), Dean Kos(c), Bonan Zhu(a), Xuejing Wang(d), Bart de Nijs(c), Haiyan Wang(d), Judith MacManus-Driscoll(a), Jeremy J. Baumberg(c) (a) Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK, (b) School of Physics and Astronomy, University of Birmingham, Birmingham, UK, (c) NanoPhotonics Centre, Cavendish Laboratory, University of Cambridge, Cambridge, UK, (d) School of Materials Engineering, Purdue University, West Lafayette, IN, USA	E 8.1

15:30	Towards non-volatile memristors based on ferroelectric polarization optical switching Huan Tan, Florencio Sánchez, Ignasi Fina Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Bellaterra, Catalonia 08193, Spain	E 8.2
15:45	Optoelectronic synaptic plasticity emulated in a ZnO-based artificial synapse for neuromorphic image sensing application Subin P S, Midhun P S, Aldrin Antony, K J Saji, M K Jayaraj Subin P S - Centre of Excellence in Advanced Materials, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India., Midhun P S - Department of Physics, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India., Aldrin Antony - Centre of Excellence in Advanced Materials, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India. Department of Physics, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India., K J Saji - International School of Photonics, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India. Centre of Excellence in Advanced Materials, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India. Inter University Centre for Nanomaterials and Devices, Cochin University of Science and Technology, Kochi - 682 022, Kerala, India., M K Jayaraj - University of Calicut, Thenjipalam – 673 635, Kerala, India.	E 8.3
16:00	Multi-mem response of topotactic redox La_{1/2}Sr_{1/2}Mn_{1/2}Co_{1/2}O₃ perovskite W. Román Acevedo (1), M. H. Aguirre (2), C. Ferreyra (1), M.J. Sánchez (1,3), M. Rengifo (1), C. A. M. van den Bosch (4), A. Aguadero (4), B. Noheda (5), D. Rubi (1) (1) Instituto de Nanociencia y Nanotecnología (INN), CONICET-CNEA, Argentina, (2) Instituto de Nanociencia y Materiales de Aragón (INMA-CSIC) and Dpto. de Física de la Materia Condensada and Laboratorio de Microscopías Avanzadas, Universidad de Zaragoza, Spain, (3) Centro Atómico Bariloche and Instituto Balseiro (UNCu), Bariloche, Argentina, (4) Department of Materials, Imperial College London, United Kingdom, (5) Groningen Cognitive Systems and Materials Center (CogniGron) and Zernike Institute for Advanced Materials, University of Groningen (RuG), The Netherlands	E 8.4

16:15 **Discussion**

Wednesday June 1

Nanowires and 2D Materials Systems : Giuliana di Martino

09:00	INV Neuromorphic properties of nanowire networks Ruomin Zhu, Alon Loeffler, Sam Lilak, Christopher Dunham, Joel Hochstetter, Adam Stieg, James Gimzewski, Zdenka Kuncic University of Sydney, University of Sydney, University of California at Los Angeles, University of California at Los Angeles, University of Cambridge, California NanoSystems Institute and University of California at Los Angeles, University of California at Los Angeles, University of Sydney	E 10.1
09:30	Volatile Memtransistor based on MoS2 for memory and neuromorphic computing Matteo Farronato, Margherita Melegari, Saverio Ricci, Shahin Hashemkhani, Alessandro Bricalli, Daniele Ielmini Matteo Farronato, Margherita Melegari, Saverio Ricci, Shahin Hashemkhani, Daniele Ielmini Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB), Politecnico di Milano and IUNET, piazza L. da Vinci 32, 20133, Milano, Italy Alessandro Bricalli Weebit Nano, Hod Hasharon, Israel	E 10.2
09:45	Fabrication and Characterization of Lateral TMDC Memristors Z. Geng, C. Zhang, S. Park, C. Ziebold, S. Sharma, F. Schwierz, K. Rossnagel†, and M. Ziegler Mikro- und nanoelektronische Systeme, Fakultät für Elektrotechnik und Informationstechnik, Technische Universität Ilmenau, 98693 Ilmenau, Germany †Institute of Experimental and Applied Physics, Kiel University, 24098 Kiel, Germany, and Ruprecht Haensel Laboratory, Deutsches Elektronen-Synchrotron DESY, 22607 Hamburg, Germany	E 10.3
10:00	Discussion	
10:15	Coffee	
	Nanowires and 2D Materials Systems 2 : Erika Covi	
10:45	In-situ optical tracking of memristive switching in MoS2 Joanna Symonowicz(a), Giuliana Di Martino(a) (a) Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK	E 11.1
11:00	Electroforming-free nonvolatile MoS2 memristors with synaptic functionalities. Litty Thomas Manamel, Dr. Bikas C. Das School of Physics, Indian Institute of Science Education and Research (IISER) Thiruvananthapuram, Kerala, India.	E 11.2
11:15	Study of switching and relaxation dynamics in Ag/SiOx/Pt volatile memristors Mrinmoy Dutta, Stefano Brivio, Mario Alia, Sabina Spiga CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, 20864 Agrate Brianza (MB), Italy	E 11.3
11:30	Charge transport in dopant network processing units Taglietti, F.*(1), Moro, F.(1), van de Ven, B.(2), van der Wiel, W.G.(2), Fanciulli, M.(1) (1) Department of Material Science, University of Milano-Bicocca, Italy, (2) MESA+ Institute for Nanotechnology and BRAINS Center for Brain-Inspired Nano Systems, University of Twente, The Netherlands	E 11.4
11:45	Accurate modeling of the reset process of bipolar resistive switching devices Mr Nikolaos Barmratsalos Dr Enrique Miranda Dr Adnan Mehonic Dr Wing Ng Prof Anthony Kenyon University College London (UCL) Universitat Autònoma de Barcelona (UAB)	E 11.5
12:00	Discussion	
12:15	Lunch	
13:45	Plenary Talk	
14:45	Coffee	
	Theory and Simulations : Adnan Mehonic	
15:15	INV Bayesian Nanoelectronics Damien Querlioz Université Paris-Saclay, CNRS	E 12.1

15:45	Nonideality-Aware Training to Make Memristive Neural Networks Accurate, Robust and Energy-Efficient Dovydas Joksas, Erwei Wang, Nikolaos Barmratsalos, Wing H. Ng, Anthony J. Kenyon, George A. Constantinides, Adnan Mehonic University College London, Imperial College London, Xilinx, University College London, University College London, University College London, Imperial College London, University College London	E 12.2
16:00	Improving the convergence of memristor-based neural networks W. Quiñonez (1,2), W. Román Acevedo (1,2), M.J. Sánchez (2,3), D. Rubi (1,2) (1) Centro Atómico Constituyentes, San Martín, Argentina, (2) Instituto de Nanociencia y Nanotecnología (INN), CONICET-CNEA, Argentina, (3) Centro Atómico Bariloche and Instituto Balseiro (UNCu), Bariloche, Argentina	E 12.3
16:15	Discussion	
16:30	Coffee	
	Theory and Simulations 2 : Adnan Mehonic	
16:45	Multi-Layer Redox-Based Memristive Structures and Cross Bar Arrays for Neuromorphic Computing B. Spetzler1*, S. Park1,2, T. Ivanov1,2, S. Klett1, A. Knauer2, J. Doell2, M. Ziegler1,2 1 Micro- and Nanoelectronic Systems, Department of Electrical Engineering and Information Technology, Technical University Ilmenau, Ilmenau, Germany 2 Institute of Micro and Nanotechnologies MacroNano, Department of Electrical Engineering and Information Technology, Technical University Ilmenau, Ilmenau, Germany	E 13.1
17:00	Modelling resistive switching in nanogranular films Miquel López-Suárez, Claudio Melis, Luciano Colombo, and Walter Tarantino Università degli Studi di Cagliari	E 13.2
17:15	Modified training for increased robustness in memristor-based neural networks Victor Zamora, Dovydas Joksas, Adnan Mehonic GFMC, Departamento de Física de Materiales, Universidad Complutense de Madrid, 28040 Madrid, Spain, Department of Electronic and Electrical Engineering, University College London, Roberts Building, Torrington Place, London WC1E 7JE, UK, Department of Electronic and Electrical Engineering, University College London, Roberts Building, Torrington Place, London WC1E 7JE, UK	E 13.3
17:30	Atomistic Insights into Electrochemical Metallization Jad Jaafar Imperial College London	E 13.4
17:45	Discussion	
18:00	E-MRS EU-40 Materials Prize & MRS Mid-Career Researcher Award Presentations	

Thursday June 2

Ferroelectric Systems : Ignasi Fina

- 09:00 **INV Ferroelectric HfO-based devices for Brain-inspired Electronics** E 14.1
Dr.-Ing. Stefan Slesazek
NaMLab gGmbH
- 09:30 **Flexible HfO₂-based Ferroelectric Memristor on Mica** E 14.3
I. Margolin, A. Chouprik, E. Korostylev, V. Mikheev and D. Negrov
Moscow Institute of Physics and Technology, Russia
- 09:45 **Fabrication process for sub-8 nm HfZrO₂-based ferroelectric tunnel junctions with enhanced properties** E 14.4
Greta Segantini^{1,3}, Benoît Manchon², Rabei Barhoumi¹, Pedro Rojo Romeo¹, Ingrid Cañero Infante², Nicolas Baboux², Shruti Nirantar³, Matthieu Bugnet⁴, Simon Jeannot⁵, Damien Deleruyelle², Sharath Sriram³, Bertrand Vilquin¹
1 Univ Lyon, Ecole Centrale Lyon, INSA Lyon, UCBL, CPE Lyon, CNRS, INL, UMR5270, 69130 Ecully, France 2 Univ Lyon, INSA Lyon, Ecole Centrale Lyon, UCBL, CPE Lyon, CNRS, INL, UMR5270, 69130 Ecully, France 3 Functional Materials and Microsystems Research Group and Micro Nano Research Facility, RMIT University, Australia 4 Univ Lyon, CNRS, INSA Lyon, UCBL, MATEIS, UMR 5510, 69621 Villeurbanne, France 5 STMicroelectronics, 850 Rue Jean Monnet, 38920 Crolles, France
- 10:00 **Discussion**
- 10:15 **Coffee**
- Ferroelectric Systems 2 : Erika Covi**
- 10:45 **Metal-Hf_{0.5}Zr_{0.5}O₂-Al₂O₃-Metal FTJ devices and their electrical programming for neuromorphic applications** E 15.1
Keerthana Shajil Nair, Marco Holzer, Catherine Dubourdieu, Veeresh Deshpande
1. Helmholtz-Zentrum Berlin für Materialien und Energie, Hahn-Meitner-Platz 1, 14109 Berlin, Germany 2. Freie Universität Berlin, Physical Chemistry, Arnimallee 22, 14195 Berlin Germany
- 11:00 **Ferroelectric switching dynamics and multi-state memory performance in epitaxial Hf_{0.5}Zr_{0.5}O₂ films** E 15.2
Tingfeng Song, Florencio Sánchez, Ignasi Fina
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Bellaterra 08193, Barcelona, Spain
- 11:15 **The role of oxygen vacancies on the stability and polarization of ferroelectric zirconia** E 15.3
Veniero Lenzi, José P. B. Silva, Luís Marques
Centre of Physics of Universities of Minho and Porto, Campus de Gualtar, 4710-057 Braga, Portugal.
- 11:30 **Disentangling electronic and thermal contributions to the observed light-induced resistance switching in BaTiO₃ ferroelectric thin films** E 15.4
Xiao Long, Huan Tan, Florencio Sánchez, Ignasi Fina, Josep Fontcuberta
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Bellaterra 08193, Catalonia, Spain
- 11:45 **Coexistence of polarization and ionic electromigration effects in the memristive response of ferroelectric oxides** E 15.5
C. Ferreyra (1,2), M. Rengifo (1,2), M.J. Sánchez (1,3), A. S. Everhardt (4), B. Noheda (4), D. Rubi (1,2)
(1) Instituto de Nanociencia y Nanotecnología (INN), CONICET-CNEA, Argentina, (2) Centro Atómico Constituyentes, Av. Gral Paz 1499 (1650), San Martín, Buenos Aires, Argentina, (3) Centro Atómico Bariloche and Instituto Balseiro (Universidad Nacional de Cuyo), 8400 San Carlos de Bariloche, Río Negro, Argentina, (4) Zernike Institute for Advanced Materials, University of Groningen, 9747 AG Groningen, The Netherlands
- 12:00 **Discussion**
- 12:15 **Lunch**
- 13:45 **Plenary Talk**
- 15:00 **Coffee**

Mott Transitions and Volatile Switching Devices : Ignasi Fina

- 15:15 **Dynamics of the voltage-triggered insulator-to-metal transition** E 16.1
Javier del Valle¹, Adrien Bercher¹, Nicolas M. Vargas², Rodolfo Rocco³, Pavel Salev², Claribel Dominguez Ordóñez¹, Jennifer G. Fowlie¹, Pavel Lapa², Yoav Kalcheim⁴, Coline Adda², Minhan Lee², Stefano Gariglio¹, Alexey Kuzmenko¹, Marcelo Rozenberg³, Ivan Schuller², Jean-Marc Triscone¹
1 University of Geneva 2 University of California, San Diego 3 Université Paris-Saclay 4 Technion-Israel Institute of Technology
- 15:45 **Effect of Physical Properties on Collective Behavior of Coupled Vanadium Dioxide Oscillators for Neuromorphic Computing Applications** E 16.2
Stefania Carapezzi, Aida Todri-Sanial
Microelectronics Department, LIRMM, University of Montpellier, CNRS, Montpellier, France
- 16:00 **Stochastic firing with exponential escape rate in Mott neurons** E 16.3
Rodolfo Rocco, Javier del Valle, Henry Navarro, Pavel Salev, Ivan K. Schuller, Marcelo Rozenberg
Université Paris-Saclay, University of Geneva University of California-San Diego, University of California-San Diego, University of California-San Diego, University of California-San Diego, Université Paris-Saclay
- 16:15 **Discussion**
- 16:30 **Coffee**
- Mott Transitions and Volatile Switching Devices 2 : Veeresh Deshpande**
- 16:45 **Thermal strain engineering in V₂O₃ for Mott Insulator-based memory applications** E 17.1
Laborie, L.*⁽¹⁾, Gergaud, P.⁽¹⁾, Tranchant, J.⁽²⁾, Corraze, B.⁽²⁾, Zucchi, X.⁽¹⁾, Hida, R.⁽¹⁾, Castellani, N.⁽¹⁾, Nolot, E.⁽¹⁾, Lefevre, G.⁽³⁾, Carabasse, C.⁽¹⁾, Magis, T.⁽¹⁾, Bourgeois, G.⁽¹⁾, Besland, M.-P.⁽²⁾, Janod, E.⁽²⁾, David, S.⁽³⁾, Andrieu, F.⁽¹⁾, Cario, L.⁽²⁾, & Jalaguier, E.⁽¹⁾.
(1) Univ. Grenoble Alpes, CEA, Leti, F-38000 Grenoble, France, (2) Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, IMN, F-44000 Nantes, France, (3) Univ. Grenoble Alpes, CNRS, CEA-LETI Minatec, LTM, 38054 Grenoble, France
- 17:00 **Electric Mott Transition: application to neuromorphic devices** E 17.2
J. Tranchant*, E. Janod, B. Corraze, M.-P. Besland, L. Cario *lead presenter
Institut des Matériaux de Nantes Jean Rouxel (IMN), Université de Nantes, CNRS, 2 rue de la Houssinière, F-44322 Nantes Cedex 3, France
- 17:15 **Multimodal synchronization in stochastic Mott oscillators** E 17.3
E. Qiu^{1,2,*}, P. Salev², L. Fratino³, R. Rocco³, H. Navarro², C. Adda², J. Li⁴, M.-H. Lee⁴, Y. Kalcheim⁵, M. Rozenberg³, and Ivan K. Schuller²
1 Department of Electrical and Computer Engineering, University of California, San Diego, 92093, USA. 2 Department of Physics, Center for Advanced Nanoscience, University of California, San Diego, 92093, USA. 3 Laboratoire de Physique des Solides, CNRS, Université Paris Saclay, 91405 Orsay Cedex, France. 4 Materials Science and Engineering Program, University of California, San Diego, 92093, USA. 5 Faculty of Materials Science and Engineering, Technion - Israel Institute of Technology, 32000 Haifa, Israel.
- 17:30 **Discussion**
- 17:45 **Closing remarks**