

## Programme - Monday 19 September 2022

All timings are in local British Summer Time (BST)

08:00-09:00 REGISTRATION + MORNING REFRESHMENTS

09:00-09:15 **OPENING REMARKS**

### SESSION 1 – PHOTONICS 1

09:15-10:15 **Ovshinsky Award:** Harish Bhaskaran – University of Oxford, United Kingdom  
**Ovshinsky Award:** David Wright – University of Exeter, United Kingdom

10:15-10:30 Mengyun Wang – University of Oxford, United Kingdom  
*Reconfigurable metasurfaces using lossless phase-change material*

10:30-10:45 Euan Humphreys – University of Exeter, United Kingdom  
*Filtering and Modulation from Visible to Terahertz using Phase-Change Extraordinary Optical Transmission Metasurfaces*

10:45-11:20 COFFEE BREAK

### SESSION 2 – PHOTONICS 2

11:20-11:45 **Invited Speaker:** Arka Majumdar – University of Washington, USA

11:45-12:00 June Sang Lee – University of Oxford, United Kingdom  
*Polarization-selective tunability in hybrid phase-change nanowires*

12:00-12:15 Zhuoran Fang – University of Washington, USA  
*Ultra-low energy programmable non-volatile silicon photonics based on graphene heaters*

12:15-12:30 Daniel Yimam – University of Groningen, The Netherlands  
*Structural colors and enhanced resolution at the nanoscale: Local structuring of phase change materials using focused ion beam*

12:30-12:55 **Invited Speaker:** Otto Muskens – University of Southampton, United Kingdom  
*Programmable and reconfigurable nanophotonics using the low-loss phase change material  $Sb_2Se_3$*

12:55-13:00 GROUP PHOTO

13:00-15:00 LUNCH BREAK & POSTER PRESENTATIONS

### SESSION 3 - DRIFT

15:00-15:25 **Invited Speaker:** Ghazi Sarwat Syed – IBM Research - Zurich, Switzerland  
*Chalcogenide Computational Memory*

15:25-15:40 Benedikt Kersting – IBM Research Europe, Switzerland  
*Many-body thermal excitation and the collective relaxation model*

15:40-15:55 Konstantinos Konstantinou – Tampere University, Finland  
*Intrinsic electron and hole trapping in amorphous phase-change memory materials: connection to resistance drift*

15:55-16:10 Nadav Torem – Technion, Israel Institute of Technology, Haifa, Israel  
*Low Resistance Drift Multi-Level PCM By Constant Amplitude Sub-Nanosecond Reset Pulses*

16:10-16:45 COFFEE BREAK

### SESSION 4 - IN-MEMORY COMPUTING

16:45-17:10 **Invited Speaker:** Irem Boybat – IBM Research - Zurich, Switzerland  
*Temperature sensitivity of phase-change memory-based in-memory computing*

17:10-17:35 **Invited Speaker:** Nicole Saulnier – IBM Research, New York, USA  
*Integration of PCM in 14nm for analog in-memory computing*

17:35-17:50 Bokusui Nakayama – Keio University, Japan  
*Mimicking the Pheromone Communication of Ant Swarm with Colloids and Phase Change Material*

## Programme - Tuesday 20 September 2022

All timings are in local British Summer Time (BST)

08:30-09:00 REGISTRATION + MORNING REFRESHMENTS

### SESSION 5 - THEORY

- 09:00-09:25 **Invited Speaker:** Riccardo Mazzarello – University of Rome, Italy  
*Atomistic study of the configurational entropy of supercooled liquid GeTe*
- 09:25-09:40 Wei Zhang – Xi'an Jiaotong University, China  
*Unraveling crystallization mechanisms and electronic structure of Ge-Sb-Te alloys by ab initio simulations*
- 09:40-09:55 Stephen Elliott – University of Cambridge, United Kingdom  
*Hyperbonding in telluride memory materials*
- 09:55-10:10 Carl-Friedrich Schön – RWTH Aachen University, Germany  
*Chemical Bonding revisited: The Potential of Property Maps*
- 10:10-10:25 Matthias Wuttig – RWTH Aachen University, Germany  
*Phase Change Materials by Design: Developing Treasure Maps with Quantum Chemistry*
- 10:25-10:40 Xian-Bin Li – Jilin University, China  
*Entropy barrier controlled ultrafast reversible ferroelectric phase change in 2D III2-VI3 materials*

10:40-11:15 COFFEE BREAK

### SESSION 6 - GE-RICH GST

- 11:15-11:40 **Invited Speaker:** Marco Bernasconi – Università di Milano-Bicocca, Italy  
*Atomistic simulations of the crystallization kinetics: Sb in confined geometry and asdep GeTe*
- 11:40-11:55 Eloïse Rahier – CEMES-CNRS/STMicroelectronics, France  
*Crystallization mechanism of Ge-rich GST unveiled by in-situ synchrotron XRD and (S)TEM*
- 11:55-12:10 Elisa Petroni – STMicroelectronics, Italy  
*Advanced metrics for quantification of by-process segregation beyond ternary systems*
- 12:10-12:35 **Invited Speaker:** Stefano Cecchi – Università di Milano-Bicocca, Italy  
*Exploration of epitaxial GeSbTe alloys with Ge-rich composition for automotive applications*
- 12:35-12:50 Sabrina Calvi – University of Rome Tor Vergata, Italy  
*Ge-Sb-Te alloys on free-standing flexible substrates*

12:50-14:50 LUNCH BREAK & POSTER PRESENTATIONS

### SESSION 7 - ePCM

- 14:50-15:15 **Invited Speaker:** Andrea Redaelli – STMicroelectronics, Italy  
*ePCM applications and related material challenges*
- 15:15-15:30 Martina Tomelleri – CEA-LETI/STMicroelectronics, Grenoble, France  
*Investigation of N-doped GeSe<sub>0.5</sub>Te<sub>0.5</sub> films for Embedded Phase-Change Memories*
- 15:30-15:45 Fabrizio Arciprete – University of Rome Tor Vergata, Italy  
*Electronic properties, interface formation and Sb confinement in In-based PCM heterostructures*
- 15:45-16:10 **Invited Speaker:** Pierre Noé – CEA/LETI, Grenoble, France  
*Phase-Change and Ovonic Chalcogenide Materials: Unique and Uncommon Physical Properties behind Innovative Electronic and Photonic Devices*

16:10-16:45 COFFEE BREAK

### SESSION 8 - THERMAL ENGINEERING

- 16:45-17:10 **Invited Speaker:** Rossella Ranica – STMicroelectronics, France  
*Optimization of heater system in ePCM for robust reliability and scalability in 28nm FDSOI technology*
- 17:10-17:25 Rob Simpson – Singapore University of Technology and Design, Singapore  
*Thermally Engineered Phase Change Materials and Superlattices*
- 17:25-17:50 **Invited Speaker:** Eric Pop – Stanford University  
*Thermal Confinement and Low-Power Memory Devices Based on Superlattice Chalcogenides*

19:30 GALA DINNER AT BALLIOL COLLEGE

## Programme - Wednesday 21 September 2022

All timings are in local British Summer Time (BST)

08:00-08:40 MORNING REFRESHMENTS

### SESSION 9 – OTS & MULTILAYERS

- 08:40-09:05 **Invited Speaker:** Elia Ambrosi – Taiwan Semiconductor Manufacturing Company Ltd, Taiwan  
*Reliability and performance improvement of arsenic-free low voltage chalcogenide selectors*
- 09:05-09:20 Chanyoung Yoo – Seoul National University, Korea  
*Atomic Layer Deposition of GeTe/Sb<sub>2</sub>Te<sub>3</sub> Superlattice and Its Switching Mechanism*
- 09:20-09:35 Michelle Huai-Yu Cheng – Macronix International Co. Ltd, Taiwan  
*Multilayer InAsSeGe OTS Selectors Engineering for High Thermal Stability and Improved Endurance 3D Crosspoint Memory*
- 09:35-10:00 **Invited Speaker:** Hyunsang Hwang – Pohang University of Science and Technology (POSTECH), Korea  
*Effect of Microwave Annealing on Ovonic Threshold Switching Device*

10:00-10:35 COFFEE BREAK

### SESSION 10 – OTS & MULTILAYERS

- 10:35-11:00 **Invited Speaker:** Taras Ravsher – KU Leuven & IMEC, Belgium  
*Polarity-dependent effects in OTS materials and their application as self-selective memory*
- 11:00-11:15 Damien Terebenec – CEA-LETI, France  
*PCM Heterostructures for Low Power Phase-Change Memory: from multilayers to van de Waals stacks*
- 11:15-11:30 Vitomir Sever – CEA-LETI, France  
*HAADF-STEM analysis of the local structure of GeTe-Sb<sub>2</sub>Te<sub>3</sub> heterostructures obtained by van der Waals epitaxy*
- 11:30-11:45 Jaemin Park – Korea University, Korea  
*Sb<sub>2</sub>Te<sub>3</sub>/TiTe<sub>2</sub> superlattice based phase change memory*
- 11:45-12:10 **Invited Speaker:** Min Zhu – Shanghai Institute of Micro-System and Information Technology, China  
*Single-Element Switch*

12:10-12:30 BREAK

12:30-13:00 **AWARD CEREMONY & CLOSING**

13:00-14:00 LUNCH & END

## Poster Index

- P-01 Julian Mertens – RWTH Aachens University, Germany  
*Confinement induced coherent phonon softening in Sb<sub>2</sub>Te<sub>3</sub> thin films*
- P-02 Jaeyeon Kim – Yonsei University, Korea  
*Filamentary Threshold Switching in an Amorphous Ga<sub>2</sub>Te<sub>3</sub> Film*
- P-03 Roopali Shekhawat – Indian Institute of Science, India  
*Rhombohedral to Orthorhombic transformation in phase change GeTe-GeSe*
- P-04 Wansun Kim – Yonsei University, Korea  
*Threshold Switching of (ZnTe)<sub>x</sub>(CrTe)<sub>1-x</sub> Thin Films*
- P-05 Chang Woo Lee – Yonsei University, Korea  
*Phase change in GeTe/Sb<sub>2</sub>Te<sub>3</sub> superlattices: formation of the vacancy-ordered metastable cubic structure via Ge migration*
- P-06 Jeong Woo Jeon – Seoul National University, Korea  
*Fabrication of Vertical-type Phase-change Memory Using Atomic Layer Deposition*
- P-07 Byongwoo Park – Seoul National University, Korea  
*Atomic layer deposition (ALD) of GeSe<sub>2</sub> for ovonic threshold switch with a low off current density*
- P-08 Sangmin Jeon – Seoul National University, Korea  
*Enhanced Atomic Layer Deposition of Antimony-Trichalcogenides by Ammonia Co-injection*
- P-09 Wonho Choi – Seoul National University, Korea  
*Parallel Integration of nano-scale Atomic Layer Deposited Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> Phase-change Memory with Indium Gallium Zinc Oxide Thin-film Transistor*
- P-10 Gwangsik Jeon – Seoul National University, Korea  
*Atomic Layer Deposition of Manganese Telluride Thin Films for Phase-change Memory*
- P-11 Anthony Albanese – CEA-LETI, France  
*Amorphous Chalcogenide Thin Films: From Bonding Mechanism To On-Chip Highly Non-Linear Photonic Devices*
- P-12 Dasol Kim – Yonsei University, Korea  
*Reshape operating room for speed, energy, and reliability*
- P-13 Giuseppe D'Arrigo – CNR-IMM HQ, Italy  
*Innovative Graphene nano-electrodes for Phase Change Memory applications*
- P-14 Alain Portavoce – Aix-Marseille University / CNRS, IM2NP, France  
*Kinetic Monte Carlo simulations of Ge-rich GST thin film crystallization*
- P-15 Sebastian Walfort – University of Münster, Germany  
*Spanning femtoseconds to seconds in the photoinduced response of antimony thin films*
- P-16 Nur Qalishah Adanan – Singapore University of Technology and Design, Singapore  
*Amorphization dependent recrystallization of Sb<sub>2</sub>Te<sub>3</sub>*
- P-17 Yuyu Jiang – Singapore University of Technology and Design, Singapore  
*Compact high-speed on-chip microwave system: from the perspective of tunable passive devices*
- P-18 Guillaume Roland – Aix-Marseille University / CNRS, IM2NP, France  
*New insights in GeTe growth mechanisms*
- P-19 Arun Kumar – CNR-Institute for Microelectronics and Microsystems, Italy  
*Structural and Interface analysis of Ge-(Sb)-Te/Sb<sub>2</sub>Te<sub>3</sub> core-shell nanowires grown by MOCVD*
- P-20 Md Tashfiq Bin Kashem – University of Connecticut, USA  
*Modeling Phase Change Memory Devices*
- P-21 Nils Holle – University of Münster, Germany  
*Influence of density on elemental antimony glass*
- P-22 Flavia Righi Riva – University of Rome Tor Vergata, Italy  
*Interdiffusion at the interface in thermally stable Ge-Sb-Te heterostructures: a photoemission study*

## Poster Index

- P-23 Suyoun Lee – Korea Institute of Science and Technology, Korea  
*Gate-tunable three-terminal Ovonic threshold switch (OTS) for a highly-scalable artificial retinal ganglion cell (RGC)*
- P-24 Peter Kerres – RWTH Aachen University, Germany  
*Combinatorial Material Synthesis of Chalcogenides by Sputter Deposition: A case study of the Sb-Te Binary Line*
- P-25 Anbarasu Manivannan – Indian Institute of Technology Madras, India  
*Realization of Tunable Reflective Optical Limiter using GeTe Phase Change Material*
- P-26 George Braid – University of Exeter, United Kingdom  
*Lens Numerical Aperture Control with Phase-Change Metasurfaces*
- P-27 Joe Shields – University of Exeter, United Kingdom  
*Phase-change spatial light modulators with amplitude-only control*
- P-28 Jesse Luchtenveld – University of Groningen/IBM Research Zurich, The Netherlands  
*Phase-change properties of ultrathin PLD-fabricated GexSb100-x thin films*
- P-29 Jessy Paterson – CEA-LETI, France  
*Electronic and thermal transport in nanocomposite phase-change material thin films*
- P-30 Akash Patil – University of Lille, CNRS, France  
*Raman Thermometry Characterization of GeSbTe Based Phase Change Materials*
- P-31 Roman Stepanov – Herzen State Pedagogical University of Russia, Russia  
*Van der Waals interactions in ab-initio studies of two dimensional functional chalcogenides*
- P-32 Angel-Theodor Buruiana – National Institute of Material Physics, Romania  
*Exhaustive in-situ evaluation of phase transitions in GST 225 thin films*
- P-33 Yuxing Zhou – University of Oxford, United Kingdom  
*Ab initio molecular dynamics simulations of Ge-rich Ge–Sb–Te alloys*
- P-34 Hao Tong – Huazhong University of Science and Technology, China  
*Trade-off between multi-level characteristics and power consumption of high aspect ratio phase change memory*
- P-35 Samarth Aggarwal – University of Oxford, United Kingdom  
*Reconfigurable Silicon Carbide photonics using Phase Change Materials*
- P-36 Yuhan He – University of Oxford, United Kingdom  
*Ultra-Efficient Plasmonic Phase-Change Devices by Improved Mode Coupling*
- P-37 Utku Emre Ali – University of Oxford, United Kingdom  
*Phase Change Nanowires as Tunable NEMS*