



## CONFERENCE PROGRAM

***Sunday, March 18, 2018***

18:00-21:00 Getting together and conference registration at Four Points Hotel Sheraton

## CONFERENCE PROGRAM

### **Monday, March 19, 2018:**

08:00-18:00 Conference registration

09:00-17:55 Oral sessions

18:00-20:00 Poster session

## CONFERENCE OPENING

**Session Chairs: Claudia Wiemer, CNR-IMM and Davide Erbetta, STMicroelectronics**

09:00-09:10 WELCOME

09:10-09:55 INTRODUCTORY KEYNOTE PRESENTATION

01K ***More than Moore technology evolution from sand to cloud***

**Bruno Murari**

*STMicroelectronics, Agrate Brianza, Italy*

09:55-10:40 KEYNOTE PRESENTATION

02K ***Area selective atomic layer deposition: a bottom-up approach for patterning***

**Annelies Delabie**

*imec, Leuven, Belgium*

**10:40-11:10 Coffee break**

## SESSION 1: MEMORIES I

**Session Chairs: Sylvain Maitrejean, LETI and Massimo Longo, CNR IMM**

11:10-11:45 INVITED TALK

01MI ***Memory Devices: Status, Outlook and Challenges***

**Fabio Pellizzer**<sup>a</sup>, Andrea Redaelli<sup>b</sup>

<sup>a</sup> *Micron Technology, Technology Development, Boise (Idaho), United States*

<sup>b</sup> *Micron Technology, Technology Development, Vimercate (MB), Italy*

11:45-12:05 ***In-doped Sb nanowires grown by MOCVD for high speed phase change memories***

02MI **Raimondo Cecchini**<sup>a</sup>, S. Selmo<sup>a,b</sup>, C. Wiemer<sup>a</sup>, M. Fanciulli<sup>a,b</sup>, E. Rotunno<sup>c</sup>, L. Lazzarini<sup>c</sup>,  
M. Rigato<sup>d</sup>, D. Pogany<sup>d</sup>, A. Lugstein<sup>d</sup> and M. Longo<sup>a</sup>

<sup>a</sup> *CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy*

<sup>b</sup> *Dipartimento di Scienza dei Materiali, University of Milano Bicocca, Via R. Cozzi 53, 20126 Milano, Italy*

<sup>c</sup> *CNR-IMEM, Parco Area delle Scienze, 37, Parma, Italy*

<sup>d</sup> *Institute for Solid State Electronics, Vienna University of Technology, Floragasse 7, Vienna, Austria*

12:05-12:25 ***Flash lamp annealing of memristive BiFeO3 thin films simulated with COMSOL***

03MI ***Multiphysics***

**Danilo Bürger**<sup>a</sup>, Sagar Baitule<sup>b</sup>, Lars Rebohle<sup>c</sup>, Stefan E. Schulz<sup>a,c</sup>, Heidemarie Schmidt<sup>a,d</sup>

<sup>a</sup> *Fraunhofer-Institut für Elektronische Nanosysteme, Back-End of Line, 09126 Chemnitz, Germany*

<sup>b</sup> *Technische Universität Chemnitz, 09126 Chemnitz, Germany*

<sup>c</sup> *Helmholtz-Zentrum Dresden-Rossendorf, Institut für Ionenstrahlphysik und Materialforschung, 01314 Dresden, Germany*

<sup>d</sup> *Leibniz-Institut für Photonische Technologien e.V., (IPHT), 07745 Jena, Germany*

## CONFERENCE PROGRAM

12:25-13:00  
04MI INVITED TALK  
***Integrated phase-change photonics for memory and computing***  
**C. D. Wright<sup>a</sup>**, H. Bhaskaran<sup>b</sup>, W. H. P. Pernice<sup>c</sup>, Z. Cheng<sup>b</sup>, J. Feldmann<sup>c</sup>, N. Gruhler<sup>c</sup>, P. Hosseini<sup>b</sup>, C. Rios<sup>b</sup>, M. Stegmaier<sup>c</sup> and N. Youngblood<sup>b</sup>  
<sup>a</sup>*Department of Engineering, University of Exeter, EX4 4QF, UK*  
<sup>b</sup>*Department of Materials, University of Oxford, OX1 3PH, UK*  
<sup>c</sup>*Institute of Physics, University of Muenster, Muenster 48149, Germany*

13:00-14:00 Lunch

## SESSION 2: MEMORIES II

Session Chairs: Sylvain Maitrejean, LETI and Sabina Spiga, CNR IMM

14:00-14:35  
01MII INVITED TALK  
***Characteristics of Si doped ZrO<sub>2</sub> deposited by ALD for DRAM capacitor***  
Kunyoung Lee<sup>a</sup>, Woochool Jang<sup>a</sup>, Hyunjung Kim<sup>b</sup> and **Hyeongtag Jeon<sup>a,b</sup>**  
<sup>a</sup>*Division of Materials Science and Engineering, Hanyang University, Seoul 133-791, Korea*  
<sup>b</sup>*Division of Nano-scale Semiconductor Engineering, Hanyang University, Seoul 133-791, Korea*

14:35-14:55  
02MII ***Non-volatile memristive switching in multiferroic yttrium manganite thin films***  
**Venkata Rao Rayapati<sup>a</sup>**, Nan Du<sup>a</sup>, Danilo Bürger<sup>a</sup>, Rajkumar Patra<sup>a</sup>, Ilona Skorupa<sup>b</sup>, Ramona Ecke<sup>a</sup>, Stefan E. Schulz<sup>a,c</sup>, Heidemarie Schmidt<sup>a,d</sup>  
<sup>a</sup>*Fraunhofer-Institut für Elektronische Nanosysteme, Back-End of Line, 09126 Chemnitz, Germany*  
<sup>b</sup>*Institut für Ionenstrahlphysik und Materialforschung, Helmholtz-Zentrum Dresden-Rossendorf, 01314 Dresden, Germany*  
<sup>c</sup>*Zentrum für Mikrotechnologien (ZfM), Technische Universität Chemnitz, 09126 Chemnitz, Germany*  
<sup>d</sup>*Leibniz-Institut für Photonische Technologien e.V., (IPHT), 07745 Jena, Germany*

## SESSION 3 ADVANCED CHARACTERIZATION I

Session Chairs: Teodor Gotszal, Wrocław University and Claudia Wiemer, CNR-IMM

14:55-15:30  
01ACI INVITED TALK  
***Advanced characterization of chalcogenides and phase change materials for emergent non-volatile memory applications***  
**Magali Putero**  
*Aix Marseille Univ, CNRS, IM2NP, UMR 7334, Faculté des Sciences de Saint Jérôme, 13397 Marseille Cedex 20*

15:30-15:50  
02ACI ***Novel in-plane inspection of micron-thick DRAM wafer using Raman imaging for WOW application***  
**Tomoji Nakamura<sup>a</sup>**, Yoriko Mizushima<sup>a,b</sup>, Young suk Kim<sup>a</sup>, Shoichi Kodama<sup>a</sup>, and Takayuki Ohba<sup>a</sup>  
<sup>a</sup>*Tokyo Institute of Technology, 4259 Nagatsuta-cho, Midori-ku, Yokohama 226-8503, Japan*  
<sup>b</sup>*Fujitsu Laboratories Ltd., 10-1 Morinosato-Wakamiya, Atsugi 243-0197, Japan*

## CONFERENCE PROGRAM

- 15:50-16:10  
03ACI **Densification scaling versus substrate effects in Nanoindentation measurements of Porous low-k thin-films**  
Krystelle Lionti, Willi Volksen and **Geraud Dubois**  
IBM Research, Almaden Research Center, San Jose, California 95120, USA
- 16:10-16:40 **Coffee break**

## SESSION 4 NOVEL MEMS DEVICES

**Session Chairs: Stefan Schulz, Fraunhofer ENAS and David Wright, University of Exeter**

- 16:40-17:15  
01ND **INVITED**  
**PZT thin film integration at wafer level for MEMS applications**  
**Paolo Ferrarini**  
STMicroelectronics, via C. Olivetti 2, Agrate Brianza, Italy
- 17:15-17:35  
02ND **Empirical High Cycle Fatigue Life Prediction Model for Polysilicon MEMS**  
**C. C. Chang**, S. D. Lin and K. N. Chiang  
Advanced Microsystem Packaging and Nano-Mechanics Research Lab  
Dept. of Power Mechanical Engineering, National Tsing Hua University, Hsinchu 300, Taiwan, R.O.C
- 17:35-17:55  
03ND **Thermal Stress and Failure Analysis for a CMOS-MEMS Microphone with Various Metallization and Materials**  
**Chun-Lin Lu** and Meng-Kao Yeh  
Department of Power Mechanical Engineering, National Tsing Hua University  
Hsinchu 30013 Taiwan R.O.C.

## 18:00-20:00 POSTER SESSION

**Session Chairs: Claudia Wiemer, CNR-IMM and Davide Erbetta, STMicroelectronics**

### MEMORIES

- P1**  
**01PM** **Perovskite oxide memristor as artificial synapse in different learning algorithms**  
**M. Kiani<sup>a</sup>**, N. Du<sup>a</sup>, C. G. Mayr<sup>b</sup>, D. Bürger<sup>a</sup>, I. Skorupa<sup>a,c</sup>, S. E. Schulz<sup>d,f</sup>, O. G. Schmidt<sup>a,c</sup>, H. Schmidt<sup>a,d,e,g</sup>  
<sup>a</sup> Materials systems for Nanoelectronics, Chemnitz University of Technology, 09126 Chemnitz, Germany  
<sup>b</sup> Highly-parallel VLSI systems and Neuro-Microelectronics, Technische Universität Dresden, Mommsenstraße 12, 01069 Dresden, Germany  
<sup>c</sup> Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstraße 400, 01328 Dresden, Germany  
<sup>d</sup> Fraunhofer-Institut für Elektronische Nanosysteme, Abteilung Back-End of Line, Technologie-Campus 3, 09126 Chemnitz, Germany  
<sup>e</sup> Institute for Integrative Nanosciences, IFW Dresden, Dresden, Germany  
<sup>f</sup> Chemnitz University of Technology, Center for Microtechnologies, 09126 Chemnitz, Germany  
<sup>g</sup> Leibniz Institute of Photonic Technology, Albert-Einstein-Str. 9, 07745 Jena, Germany
- P2**  
**02PM** **Resistive switching dynamics in memristive BiFeO3**  
**Nan Du<sup>a,d</sup>**, Danilo Bürger<sup>a</sup>, Ilona Skorupa<sup>a,b</sup>, Oliver G. Schmidt<sup>a,c</sup>, Stephan E. Schulz<sup>d</sup>, Heidemarie Schmidt<sup>d,e</sup>

<sup>a</sup> Faculty of Electrical and Information Engineering, Chemnitz University of Technology, Im Technologiepark 25, Chemnitz 09126, Germany

<sup>b</sup> Institute of Ion Beam Physics and Materials Research, HZDR, Germany

<sup>c</sup> Institute for Integrative Nanosciences, Leibniz Institute for Solid State and Materials Research Dresden, Helmholtzstraße 20, 01069 Dresden, Germany

<sup>d</sup> Fraunhofer-Institut für Elektronische Nanosysteme, Technologie-Campus 3, 09126 Chemnitz, Germany

<sup>e</sup> Leibniz Institute of Photonic Technology, Albert-Einstein-Str. 9, 07745 Jena, Germany

**P3  
03PM** ***Influence of the chalcogen element on the filament stability in CuIn(Te,Se,S)2/Al2O3 filamentary switching devices***

**T. Ahmad<sup>a</sup>**, W. Devulder<sup>b</sup>, K. Opsomer<sup>b</sup>, M. Minjauw<sup>a</sup>, U. Celano<sup>b</sup>, T. Hantschel<sup>b</sup>, W. Vandervorst<sup>b</sup>, L. Goux<sup>b</sup>, G.S. Kar<sup>b</sup> and C. Detavernier<sup>a</sup>

<sup>a</sup> Ghent University, Dept. of Solid State Sciences, Krijgslaan 281 (S1), 9000 Ghent

<sup>b</sup> imec, Kapeldreef 75, B-3001 Leuven, Belgium

**P4  
04PM** ***Evaluation of structural and chemical properties of La2O3/CeO2 stacks by atomic layer deposition under in-situ annealing***

R. Piagge<sup>a</sup>, S. Spadoni<sup>a</sup>, S. Vangelista<sup>b</sup>, E. Ravizza<sup>a</sup>, G. Ghidini<sup>a</sup>, R. Ritasalo<sup>c</sup>, P. Jarvinen<sup>c</sup> and **A. Lamperti<sup>b</sup>**

<sup>a</sup> STMicroelectronics, Via C. Olivetti 2, Agrate Brianza, Italy

<sup>b</sup> CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy

<sup>c</sup> Picosun Oy, Tietotie 3, Espoo FI-02150, Finland

**P5  
05PM** ***In-situ evolution of stress in GeTe thin films during thermal annealing***

M. S. Amara<sup>a</sup>, M. Gallard<sup>a,b</sup>, C. Guichet<sup>a</sup>, **N. Burle<sup>a</sup>**, C. Mocuta<sup>b</sup>, S. Escoubas<sup>a</sup>, M. Putero<sup>a</sup>, B. Ben Yahia<sup>a</sup>, M.-I., Richard<sup>a,c</sup>, R. Chahine<sup>d</sup>, M. Bernard<sup>d</sup>, L. Fellouh<sup>d</sup>, C. Sabbione<sup>d</sup>, P. Noé<sup>d</sup>, O. Thomas<sup>a</sup>

<sup>a</sup> Aix Marseille Univ, Univ Toulon, CNRS, IM2NP UMR 7334, Campus de St-Jérôme, 13397 Marseille Cedex 20, France

<sup>b</sup> Synchrotron SOLEIL, l'Orme des Merisiers, Saint-Aubin-BP 48, 91192 Gif-sur-Yvette, France

**NOVEL DEVICES**

**P6  
01PND** ***Shock Loading Analysis for a MEMS Capacitive Microphone with Various Materials in Acoustic Plate***

**Pei-Rong Ni**, Chun-Lin Lu, and Meng-Kao Yeh

Department of Power Mechanical Engineering, National Tsing Hua University, Hsinchu 30013 Taiwan R.O.C.

**P7  
02PND** ***InRel-NPower Innovative Reliable Nitride-based Power Devices and applications***

**F. Geenen<sup>a</sup>**, F. Medjdoub<sup>b</sup>, M. Rittner<sup>c</sup>, E. Meissner<sup>d</sup>, J. Naundorf<sup>e</sup>, J. Derluyn<sup>f</sup>, P.

Moens<sup>g</sup>, P. Bleus<sup>h</sup>, C. Detavernier<sup>a</sup>, Y. Kangawa<sup>i</sup>, H. Miyake<sup>j</sup>, G. Meneghesso<sup>k</sup>

<sup>a</sup>Ghent University, Belgium

<sup>b</sup> Centre National de la Recherche Scientifique, France

<sup>c</sup> Robert Bosch GmbH, Germany

<sup>d</sup> Fraunhofer Institute for Integrated Systems and Device Technology, Germany

<sup>e</sup> Siemens, Germany

<sup>f</sup> EpiGaN, Belgium

<sup>g</sup> ON Semiconductor Belgium BVBA, Belgium

<sup>h</sup> CE+T, Belgium

<sup>i</sup> National University Corporation Kyushu University, Japan

<sup>j</sup> National University Corporation Mie; University, Japan

<sup>k</sup> Università degli Studi di Padova, Italy

- P8  
03PND** **Characterization of PZT seed layer by Chemical Solution Deposition probed at meso and nano-scale level**  
Simona Spadoni<sup>a</sup>, Paolo Ferrarini<sup>a</sup>, Carla Lazzari<sup>a</sup>, Luigi Avaro<sup>a</sup>, Davide Codegoni<sup>a</sup>, **Alessio Lamperti<sup>b</sup>**  
<sup>a</sup> STMicroelectronics, via C. Olivetti 2, Agrate Brianza, Italy  
<sup>b</sup> CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy
- P9  
04PND** **Platinum wire bonding on electroplated Pt antennas on Al<sub>2</sub>O<sub>3</sub> ceramic for wireless SAW temperature sensors**  
**Erik Brachmann**, Marietta Seifert, Gayatri K. Rane, Siegfried B. Menzel and Thomas Gemming  
IFW Dresden and SAWLab Saxony, P.O. Box 270116, D-01171 Dresden, Germany
- P10  
05PND** **Effect of sintering conditions on mechanical strength of Cu sintered joints for power module applications**  
Jong-Hoon Back<sup>a,b</sup>, Byung-Suk Lee<sup>a</sup>, Seung-Boo Jung<sup>b</sup> and **Jeong-Won Yoon<sup>a,c</sup>**  
<sup>a</sup> Welding and Joining R&D Group, Korea Institute of Industrial Technology (KITECH), 156 Gaetbeol-ro, Yeonsu-gu, Incheon 21999, Korea  
<sup>b</sup> School of Advanced Materials Science and Engineering, Sungkyunkwan University, 2066 Seobu-ro, Jangan-gu, Suwon, Gyeonggi-do 16419, Korea  
<sup>c</sup> Critical Materials and Semiconductor Packaging Engineering, University of Science and Technology (UST), 217 Gajeong-ro, Yuseong-gu, Daejeon 34113, Korea
- P11  
06PND** **Superfine inkjet printing of Platinum based IDT electrodes for surface acoustic wave devices**  
**S.B. Menzel<sup>a</sup>**, B. Kirbus<sup>a,b</sup>, E. Brachmann<sup>a</sup>, C. Hengst<sup>a</sup>  
<sup>a</sup> IFW Dresden and SAWLab Saxony, P.O. Box 27 01 16, D-01171 Dresden, Germany  
<sup>b</sup> TU Dresden, Institut für Angewandte Physik, Nöthnitzer Str. 61, D-01187 Dresden, Germany

### SILICIDES AND CONTACTS

- P12  
01PS** **Comparative phase formation study of Ni and Ni<sub>0.9</sub>Pt<sub>0.1</sub> stanogermanides during solid-state reaction**  
A. Quintero<sup>a,b</sup>, P. Gergaud<sup>a</sup>, J. Aubin<sup>a</sup>, J. M. Hartmann<sup>a</sup>, V. Loup<sup>a</sup>, V. Reboud<sup>a</sup>, F. Nemouchi<sup>a</sup>, E. Cassan<sup>b</sup> and **Ph. Rodriguez<sup>a</sup>**  
<sup>a</sup> Univ. Grenoble Alpes, F-38000 Grenoble, France  
CEA, LETI, MINATEC Campus, F-38054 Grenoble France.  
<sup>b</sup> Centre de Nanosciences et de Nanotechnologies, CNRS, Univ. Paris-Sud, Université Paris-Saclay, C2N - Orsay, 91405 Cedex, France
- P13  
02PS** **Impact of Si and Ge pre-amorphization implantation on NiPt silicide properties**  
**Ph. Rodriguez<sup>a</sup>**, L. Lachal<sup>a</sup>, M. Grégoire<sup>b</sup>, E. Ghegin<sup>b</sup>, R. Famulok<sup>a</sup>, M. Lemang<sup>a,b</sup>, J. Borrel<sup>b</sup>, S. Joblot<sup>b</sup>, M. Juhel<sup>b</sup>, K. Dabertrand<sup>b</sup>, F. Mazen<sup>a</sup> and F. Nemouchi<sup>a</sup>  
<sup>a</sup> Univ. Grenoble Alpes, F-38000 Grenoble, France  
CEA, LETI, MINATEC Campus, F-38054 Grenoble, France.  
<sup>b</sup> STMicroelectronics, 850 rue Jean Monnet, 38926 Crolles Cedex, France

### 3D INTEGRATION AND ADVANCED METALLIZATIONS SCHEMES

- P14  
01P3D** **Properties and Structure of Electroless Deposited Rhenium-rich Re-Co Thin Films**  
**Alexandra Inberg<sup>a</sup>**, Alla Duhin<sup>b</sup>, Noam Eliaz<sup>b</sup>, and Eliezer Gileadi<sup>c</sup>

<sup>a</sup>Department of Physical Electronics, Faculty of Engineering, Ramat-Aviv, Tel Aviv 69978, Israel.

<sup>b</sup> Department of Materials Science and Engineering, Faculty of Engineering, Tel-Aviv University, Ramat-Aviv, Tel Aviv 69978, Israel.

<sup>c</sup> School of Chemistry, Faculty of Exact Sciences, Tel-Aviv University, Ramat-Aviv, Tel Aviv 69978, Israel.

**P15** **New Cu(NbC) Film and its Characteristics**

**02P3D** **Chon-Hsin Lin**

Center for Generation Education, Asia-Pacific Institute of Creativity, Toufen, Miaoli 351, Taiwan

**P16** **Anneal for CVD Tungsten Layers for the Reduction of the Wafer Bow respectively Film Stress and the Resistance**

**03P3D**

**Tom Schröder**, Thomas Bertrams, Axel Bürke

Infineon Technologies Dresden GmbH, Königsbrücker Straße 180, Dresden, 01099, Germany

**P17** **Stress-induced distortion of low-k dielectric nano-patterns**

**04P3D**

**Houman Zahedmanesh**, Zsolt Tókei

imec, Kapeldreef 75, Leuven, 3001, Belgium

**P18** **Investigation of a patterning regime for copper by using inductive coupled methane-hydrogen based plasma**

**05P3D**

**M. Haase**<sup>a</sup>, M. Alhousseini<sup>b</sup>, R. Ecke<sup>a</sup> and S.E. Schulz<sup>a,b</sup>

<sup>a</sup> Fraunhofer Institute for Electronic Nano Systems ENAS, Technologie-Campus 3, D-09126 Chemnitz, Germany

<sup>b</sup> Chemnitz University of Technology, Reichenhainer Strasse 70, D-09107 Chemnitz, Germany

**P19** **Electrochemical Analysis of Semiconductor Plating Baths**

**06P3D**

**Michael Pavlov**, Danni Lin, Eugene Shalyt and Isaak Tsimberg

ECI Technology, 60 Gordon Drive, Totowa, NJ, USA

**ADVANCED CHARACTERIZATION**

**P20** **In-situ Young's Modulus Measurements on M1-M5 BEoL Cantilevers**

**01PAC**

**C. Sander**<sup>a</sup>, H. Rajendran<sup>a</sup>, M. Löffler<sup>b</sup>, Y. Standke<sup>a</sup>, A. Clausner<sup>a</sup>, M. Kraatz<sup>a</sup>, M. Gall<sup>a</sup>, E. Zschech<sup>a</sup>

<sup>a</sup> Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany

<sup>b</sup> Dresden Center for Nanoanalysis DCN, TU Dresden, Dresden, Germany

**P21** **Pore topology of organosilicate glass studied by positron annihilation experiments and positronium migration modeling**

**02PAC**

**M. Kraatz**<sup>a</sup>, C. Sander<sup>a</sup>, A. Clausner<sup>a</sup>, M. O. Liedke<sup>b</sup>, M. Butterling<sup>b</sup>, A. Wagner<sup>b</sup>, W. Anwand<sup>b</sup>, M. Gall<sup>a</sup>, R. Krause-Rehberg<sup>c</sup>, E. Zschech<sup>a</sup>

<sup>a</sup> Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany

<sup>b</sup> Institute of Radiation Physics, Helmholtz Center Dresden-Rossendorf, Dresden, Germany

<sup>c</sup> Department of Physics, Martin Luther University Halle-Wittenberg, Halle, Germany

**ALD: METALS, SAMs, SALD, 2D**

**P22** **A Method to Pattern Tight Tip-to-Tip in 32nm-Pitch N5 Interconnect Using Ru Area Selective Deposition Tone Inversion Process**

**01PALD**

**Basoene Briggs**, Job Soethoudt, Annelies Delabie, Chris Wilson, Zsolt Tokei, Juergen Boemmels, Farid Sebaai, Christophe Lorant, Hubert Hody  
*Imec, Kapeldreef 75, 3001 Heverlee, Belgium*

**P23**  
**02PALD**      ***Investigation of sequential infiltration synthesis of Al<sub>2</sub>O<sub>3</sub> in polymer thin films using dynamic in situ spectroscopic ellipsometry***

**E. Cianci**<sup>a</sup>, D. Nazzari<sup>a,b</sup>, G. Seguini<sup>a</sup> and M. Perego<sup>a</sup>

<sup>a</sup> *CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy*

<sup>b</sup> *Department of Physics, Università Statale di Milano, Via G. Celoria 16, 20133, Milano (Mi), Italy*

**P24**  
**03PALD**      ***Characterisation of self-assembled monolayers for Cu-Cu bonding technology***

**M. Lykova**<sup>a</sup>, K. Hinrichs<sup>b</sup>, E. Langer<sup>c</sup>, I. Panchenko<sup>a,d</sup>, U. Künzelmann<sup>c</sup>, M. J. Wolf<sup>d</sup> and K.-D. Lang<sup>e</sup>

<sup>a</sup> *Institute of Electronic Packaging Technology (IAVT), TU Dresden, 01062 Dresden, Germany*

<sup>b</sup> *Leibniz-Institut für Analytische Wissenschaften – ISAS – e. V., Schwarzschildstr. 8, 12489 Berlin, Germany*

<sup>c</sup> *Institute of Semiconductors and Microsystems (IHM), TU Dresden, 01062 Dresden, Germany*

<sup>d</sup> *All Silicon System Integration Dreuboisssden (IZM-ASSID), Fraunhofer Institute for Reliability and Microintegration (IZM), Ringstr. 12, 01468 Dresden, Germany*

<sup>e</sup> *Fraunhofer Institute for Reliability and Microintegration (IZM), Gustav-Meyer-Allee 25, 13355 Berlin, Germany*

**P25**  
**04PALD**      ***Influence of MoOx film precursor in the growth of few layers MoS2 by chemical vapor deposition***

**C. Martella**<sup>a,b</sup>, M. Alia<sup>a</sup>, E. Cianci<sup>a</sup>, A. Lamperti<sup>a</sup>, M. Longo<sup>a</sup>, and A. Molle<sup>a</sup>

<sup>a</sup> *CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy*

<sup>b</sup> *CNR-ISC, U.O.S. Sapienza, Roma I-00185, Italy*



**Tuesday March 20, 2018**

08:30- 18:05 Oral sessions

20:00-23:00 Conference dinner

**SESSION 5 SILICIDES I**

**Session chairs: Christophe Detavernier, Ghent University and Olivier Thomas, IM2NP**

08:30-09:05 INVITED TALK

01SI

***Evolution of thin film silicides – correlating morphology and texture***

**F. Geenen<sup>a</sup>**, B. de Schutter<sup>a</sup>, K. De Keyser<sup>a</sup>, D. Deduytsche<sup>a</sup>, C. Lavoie<sup>b</sup>, C. Detavernier<sup>a</sup>

<sup>a</sup> CoCooN, dep. Solid state sciences, Ghent University, Belgium

<sup>b</sup> IBM T.J. Watson Research Center, Yorktown Heights, NY, USA

09:05-09:25

02SI

***Low temperature formation of NiSi<sub>2</sub> during the reaction between Ni(W) and Si(001)***

**T. Luo<sup>a</sup>**, H. Zschiesche<sup>a</sup>, C. Girardeaux<sup>a</sup>, C. Alfonso<sup>a</sup>, D. Mangelinck<sup>b</sup>

<sup>a</sup> Aix-Marseille University, CNRS, IM2NP, Faculté Saint Jérôme, Case 142, 13397 Marseille Cedex 20, France

<sup>b</sup> CNRS, Aix-Marseille University, IM2NP, Faculté Saint Jérôme, Case 142, 13397 Marseille Cedex 20, France

09:25-09:45

03SI

***Redistribution of phosphorus during NiPtSi formation on in-situ doped Si***

**M. Lemang<sup>a,b,c</sup>**, Ph. Rodriguez<sup>b</sup>, F. Nemouchi<sup>b</sup>, M. Juhel<sup>a</sup>, M. Grégoire<sup>a</sup> and D. Mangelinck<sup>c</sup>

<sup>a</sup> STMicroelectronics, 850 rue Jean Monnet, 38926 Crolles cedex, France

<sup>b</sup> Univ. Grenoble Alpes, F-38000 Grenoble, France CEA, LETI, MINATEC Campus, F-38054 Grenoble, France.

<sup>c</sup> CNRS, Aix Marseille Université, IM2NP (UMR 7334) Faculté de Saint-Jérôme, F-13397 Marseille Cedex, France

09:45-10:05

04SI

***Low Contact Resistivity between Co and n-Si with a CoTix Interface Layer***

**Maryamsadat Hosseini**, Mohsen Saadatmand, Daisuke Ando, Yuji Sutou and Junichi Koike

Department of Materials Science, Tohoku University, Sendai 980-8579, Japan

**10:05-10:35**

**Coffee break**

**SESSION 6 SILICIDES II**

**Session chairs: Davide Erbetta, STMicroelectronics and Filip Geenen, Ghent University**

10:35-10:55

01SII

***Nucleation-controlled texture growth in intermetallic formed by solid-state reaction of Ni with In<sub>0.53</sub>Ga<sub>0.47</sub>As***

Jayanth Channagiri, Seifeddine Zhiou, Philippe Rodriguez, Fabrice Nemouchi and **Patrice Gergaud**

Univ. Grenoble Alpes, F-38000 Grenoble, France

CEA, LETI, MINATEC Campus, F-38054 Grenoble, France

10:55-11:15

02SII

***Improved Ti Germanosilicidation by Ge Pre-amorphization Implantation (PAI) for Advanced Contact Technologies***

Shujuan Mao<sup>a,b</sup>, Jing Xu<sup>a</sup>, Guilei Wang<sup>a</sup>, Dan Zhang<sup>a,b</sup>, Xue Luo<sup>a,b</sup>, Ningyuan Duan<sup>a,b</sup>, Shi Liu<sup>a</sup>, Wenwu Wang<sup>a,b</sup>, Dapeng Chen<sup>a</sup>, Junfeng Li<sup>a</sup>, Chao Zhao<sup>a,b</sup>, Tianchun Ye<sup>a,b</sup> and **Jun Luo<sup>a,b</sup>**

<sup>a</sup>Key Laboratory of Microelectronic Devices & Integrated Technology, Institute of Microelectronics, Chinese Academy of Sciences, Beijing 100029, China

<sup>b</sup>University of Chinese Academy of Sciences (UCAS), Beijing 100049, P. R. China

- 11:15-11:35 ***Ti ohmic contacts to p-InGaAs: Phase formation sequence and electrical results***  
 03SII S. Bensalem<sup>a</sup>, E. Ghegin<sup>b</sup>, F. Boyer<sup>b</sup>, M. Pasquali<sup>a</sup>, J. L. Lábár<sup>c</sup>, M. Menyhárd<sup>c</sup>, S. Favier<sup>a,b</sup>, P. Gergaud<sup>a</sup>, F. Nemouchi<sup>a</sup> and **Ph. Rodriguez<sup>a</sup>**  
<sup>a</sup> Univ. Grenoble Alpes, F-38000 Grenoble, France  
 CEA, LETI, MINATEC Campus, F-38054 Grenoble, France.  
<sup>b</sup> STMicroelectronics, 850 rue Jean Monnet, 38926 Crolles Cedex, France  
<sup>c</sup> MTA EK MFA, Konkoly Thege M. u. 29-33, H-1121 Budapest, Hungary

## SESSION 7 ADVANCED CHARACTERIZATION II

Session chairs: Grazia Tallarida, CNR-IMM and Magali Putero, IM2NP

- 11:35-12:10 INVITED TALK  
 01ACII ***Nanometrology using scanning thermal microscopy (SThM) methods***  
**T. Gotszalk<sup>a</sup>**, M. Rudek<sup>a</sup>, P. Janus<sup>b</sup>,  
<sup>a</sup> Wrocław University of Science and Technology, Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland  
<sup>b</sup> Institute of Electron Technology, Al. Lotników 32/46, 02-668 Warsaw, Poland
- 12:10-12:30 ***Lateral growth of NiSi at the epitaxial  $\vartheta$ -Ni<sub>2</sub>Si/Si(100) interface: experiments and modelling.***  
 02ACII **D. Mangelinck<sup>a</sup>**, M. El Kousseifi<sup>a</sup>, K. Hoummada<sup>a</sup>, F. Panciera<sup>a</sup>, T. Epicier<sup>b</sup>  
<sup>a</sup> IM2NP, CNRS, Aix-Marseille Université, faculté de saint Jérôme, 13397 Marseille Cedex 20, France  
<sup>b</sup> Univ. Lyon, INSA de Lyon, MATEIS, UMR 5510, Bât. B. Pascal, F-69621 Villeurbanne, France
- 12:30-12:50 ***Localization of Ti as an alloying element in the formation of CoSi<sub>2</sub> by the combination of APT and TEM***  
 03ACII **H. Zschiesche**, C. Alfonso, D. Mangelinck  
 IM2NP - CNRS, Aix-Marseille University, Faculté des Sciences de Saint-Jérôme, F-13397 Marseille, France
- 12:50-13:50 Lunch**

## SESSION 8 3D INTEGRATION AND ADVANCED METALLIZATIONS SCHEMES I

Session chairs: Christoph Wilson, IMEC and Yosi Shacham D., Tel Aviv University

- 13:50-14:25 INVITED TALK  
 013DI ***Direct bonding and 3D applications***  
**F. Fournel<sup>a,b</sup>**, H. Moriceau<sup>a,b</sup>, V. Larrey<sup>a,b</sup>, F. Rieutord<sup>b,c</sup>, C. Morales<sup>a,b</sup>, C. Mauguen<sup>a,b</sup>, C. Bridoux<sup>a,b</sup>  
<sup>a</sup> CEA, Leti, Minatec Campus, F-38054 Grenoble France  
<sup>b</sup> Univ. Grenoble Alpes, F-38000 Grenoble France  
<sup>c</sup> CEA, INAC, Minatec Campus, F-38054 Grenoble, France
- 14:25-14:45 ***Impact of Back-End-Of-Line architecture on Chip-Package-Interaction in advanced interconnects using shear microprobing and finite element simulations***  
 023DI **Kris Vanstreels**, Houman Zahedmanesh, Mario Gonzalez  
 imec, Kapeldreef 75, B-3001 Leuven, Belgium
- 14:45-15:05 ***Low temperature Fluorine-Free MOCVD Copper seed layer deposition for High Aspect Ratios TSV for 3D Integration***  
 033DI

**Sabrina Fadloun**<sup>a</sup>, Dean Stephens<sup>b</sup>, Elisabeth Blanquet<sup>c</sup>, Thierry Mourier<sup>d</sup>, Ioana Nuta<sup>c</sup>, Stéphane Minoret<sup>d</sup>, Chris Jones<sup>b</sup>, Steve Burgess<sup>b</sup>, Laurent Vandroux<sup>d</sup>  
<sup>a</sup> SPTS SAS, Inovallée - Bat B 445, rue Lavoisier, Montbonnot, 38330, France.  
<sup>b</sup> SPTS, Ringland Way, Newport, Gwent, NP18 2TA, UK.  
<sup>c</sup> Univ. Grenoble Alpes, Grenoble INP, SIMaP, 38000 Grenoble France.  
<sup>d</sup> CEA, LETI, MINATEC Campus, 17 rue des Martyrs, 38054, Grenoble Cedex 9, France.

15:05-15:25 **Analysis of the mechanical integrity of nano-interconnects; A novel approach inspired by composite mechanics**

043DI

**Houman Zahedmanesh**, Kris Vanstreels, Mario Gonzalez  
 imec, Kapeldreef 75, B-3001 Leuven, Belgium

15:25-15:55 **Coffee break**

## SESSION 9 3D INTEGRATION AND ADVANCED METALLIZATIONS SCHEMES II

Session chairs: Ohba Takayuki, Tokio Institute of Technology and Frank Fournel, LETI

15:55-16:30 INVITED TALK

013DII

**Multilayer Electroless and Electrochemical Plating on 2D and 3D Printed Flexible Devices**  
**Yosi Shacham-Diamand**<sup>a</sup>, Richa Pandey<sup>a</sup>, Stav Freidberg<sup>a</sup>, Sagiv Kleinman<sup>a</sup>, Matteo Beggiano<sup>b</sup>, Danilo Demarchi<sup>b</sup>, Chloé Minnai<sup>c</sup>, Paolo Milani<sup>c</sup>, Yelena Sverdlov<sup>a</sup>  
<sup>a</sup>Dept. of Physical Electronics, Faculty of Engineering, Tel Aviv University, Tel-Aviv, Israel.  
<sup>b</sup>Dept. of Electronics and Telecommunications, Politecnico di Torino, Torino 10129, Italy  
<sup>c</sup>Cimaina and Dept. of Physics, University of Milano, via Celoria 16, 20133 Milano, Italy

16:30-16:50

023DII

**Additional Siconi<sup>TM</sup> Pre-clean for Reliable TiSix Contacts in Advanced Imager Technologies**

**M. Grégoire**<sup>a</sup>, B. Horvat<sup>a</sup>, B.N. Bozon<sup>b</sup>, D. Combe<sup>a</sup>, K. Dabertrand<sup>a</sup>, and D. Roy<sup>a</sup>  
<sup>a</sup> STMicroelectronics, 850, rue Jean Monnet, 38926, Crolles cedex, France  
<sup>b</sup> Applied Materials France, 864 Chemin des Fontaines, 38190 Bernin

16:50-17:25

033DII

INVITED TALK

**RC Modeling, Scaling Trends and Mitigation Approaches**

**I. Ciofi**, Ph. J. Roussel, R. Baert, A. Contino, A. Gupta, K. Croes, C. J. Wilson, D. Mocuta and Z. Tókei  
 imec, Kapeldreef 75, B-3001 Leuven, Belgium

17:25-17:45

043DII

**New copper-based interconnections for high power AlGaN/GaN transistors**

**M. Guziewicz**<sup>a</sup>, K. Pagowska<sup>a</sup>, A. Laszcz<sup>a</sup>, M. Wzorek<sup>a</sup>, K. Kruszka<sup>a</sup>, J. Dyczewski<sup>b</sup>, and M. Mysliwiec<sup>c</sup>  
<sup>a</sup> Institute of Electron Technology, Warsaw, 02-668, Al. Lotników 32/46, Poland  
<sup>b</sup> Institute of Physics, Polish Academy of Sciences, Al. Lotników 32/46, 02-668 Warsaw, Poland  
<sup>c</sup> Central Laboratory of CEZAMAT, WUT, Warsaw, 02-822, Poleczki 19, Poland

17:45-18:05

053DII

**Observation of structure dependent seed layer resistance and its impact on the electrochemical copper deposition**

**M. Wislicenus**<sup>a</sup>, L. Gerlich<sup>a</sup>, J. Koch<sup>a</sup>, B. Uhlig<sup>a</sup>, A. Preusse<sup>b</sup>, J. W. Bartha<sup>c</sup>  
<sup>a</sup> Fraunhofer IPMS, Center Nanoelectronic Technologies Dresden CNT, Königsbrücker Str. 178, 01099 Dresden, Germany  
<sup>b</sup> GLOBALFOUNDRIES Module One LLC Co. KG, Wilschdorfer Landstr. 101, 01109 Dresden, Germany  
<sup>c</sup> IHM, Dresden University of Technology, Nöthnitzer Str. 64, 01187 Dresden, Germany

CONFERENCE PROGRAM

***Conference Dinner 20:00-23:00***

**Wednesday March 21, 2018**

08:30-15.55 Oral sessions

15:55-17.30 Panel discussion

17.30-18:00 Conference closing

**SESSION 10 METALS AND ALD**

**Session chairs: Annelies Delabie, IMEC and Elena Cianci, CNR-IMM**

- 08:30-09:05 INVITED TALK  
01MALD ***New Precursors and Chemistry for the Low Temperature, Thermal Atomic Layer Deposition of Electropositive Metal Thin Films***  
**Charles H. Winter<sup>a</sup>**, Marissa M. Kerrigan<sup>a</sup>, Joseph P. Klesko<sup>a</sup>, and Kyle J. Blakeney<sup>a</sup>  
<sup>a</sup> *Department of Chemistry, Wayne State University, Detroit, Michigan 48202, USA*
- 09:05-09:25 ***In vacuo investigations on the growth of tantalum-based thin films with plasma-enhanced atomic layer deposition***  
02MALD **J. Reif<sup>a</sup>**, M. Knaut<sup>a</sup>, M. Albert<sup>a</sup>, J.W. Bartha<sup>a</sup>  
<sup>a</sup> *Technische Universität Dresden, Institute of Semiconductors and Microsystems, 01062 Dresden, Germany*
- 09:25-09:45 ***Investigation of Co Thin Films as an Alternative Seed Layer for TSV Metallization***  
03MALD **S. Esmaili<sup>a</sup>**, K. Lilienthal<sup>a</sup>, N. Nagy<sup>a</sup>, L. Gerlich<sup>a</sup>, B. Uhlig<sup>a</sup> and R. Krause<sup>a</sup>  
<sup>a</sup> *Fraunhofer Institute of Photonic Microsystems, Center of Nanoelectronic Technology (CNT), Dresden, Germany*
- 09:45-10:05 ***Wet-chemical deposition of alternative metals***  
04MALD **H. Philipsen<sup>a</sup>**, W. Monnens<sup>a,b</sup>, L. Gnocchi<sup>a,c</sup>, M. Pedrali<sup>a,c</sup>, T. Berthuit<sup>a,d</sup>, E. Imhof<sup>a,e</sup> and S. Armini<sup>a</sup>  
<sup>a</sup> *imec, Kapeldreef 75, B-3001 Leuven, Belgium*  
<sup>b</sup> *KU Leuven, Leuven, Belgium*  
<sup>c</sup> *Politecnico di Milano, Milan, Italy*  
<sup>d</sup> *INP-Phelma, Grenoble, France*  
<sup>e</sup> *Technische Universiteit Eindhoven, Eindhoven, The Netherlands*
- 10:05-10:35 Coffee break**

**SESSION 11 SELECTIVE AREA DEPOSITION AND SELF ASSEMBLED MONOLAYERS**

**Session chairs: Markku Leskela, Helsinki University and Hyeongtag Jeon, Hanyang University**

- 10:35-11:10 INVITED TALK  
01SALD ***Boron Nitride EE-ALD at Room Temperature and Prospects for Selective Area Deposition***  
**Andrew S. Cavanagh<sup>a</sup>**, Jaclyn K. Sprenger<sup>a</sup>, Huaxing Sun<sup>a</sup>, Alexana Roshko<sup>b</sup>, Paul Blanchard<sup>b</sup> and Steven M. George<sup>a,c</sup>  
<sup>a</sup> *Department of Chemistry and Biochemistry, University of Colorado, Boulder, CO 80309 USA*  
<sup>b</sup> *National Institute of Standards and Technology, Boulder, CO 80305 USA*  
<sup>c</sup> *Department of Mechanical Engineering, University of Colorado, Boulder, CO 80309 USA*

## CONFERENCE PROGRAM

- 11:10-11:30  
02SALD **Area-selective grafting of siloxane molecules on low-k dielectric with respect to copper surface**  
**A. Rezvanov**<sup>a, b, c</sup>, I. Zyulkov<sup>a, d</sup>, E.S. Gornev<sup>b, c</sup>, J. F. de Marneffe<sup>a</sup>, S. Armini<sup>a</sup>  
<sup>a</sup> imec, Kapeldreef 75, Leuven, B-3001, Belgium  
<sup>b</sup> Moscow Institute of Physics and Technology (State University), Institutskiy per. 9, Dolgoprudny, 141700, Russia  
<sup>c</sup> Molecular Electronics Research Institute, 1-y Zapadny Proezd 12/1, Zelenograd, Moscow, 124460, Russia  
<sup>d</sup> KU Leuven, Department of Chemistry, Faculty of Science, Leuven, B-3001, Belgium
- 11:30-11:50  
03SALD **Vapor Phase Thiol Self-Assembled Monolayers for ALD Blocking**  
**Sebastian J. F. Herregods**<sup>a</sup>, Laurent Lecordier<sup>b</sup>, Tinne Delande<sup>a</sup>, Zsolt Tokei<sup>a</sup>, Herbert Struyf<sup>a</sup>, Silvia Armini<sup>a</sup>  
<sup>a</sup> imec, Kapeldreef 75, B-3001 Leuven, Belgium  
<sup>b</sup> Ultratech/CNT, USA
- 11:50-12:10  
04SALD **XPS and KPFM metrology of Self-Assembled Monolayer Barrier for Cu Metallization**  
**Rakefet Ofek Almog**<sup>a, b</sup> Kian Kadan<sup>b</sup>, Yelena Sverdlov<sup>b</sup>, Larisa Burstein<sup>c</sup>, Ronen Dagan<sup>b</sup> and Yosi Shacham-Diamand<sup>b</sup>  
<sup>a</sup> Department of Advanced Materials Engineering, Azrieli College of Engineering, Jerusalem, Israel  
<sup>b</sup> Department of Physical Electronics, School of Electrical Engineering, Faculty of Engineering, Tel-Aviv University, Ramat Aviv, 69978, Israel  
<sup>c</sup> Wolfson Applied Materials Research Center, Tel Aviv University, Ramat Aviv 69978, Israel
- 12:10-12:30  
05SALD **Metal-barrier induced damage in self-assembly based organosilica low-k dielectrics and its reduction by surfactant residues**  
**M. Krishtab**<sup>a, b</sup>, J-F. de Marneffe<sup>b</sup>, S. Armini<sup>b</sup>, C. Wilson<sup>b</sup>, S. De Gendt<sup>a</sup>  
<sup>a</sup> Department of Chemistry, University of Leuven, 3000 Leuven, Belgium  
<sup>b</sup> imec, Kapeldreef 75, B-3001 Leuven, Belgium
- 12:30-12:50  
06SALD **Area-selective deposition of low-k materials by means of the sol-gel method**  
**M. Redzheb**<sup>a</sup>, M. Pasquali<sup>a, b</sup>, S. Armini<sup>a</sup>  
<sup>a</sup> imec, Kapeldreef 75, B-3001 Leuven, Belgium  
<sup>b</sup> Department of Chemistry, KU Leuven, Celestijnenlaan 200f, 3001 Leuven, Belgium
- 12:50-13:50 Lunch**

## SESSION 12: ALD AND 2D MATERIALS

Session chairs: Andrew Cavanagh, University of Colorado and Alessandro Molle, CNR-IMM

- 13:50-14:25  
01ALD2D INVITED TALK  
**Atomic Layer Deposition of Transition Metal Dichalcogenide 2D Materials**  
Miika Mattinen<sup>a</sup>, Jani Hämäläinen<sup>a</sup>, Peter King<sup>a</sup>, Timo Hatanpää<sup>a</sup>, Marko Vehkamäki<sup>a</sup>, Kristoffer Meinander<sup>b</sup>, Kenichiro Mizohata<sup>b</sup>, Jyrki Räisänen<sup>b</sup>, Mikko Ritala<sup>a</sup>, and **Markku Leskelä**<sup>a</sup>  
<sup>a</sup>Department of Chemistry, PO Box 55, University of Helsinki, FI-00014 Helsinki, Finland  
<sup>b</sup>Department of Physics, PO Box 43, University of Helsinki, FI-00014 Helsinki, Finland
- 14:25-14:45  
02ALD2D **The route to X-enes transistors: from silicene to phosphorene**  
**C. Grazianetti**<sup>a</sup>, L. Tao<sup>b</sup>, D. Akinwande<sup>b</sup>, A. Molle<sup>a</sup>  
<sup>a</sup> CNR-IMM Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy  
<sup>b</sup> Microelectronics Research Center, The University of Texas at Austin, TX-78758, U.S.A.

CONFERENCE PROGRAM

- 14:45-15:05  
03ALD2D      ***Ab initio simulation of electronic and optical properties of Silicene nanoribbons***  
M. Ferri<sup>a,b</sup>, G.Fratesi<sup>a</sup>, G.Onida<sup>a</sup>, **A. Debernardi<sup>b</sup>**  
<sup>a</sup> *Università degli Studi di Milano, via Celoria, Milano, Italy*  
<sup>b</sup> *CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, Agrate Brianza, Italy*
- 15:05-15:25  
04ALD2D      ***Combining electrical AFM techniques for the study of exfoliated MoS2 devices***  
**Marco Mascaro<sup>a,c</sup>**, Umberto Celano<sup>a</sup>, Yashwanth Balaji<sup>b,c</sup>, Jonathan Ludwig<sup>a,c</sup>, Kristof Paredis<sup>a</sup>, Inge Asselberghs<sup>c</sup>, Iuliana Radu<sup>c</sup> and Wilfried Vandervorst<sup>a,c</sup>  
<sup>a</sup> *KU Leuven, Department of Physics and Astronomy (IKS), Celestijnenlaan 200D, 3001 Leuven, Belgium*  
<sup>b</sup> *KU Leuven, Department of Electrical Engineering (ESAT), Kasteel Arenberg 10, 3001 Leuven, Belgium*  
<sup>c</sup> *imec, Kapeldreef 75, B-3001 Leuven, Belgium*
- 15:25-15:55      Coffee break**
- 15:55-17:30      Panel discussion and awards
- 17:30-18:00      Conference Closing