

# Scientific Program WOCSDICE 2011

**Sunday May 29<sup>th</sup> 2011**

**17:00-19:00 Registration**  
**19:00-20:30 Welcome Reception**

**Monday May 30<sup>th</sup> 2011**

**8:00 Registration**  
**8:20-8:40 Welcome and Conference Opening**

**Session 1 (In,Ga)As devices and In(P,Sb) devices**  
**(Chair Prof. Hans Hartnagel - TU Darmstadt, Germany)**

8:40-9:00 **Franco Giannini** (University of Tor Vergata, Roma, Italy)  
**Invited** *Being Seventy-five still Young: The Doherty Power Amplifier*

9:00-9:10 **Ion Oprea** (Technische Universität Darmstadt, Germany)  
*Analysis of thermal dissipation for mm-wave frequency multipliers using GaAs Schottky Diodes*

9:10-9:20 **Benedetto Pasciuto** (University of Tor Vergata, Roma, Italy)  
*Advanced PHEMT GaAs E/D technology, modeling and characterisation*

9:20-9:30 **Andrea Bentini** (University of Tor Vergata, Roma, Italy)  
*C-Band MMIC Chipset and Digital Control Circuits for T/R Modules based on GaAs Enhancement/Depletion Technology*

9:30-9:40 **Paolo Romanini** (Selex Sistemi Integrati SpA, Roma, Italy)  
*High level of automated process for Broadband and X-band MMIC's production*

9:40-9:50 **Giuseppe Moschetti** (Chalmers University of Technology, , Göteborg, Sweden)  
*Anisotropic transport of InAs/AlSb heterostructures grown on InP substrates*

9:50-10:00 **Werner Prost** (University Duisburg-Essen, Germany)  
*Sample-and-hold circuits using InAs nanowire FETs*

10:00-10:10 **Andreas Westlund** (Chalmers University of Technology, Göteborg, Sweden)  
*Fabrication and characterization of InGaAs slot diodes*

10:10-10:20 **Koichi Maezawa** (University of Toyama, Japan)  
*Characterization of InSb MOS diodes on Si substrates prepared by surface reconstruction controlled epitaxy*

10:20-10:30 **Mirja Richter** (IBM Research – Zurich, Switzerland)  
*Development of (In,Ga)As-MOSFETs: High-k gate stacks and options for integration on silicon*

**10:30-11:00 COFFEE BREAK**

**Session 2 Microwaves and terahertz devices and technology**  
**(Chair Prof. Dimitris Pavlidis - TU Darmstadt, Germany)**

11:00-11:20 **Roger A. Lewis** (University of Wollongong, Australia)  
**Invited** *Terahertz generation in compound semiconductors*

11:20-11:30 **Daniel Schönherr** (Technical University Darmstadt Germany)  
*Electro-optic detection of continuous wave THz radiation*

11:30-11:40 **Hans Hartnagel** (Technical University Darmstadt Germany)  
*Microwave Circuits affected by Passive Inter-Modulation in Communication Satellites*

11:40-11:50 **Farid Medjdoub** (IEMN, Villeneuve d'ascq, France)  
*SiN/AlN/GaN: A promising heterostructure for millimeter wave applications*

11:50-12:00 **Jonathan Felbinger** (Chalmers University of Technology, Göteborg, Sweden)  
*Al<sub>0.5</sub>Ga<sub>0.5</sub>N/AlN/GaN HEMTs for Microwave Applications*

12:00-12:10 **Judith Spiegel** (Chalmers University of Technology, Göteborg, Sweden)  
*Design and characterization of GaN HEMT varactors for reconfigurable MMICs*

12:10-12:20 **Grigory Simin** (University of South Carolina, Columbia, USA)  
*Power III-Nitride devices with frequency-configurable elements*

12:20-12:30 **Cezary Sydlo** (Technische Universität Darmstadt, Germany)

- 12:30-12:40 *Demonstration of RTD oscillations beyond tunnel-lifetime limit*  
**Moumita Mukherjee** (University of Calcutta, India)  
*Full-Scale Non-Linear Analysis of III-V Nitride Based Transit Time Diode for High-Power Generation in the Terahertz Regime*
- 12:40-13:00 **Mircea Dragoman** (IMT, Bucharest, Romania)  
**Invited** *Graphene devices for microwaves and terahertz applications*

**13:00-14:30 LUNCH**

**Session 3 Graphene and carbon nanostructures**  
**(Chair Prof. Luigi Colombo - Texas Instruments Incorporated, Dallas Tx, USA)**

- 14:30-14:50 **Phaedon Avouris** (IBM T.J.Watson Research Center, Yorktown Heights, USA)  
**Invited** *Fast graphene electronics and photonics*
- 14:50-15:00 **Filippo Giannazzo** (CNR-IMM, Catania, Italy)  
*Epitaxial graphene on off-axis 4H-SiC (0001): study of the growth mechanisms and nano/micro-scale electrical characterization*
- 15:00-15:10 **Antonino La Magna** (CNR-IMM, Catania, Italy)  
*Coherent Electron Transport in quasi one-dimensional carbon-based systems*
- 15:10-15:20 **Giuseppe Angilella** (Dipartimento di Fisica e Astronomia, Università di Catania, Italy)  
*Strain effects on the electronic properties of graphene*
- 15:20-15:30 **Ioannis Deretzis** (CNR-IMM, Catania, Italy)  
*Theoretical investigation of the structural, electronic and transport properties of pure and intercalated graphene on SiC substrates*
- 15:30-15:40 **Kostantinos Zekentes** (IESL- FORTH, Heraklion, Crete, Greece)  
*SiC nanowire FET operation improvement by using Schottky contacts at source and drain regions*
- 15:40-15:50 **Kazuhiko Matsumoto** (Osaka University, Japan)  
*1/10 low bias operation and individual charge detection of carbon nanotube quantum nano memory*
- 15:50-16:00 **Oktay Yilmazoglu** (Department of High Frequency Electronics, TU Darmstadt, Germany)  
*Flexible carbon nanotube arrays for pressure sensing with high spatial resolution*

**16:00-16:30 COFFEE BREAK**

**Session 4 Graphene devices**  
**(Chair Prof. Phaedon Avouris - IBM T.J.Watson Research Center, USA)**

- 16:30-16:50 **Luigi Colombo** (Texas Instruments Incorporated, Dallas Tx, USA)  
**Invited** *Graphene for Beyond Scaled CMOS*
- 16:50-17:00 **Shabnam Shambayati** (ECE Dept., University of British Columbia Vancouver, Canada)  
*Performance predictions for Graphene-Window Schottky-barrier solar cells*
- 17:00-17:10 **Dong Hao** (Cornell University, Ithaca, NY, USA)  
*Covalent Functionalization of Graphene Towards a Biological Transducer*
- 17:10-17:20 **Tetsuya Suemitsu** (RIEC, Tohoku University, Japan)  
*Graphene FETs with SiCN gate stack deposited by PECVD using HMDS vapor*

**Session 5 Thermal effects, reliability and packaging issues**  
**(Chair Prof. Gaudenzio Meneghesso – University of Padova, Italy)**

- 17:20-17:30 **Yvon Cordier** (CRHEA-CNRS, Valbonne, France)  
*Effects of substrate and buffer layer quality on the behavior of AlGaIn/GaN HEMTs : thermal effects versus electron trapping*
- 17:30-17:40 **Milan Tapajna** (CDTR, University of Bristol, UK)  
*The Impact of Barrier Surface Treatment on AlGaIn/GaN HEMT Reliability*
- 17:40-17:50 **Nicole Killat** (CDTR, University of Bristol, UK)  
*Thermal Challenges of Wafer Bonding of AlGaIn/GaN HEMTs*
- 17:50-18:00 **Cristina Miccoli** (ST Microelectronics, Catania, Italy)  
*Two-Dimensional Transient Simulations Including Trapping and Thermal Effects in GaN*

- HEMTs*
- 18:00-18:10 **Abel Fontserè** (IMB-CNM-CSIC, Barcelona, Spain)  
*Reverse Current Thermal Activation of AlGaIn/GaN HEMTs*
- 18:10-18:20 **Enrique Miranda** (Universitat Autònoma de Barcelona, Spain)  
*Extraction of the degradation parameters of constant voltage- stressed Al/HfYO<sub>x</sub>/GaAs structures with important series resistance effects*
- 18:20-18:30 **Harald Etschmaier** (Infineon Technologies Austria AG, Villach, Austria)  
*Characterization of the phase composition and Microstructure in diffusion soldered Au/Sn joints for die attach*
- 18:30-18:40 **Alessio Pantellini** (SELEX Sistemi Integrati, Roma, Italy)  
*Thermal Assessment of AlGaIn/GaN on 50µm Silicon Microstrip Technology*
- 18:40-18:50 **David Maier** (Institute of Electron Devices and Circuits, University of Ulm, Germany)  
*Large Signal Operation of InAlIn/GaN HEMTs at Very High Temperature*
- 18:50-19:00 **Arvydas Matulionis** (Semiconductor Physics Institute of CPST, Vilnius, Lithuania)  
*Mitigation of hot-phonon effects in a twin channel for a GaN heterostructure field effect transistor*

## Tuesday May 31<sup>st</sup> 2011

### Session 6 **Challenges and perspectives** (Chair Prof. Petra Specht - University of California at Berkeley, USA)

- 9:00-9:20 **Gaudenzio Meneghesso** (Department of Information Engineering, University of Padova, Italy)  
**Invited** *Report on 47<sup>th</sup> Workshop on Compound Semiconductor Materials and Devices (WOCSEMMAD 2011): challenges for compound semiconductors*
- 9:20-9:40 **Antonino Scuderi** (ST Microelectronics, Catania, Italy)  
**Invited** *GaN and SiC from industrial perspectives*

### Session 7 **Nitrides: materials and processing** (Chair Prof. Takashi Mizutani - Nagoya University, Japan)

- 9:40-10:00 **Michal Leszczynski** (Unipress and TopGaN Ltd, Warsaw, Poland)  
**Invited** *Influence of substrate miscut on properties of GaN-based devices*
- 10:00-10:10 **Mariusz Martyniuk** (The University of Western Australia, Australia)  
*Mechanical properties of lateral epitaxial overgrown gallium nitride*
- 10:10-10:20 **Hideo Kawanishi** (Dept. Electronics Engineering, Kogakuin University, Japan)  
*Carbon-doped p-type (0001) plane AlGaIn (Al= 0.06 to 0.50) with high hole density*
- 10:20-10:30 **Giuseppe Greco** (CNR-IMM, Catania, Italy)  
*Carrier transport in inhomogeneous annealed Au/Ni/p-GaN interfaces*
- 10:30-10:40 **Ales Chvála** (Department of Microelectronics, University of Technology, Bratislava, Slovakia)  
*Analysis of the leakage current of AlGaIn/GaN Schottky diode dependent on ohmic contact pad electrode position*
- 10:40-10:50 **Berndt Schineller** (AIXTRON SE, Herzogenrath, Germany)  
*Process Stability Study of Mass Production of LED Structures by MOCVD*
- 10:50-11:00 **Yury Buzynin** (Institute for Physics of Microstructures -RAS, Nizhny Novgorod, Russia)  
*InN, AlN, GaN films on sapphire substrate and buffer layer*

### 11:00-11:30 **COFFEE BREAK**

### Session 8 **GaN HEMT devices** (Chair Prof. Elias Muñoz - Universidad Politécnica de Madrid, Spain)

- 11:30-11:50 **Peter Kordoš** (Department of Microelectronics, University of Technology, Bratislava, Slovakia)  
**Invited** *Preparation and properties of GaN-based MOSHFETs*
- 11:50-12:00 **Philipp Leber** (Institute of Electron Devices and Circuits, Ulm University, Germany)  
*Influence of Passivation on the Gate Leakage Current Behavior of AlGaIn/GaN High Electron Mobility Transistors*
- 12:00-12:10 **Herwig Hahn** (GaN Device Technology, RWTH Aachen University, Germany)

- Influence of oxygen addition in SiN dry etch process on device characteristics of passivated AlGaN/GaN HFETs*
- 12:10-12:20 **Alessandro Chini** (University of Modena and Reggio Emilia, Italy)  
*Dependence of static and dynamic GaN HEMT characteristics from Fe-doped GaN buffer parameters*
- 12:20-12:30 **Donatella Dominijanni** (CNR-IFN, Rome, Italy)  
*Scalable Gate two EBL steps fabrication process for optimal high frequency GaN HEMT performances*
- 12:30-12:40 **Dominik Schrade-Köhn** (Institute of Electron Devices and Circuits, Ulm University, Germany)  
*Impact of Ar-milling on the GaN surface and correlation with electrical results on AlGaN/GaN HEMTs*
- 12:40-12:50 **Nico Ketteniss** (GaN Device Technology, RWTH Aachen University, Germany)  
*Impact of gate length on the device performance of passivated InAlN/GaN HFETs*
- 12:50-13:00 **Alexander Alexewicz** (TU Wien, Austria)  
*Threshold voltage scaling in E-mode InAlN/AlN GaN-HEMTs on Si substrate*
- 13:00-13:10 **Antonio Stocco** (Department of Information Engineering, University of Padova, Italy)  
*Electrical and reliability investigation of AlGaN/GaN HEMTs grown on 8° off-axis 4H-SiC*
- 13:10-14:40 LUNCH**
- 14:40-24:00 TRIP TO TAORMINA AND SOCIAL DINNER (suggested dresses: casual)**

### Wednesday June 1<sup>st</sup> 2011

**Session 9 WBG compound semiconductors for power electronics**  
(Chair Prof. Kostantinos Zekentes - IESL-FORTH, Greece)

- 9:00-9:20 **T. Paul Chow** (Rensselaer Polytechnic Institute, Troy, NY, USA)  
**Invited** *Recent Advances in High-Voltage GaN MOS-gated Transistors for Power Electronics Applications*
- 9:20-9:30 **Takashi Mizutani** (Nagoya University, Japan)  
*Normally-off mode AlGaN/GaN HEMTs with p-InGaN cap layer*
- 9:30-9:40 **Rimma Zhytnytska** (FBI, Leibniz Institut für Höchstfrequenztechnik, Berlin, Germany)  
*High voltage power transistor design– influence of metallic contact area on device breakdown*
- 9:40-9:50 **Eldad Bahat-Treidel** (FBI, Leibniz Institut für Höchstfrequenztechnik, Berlin, Germany)  
*AlGaN/GaN/GaN:C back barrier Schottky diodes for power switching*
- 9:50-10:00 **Olivier Menard** (ST Microelectronics, Tours, France)  
*Progresses in GaN Power Rectifier*
- 10:00-10:10 **Alessia Frazzetto** (CNR-IMM, Catania, Italy)  
*Impact of surface processing on the electrical properties of p-type implanted 4H-SiC for power devices*
- 10:10-10:20 **Aurore Constant** (IMB-CNM-CSIC, Barcelona, Spain)  
*Performance and bias temperature instability characteristics of 4H-SiC MOSFETs with nitrided gate oxide grown by RTP*
- 10:20-10:50 COFFEE BREAK**

**Session 10 Optoelectronics, detectors and sensors**  
(Chair Prof. Joachim Würfl - FBI für Höchstfrequenztechnik, Germany )

- 10:50-11:10 **Jean-Yves Duboz** (CRHEA, CNRS, Valbonne, France)  
**Invited** *AlGaN based arrays for Extreme UV detection*
- 11:10-11:20 **Elias Muñoz** (Univ. Politécnica de Madrid, Madrid, Spain)  
*(In,Ga)N Photodetectors and Applications in Biophotonics*
- 11:20-11:30 **Laurent Ottaviani** (University Paul Cézanne, Marseille, France)  
*Influence of p+ layer parameters on 4H-SiC UV PiN Photodetector characteristics*
- 11:30-11:40 **Stefan Herbert** (RWTH, Aachen University, Germany)  
*Challenges of high-speed EUV mask blank inspection*

- 11:40-11:50 **Matteo Dal Lago** (Department of Information Engineering, University of Padova, Italy)  
*The role of operating conditions in the chip-level degradation of white LEDs*
- 11:50-12:00 **Jens-Peter Biethan** (Department of High Frequency Electronics, TU Darmstadt, Germany)  
*MOCVD grown ZnO on c-plane sapphire substrates for light and gas sensing applications*
- 12:00-12:10 **Clifton J. Fonstad** (MIT, Cambridge, MA, USA)  
*Multi-waveguide Needle Probes and Integrated Laser Diodes for Opto-genetic Neural Applications*
- 12:10-12:20 **David J.Y. Feng** (National University of Kaohsiung, Taiwan)  
*All-in-one design of integrated 1x2 TE/TM polarization splitter/combiner/converter on InGaAlAs-InP*
- 12:20-12:30 **Aris Christou** (University of Maryland College Park, Maryland USA)  
*Dielectric Constants With Extended Model of Interband Transition Contributions for AlGaInAs Quaternary Semiconductor Alloys*
- 12:30-12:40 **Carlo De Santi** (Department of Information Engineering, University of Padova, Italy)  
*Electro-Optical analysis of the degradation of advanced InGaN-laser structures*
- 12:40-12:50 **Alexander Buzynin** (A.M. Prokhorov General Physics Institute, RAS, Moscow, Russia)  
*Functional fiantite films in photonics*

**12:50-14:30 LUNCH**

**Session 11 Miscellaneous: novel materials, devices, and applications**  
**(Chair Prof. David Pulfrey - University British Columbia, Canada)**

- 14:30-14:40 **Irina Khmyrova** (University of Aizu, Japan)  
*Resonant MEMS with two-dimensional electron gas system*
- 14:40-14:50 **Alexander V. Luce** (University of California at Berkeley, USA)  
*MBE Grown Self-Catalyzed III-V Nanowires on Silicon*
- 14:50-15:00 **Carlos García Núñez** (Universidad Autónoma de Madrid (UAM), Spain)  
*High mobility n-type Zn<sub>3</sub>N<sub>2</sub> thin films as channel for thin film transistors*
- 15:00-15:10 **Petra Specht** (University of California at Berkeley, USA)  
*Low Dose Microscopy of Semiconducting and Metallic Nanostructures: Towards Recovering Original Material Structures*
- 15:10-15:20 **Antonella Sciuto** (CNR-IMM, Catania, Italy)  
*Interdigit 4H-SiC Vertical Schottky Diode for Beta-Voltaic Applications*
- 15:20-15:30 **Davide Spirito** (Dipartimento di Fisica, Università degli Studi Roma Tre, Roma, Italy)  
*Spin properties and ballistic transport in low-dimensional AlGaN/AlN/GaN systems*
- 15:30-15:40 **Daniel Slocombe** (Cardiff University, School of Engineering, UK)  
*Dielectric relaxation of transparent conducting oxides at microwave frequencies*
- 15:40-15:50 **Patrick Fiorenza** (CNR-IMM, Catania, Italy)  
*High capacitance density capacitors by calcium copper titanate thin films*
- 15:50-16:00 **Ibrahim Abdel-Motaleb** (Northern Illinois University, DeKalb, IL USA)  
*Investigation of the behavior of barium strontium titanate MOS capacitors*
- 16:00-16:10 **Roman Vitushinsky** (Holst Centre, Eindhoven, The Netherlands)  
*AlGa<sub>N</sub> ultrathinned 2DEG structures for NO<sub>x</sub> sensing*

**16:10 Closing Remarks**