

# 7<sup>th</sup> Spanish Conference on Electron Devices 2009

## Technical Program and Contents

### Tuesday Feb, 10 2009

17:00 CDE 2009 Registration.

20:00 Welcome reception.

### Wednesday Feb 11, 2009

09:00 CDE 2009 Registration.

10:00 Opening and Welcome.

10:30 Invited talk: *Simulation of Statistical Variability in NanoCMOS Devices*, Asen Asenov (University of Glasgow, UK).

11:30 Coffee break.

#### Session 1: Materials, technology and process simulation.

Chairperson: *Albert Romano* (Universitat de Barcelona)

12:00	GaN/AlN Axial Multi Quantum Well Nanowires for Optoelectronic Devices. <i>Sònia Conesa-Boj</i> (Universitat de Barcelona), <i>Jordi Arbiol</i> (Universitat de Barcelona), <i>Francesca Peiró</i> (Universitat de Barcelona), <i>Joan Ramón Morante</i> (Universitat de Barcelona), <i>Florian Furtmayr</i> (WSI, Technische Universität München), <i>C. Stark</i> (WSI, Technische Universität München), <i>S. Schäfer</i> (WSI, Technische Universität München), <i>M. Stutzmann</i> (WSI, Technische Universität München), <i>M. Eickhoff</i> (WSI, Technische Universität München).	1
12:20	High Quality Ti-Implanted Si Layers above Solid Solubility Limit. <i>Javier Olea</i> (UCM), <i>David Pastor</i> (UCM), <i>María Toledano-Luque</i> (UCM), <i>Enrique San Andrés</i> (UCM), <i>Ignacio Mártel</i> (UCM), <i>Germán González-Díaz</i> (Universidad Complutense de Madrid).	3
12:40	Improved Integrated Capacitive Elements Based on Porous Silicon. <i>Ana Sancho</i> (CEIT), <i>Javier Gracia</i> (CEIT).	5
13:00	Study of Atomic Layer Deposited Zirconium Oxide Thin Films by Using Mono-Cyclopentadienyl Based Precursors. <i>Helena Castán</i> (Universidad de Valladolid), <i>Salvador Dueñas</i> (Universidad de Valladolid), <i>Héctor García</i> (Universidad de Valladolid), <i>Alfonso Gómez</i> (Universidad de Valladolid), <i>Luis Bailón</i> (Universidad de Valladolid), <i>K. Kukli</i> (University of Helsinki), <i>J. Niinistö</i> (University of Helsinki), <i>M. Ritala</i> (University of Helsinki), <i>M. Leskelä</i> (University of Helsinki).	7
13:20	Growth of SiN <sub>x</sub> on Si by ECR Plasma Nitridation. <i>Álvaro del Prado</i> (Universidad Complutense de Madrid), <i>María Toledano-Luque</i> (Universidad Complutense de Madrid), <i>Enrique San Andrés</i> (Universidad Complutense de Madrid), <i>Pedro Carlos Feijoo</i> (Universidad Complutense de Madrid), <i>Marta Luisa Lucta</i> (Universidad Complutense de Madrid).	9
13:40	Carrier Mobility Degradation in Highly B-Doped Junctions. <i>María Aboy</i> (University of Valladolid), <i>Lourdes Pelaz</i> (University of Valladolid), <i>Pedro López</i> (University of Valladolid), <i>Elena Bruno</i> (MATIS CNR-INFN of Catania), <i>Salvo Mirabella</i> (MATIS CNR-INFN of Catania).	11

14:00 Lunch

15:30 Industrial talk: *Realization of Industrial Applications by utilizing Soft UV-NIL*, Otto Bobenstetter (EV Group, Austria).

#### Session 2: Modeling and devices simulation.

Chairperson: *Andrés Godoy* (Universidad de Granada)

16:00	High-Performance In <sub>0.75</sub> Ga <sub>0.25</sub> As Implant-Free N-Type MOSFETs for Low Power Applications. <i>Jason Ayubi-Moak</i> (University of Glasgow), <i>Karol Kalna</i> (University of Glasgow), <i>Asen Asenov</i> (University of Glasgow).	13
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16:20	Effect of Traps in the Performance of Four Gate Transistor.	15
	<i>Abraham Luque Rodríguez</i> (Universidad de Granada), <i>Juan Antonio Jiménez Tejada</i> (Universidad de Granada), <i>Andrés Gogoy Medina</i> (Universidad de Granada), <i>Juan Antonio López Villanueva</i> (Universidad de Granada), <i>Salvador Rodríguez Bolívar</i> (Universidad de Granada), <i>Francisco Manuel Gómez-Campos</i> (Universidad de Granada).	
16:40	Mesh Generation for the "Atomistic" Simulation of Variability in InGaAs Implant-Free NanoMOSFETs.	17
	<i>Manuel Aldegunde</i> (Universidad de Santiago de Compostela), <i>Antonio García-Loureiro</i> (Universidad de Santiago de Compostela), <i>Natalia Seoane</i> (Universidad de Santiago de Compostela), <i>Asen Asenov</i> (University of Glasgow), <i>Karol Kalna</i> (University of Glasgow).	
17:00	Current Drive in N-Type Schottky Barrier MOSFETs: a Monte Carlo Study.	19
	<i>Elena Pascual</i> (Universidad de Salamanca), <i>Raúl Rengel</i> (Universidad de Salamanca), <i>María Jesús Martín</i> (Universidad de Salamanca).	
17:20	Simulation Methods for Ionizing Radiation Single Event Effects Evaluation.	21
	<i>Pablo Fernández-Martínez</i> (Instituto de Microelectrónica de Barcelona (CSIC)), <i>Juan Manuel Mogollón</i> (Universidad de Sevilla), <i>Salvador Hidalgo</i> (Instituto de Microelectrónica de Barcelona (CSIC)), <i>Francisco Rogelio Palomo</i> (Universidad de Sevilla), <i>David Flores</i> (Instituto de Microelectrónica de Barcelona (CSIC)), <i>Miguel Angel Aguirre</i> (Universidad de Sevilla).	
17:40	Analytical Modeling of Effective Conduction Path Effect (ECPE) on the Subthreshold Swing of DG-MOSFETs.	23
	<i>Pramod Kumar Tiwari</i> (Banaras Hindu University), <i>Chinmaya Ranjan Panda</i> (Banaras Hindu University), <i>Anupam Agarwal</i> (Banaras Hindu University), <i>Prateek Sharma</i> (Banaras Hindu University), <i>Satyabrata Jit</i> (Banaras Hindu University).	

18:00 Coffee break

18:30 Poster session: Materials, technology and process simulation. Modeling and devices simulation.

## Thursday Feb 12, 2009

### Session 3: Sensors, actuators and MEMS.

Chairperson: *Luis Castañer* (Universitat Politècnica de Catalunya)

09:30	Design and Fabrication of Si Technology Microgenerators for Vibrational Energy Scavenging.	25
	<i>Nuria Fondevilla</i> (Universitat de Barcelona), <i>Christophe Serre</i> (Universitat de Barcelona), <i>Alejandro Pérez-Rodríguez</i> (Universitat de Barcelona), <i>Juan Ramón Morante</i> (Universitat de Barcelona), <i>Josep Montserrat</i> (Centre Nacional de Microelectrónica. CNM-CSIC), <i>Jaume Esteve</i> (Centre Nacional de Microelectrónica. CNM - CSIC).	
09:50	The Design of an Infrared Sensor for the Measurement of Martian Surface Temperature and Gas Concentration.	27
	<i>Jose M. Aranda</i> (Universidad Carlos III de Madrid), <i>Antonio J. de Castro</i> (Universidad Carlos III de Madrid), <i>Juan Meléndez</i> (Universidad Carlos III de Madrid), <i>Francisco Cortés</i> (Universidad Carlos III de Madrid), <i>Isabel Fernández-Gómez</i> (Universidad Carlos III de Madrid), <i>Fernando López</i> (Universidad Carlos III de Madrid).	
10:10	Integration of Multilayered Magnetoresistances and Microfluidic Networks for the Immunomagnetic Detection of Biological Species.	29
	<i>Maite Mujika</i> (CEIT-IK4), <i>Sergio Arana</i> (CEIT-IK4), <i>Enrique Castaño</i> (CEIT-IK4), <i>María Tijero</i> (IKERLAN-IK4), <i>Román Vilares</i> (IKERLAN-IK4), <i>Jesús M. Ruano-López</i> (IKERLAN-IK4).	
10:30	MEMS Solar Sensor Testing for Satellite Applications.	31
	<i>Juan García</i> (Universidad de Sevilla), <i>Cristina López Tarrida</i> (Universidad de Sevilla), <i>José Manuel Quero Reboul</i> (Universidad de Sevilla), <i>Pablo Ortega</i> (Universidad Politècnica de Catalunya), <i>Manuel Reina</i> (Instituto Nacional de Técnica Aeroespacial, INTA), <i>Yolanda Morilla</i> (CNA), <i>Javier García López</i> (CNA).	
10:50	Interdigitated $\mu$ -electrodes for Develop an Impedimetric Immunosensor for Atrazine Detection.	33
	<i>Enrique Valera</i> (UPC), <i>Javier Ramón-Azcón</i> (CSIC), <i>Francisco J. Sánchez</i> (CSIC), <i>M. Pilar Marco</i> (CSIC), <i>Angel Rodríguez</i> (UPC), <i>Luis Castañer</i> (UPC).	
11:10	Analysis of Grape Variety and Denomination of Origin of Several Wines with an Artificial Nose.	35
	<i>Manuel Alexandre</i> (CSIC), <i>Alberto García</i> (CSIC), <i>Isabel Sayago</i> (CSIC), <i>María Jesús Fernández</i> (CSIC), <i>Javier Gutiérrez Monreal</i> (CSIC), <i>María del Carmen Horrillo Güemes</i> (CSIC).	

11:30 Coffee break.

12:00 Invited talk: *Posibilidades de las Microtecnologías para la Fabricación de Pilas de Combustible para Aplicaciones Portátiles*, Carles Cané (IMB-CNM-CSIC, Spain).

### Session 4: Modeling and devices simulation.

Chairperson: *Javier Mateos* (Universidad de Salamanca)

13:00	Numerical Simulation of a Ferromagnetic Spin-Polarised Diode.	37
	<i>Enrique Comesaña Figueroa</i> (Universidade de Santiago de Compostela), <i>Manuel Aldegunde</i> (Universidade de Santiago de Compostela), <i>Gillian Gehring</i> (University of Sheffield), <i>Antonio García-Loureiro</i> (Universidade de Santiago de Compostela).	

13:20	On the Computation of High Frequency Current in Nanoelectronic Ballistic Devices.	39
	<i>Alfonso Alarcón</i> (Universitat Autònoma de Barcelona), <i>Abdelilah Benali</i> (Universitat Autònoma de Barcelona), <i>Guillem Albareda</i> (Universitat Autònoma de Barcelona), <i>Xavier Oriols</i> (Universitat Autònoma de Barcelona).	
13:40	High Frequency and Noise Model of Gate-All-Around MOSFETs Including Quantum Effects.	41
	<i>Bogdan Nae</i> (Universitat Rovira i Virgili), <i>Antonio Lázaro</i> (Universitat Rovira i Virgili), <i>Benjamín Iñiguez</i> (Universitat Rovira i Virgili).	
14:00 Lunch		
15:15 Talk: <i>Large Scale Facilities for micro-nanofabrication available in Spain: ISOM-UPM and CNM-IMB-CSIC</i> , Fernando Calle (ISOM, Spain) and Emilio Lora-Tamayo (CNM-IMB, Spain).		
<b>Session 5: Photovoltaic and optoelectronic devices and displays.</b>		
Chairperson: <i>Joaquim Puigdollers</i> (Universitat Politècnica de Catalunya)		
16:00	InAs/(Ga,In)(N,As) Quantum Dot LEDs Emitting at 1.3-1.5 $\mu\text{m}$ .	43
	<i>Miguel Montes Bajo</i> (ISOM-Universidad Politècnica de Madrid), <i>A. Hierro</i> (Universidad Politècnica de Madrid), <i>J. M. Ulloa</i> (Universidad Politècnica de Madrid), <i>A. Guzmán</i> (Universidad Politècnica de Madrid), <i>M. Al Khaljioui</i> (CRHEA-Centre National de la Recherche Scientifique), <i>M. Hugues</i> (EPSRC National Centre for III-V Technologies), <i>B. Damilano</i> (CRHEA-Centre National de la Recherche Scientifique), <i>J. Massies</i> (CRHEA-Centre National de la Recherche Scientifique).	
16:20	Improvement of Multi-Crystalline Silicon Wafer Quality During the Solar Cell Fabrication Process.	45
	<i>Jasmin Hofstetter</i> (Universidad Politècnica de Madrid), <i>Jean François Lelièvre</i> (Universidad Politècnica de Madrid), <i>Carlos del Cañizo</i> (Universidad Politècnica de Madrid), <i>Antonio Luque</i> (Universidad Politècnica de Madrid).	
16:40	GaInP/GaInAs/Ge Triple Junction Solar Cell for Ultra High Concentration.	47
	<i>Enrique Barrigon</i> (Solar Energy Institute, UPM), <i>Ignacio Rey-Stolle</i> (Solar Energy Institute, UPM), <i>Beatriz Galiana</i> (Solar Energy Institute, UPM), <i>Carlos Algora</i> (Solar Energy Institute, UPM).	
17:00	N-Type Emitters Passivation Through Antireflective Phosphorus Doped a-SiC <sub>x</sub> N <sub>y</sub> :H(n) Stacks.	49
	<i>Albert Orpella</i> (Universitat Politècnica de Catalunya), <i>Servane Blanqué</i> (Universitat Politècnica de Catalunya), <i>Vittoria Roiati</i> (Universitat Politècnica de Catalunya), <i>Isidro Martín</i> (Universitat Politècnica de Catalunya), <i>Ramón Alcubilla</i> (Universitat Politècnica de Catalunya), <i>Cristóbal Voz</i> (UPC), <i>Joaquim Puigdollers</i> .	
17:20	Enhanced Performance of OLEDs Using Polymer Blends as the Active Layer.	51
	<i>Stephanie Cheylan</i> (ICFO - Institute of Photonic Sciences), <i>Danny Krautz</i> (ICFO - Institute of Photonic Sciences), <i>Joaquim Puigdollers</i> (Universidad Politecnica de Catalunya - UPC), <i>Cristóbal Voz</i> (UPC), <i>Ramón Alcubilla</i> (Universidad Politecnica de Catalunya - UPC), <i>Gonçal Badenes</i> (ICFO - Institute of Photonic Sciences).	
17:40	Fabrication of Very Large 2.6m x 2.2m Amorphous Silicon Solar Modules on Glass.	53
	<i>Michael Vetter</i> (T-SOLAR GLOBAL S.A.), <i>Jacinto Pérez-Borrajo</i> (T-SOLAR GLOBAL S.A.), <i>Jordi Andreu</i> (T-SOLAR GLOBAL S.A.).	
18:00 Coffee break.		
18:30 Poster session: Characterisation and reliability. Sensors, actuators and MEMS. Photovoltaic, optoelectronic devices and displays. Micro and nano-devices. RF, microwave and power devices.		
21:00 Official dinner.		

## Friday Feb 13, 2009

### Session 6: RF, microwave and power devices.

Chairperson: *José Millán* (IMB-CNM-CSIC)

09:30	Design and Fabrication of 3.3 kV IGBTs for Traction Applications.	55
	<i>David Flores</i> (Instituto de Microelectronica de Barcelona (CSIC)), <i>Salvador Hidalgo</i> (Instituto de Microelectronica de Barcelona (CSIC)), <i>José Rebollo</i> (Instituto de Microelectronica de Barcelona (CSIC)), <i>Christian Caramel</i> (Laboratoire d'Analyse et d'Architecture des System), <i>Jean Louis Sanchez</i> (Laboratoire d'Analyse et d'Architecture des System).	
09:50	Tunable Terahertz Resonance in Planar Asymmetric Nanodiodes.	57
	<i>Ignacio Iñiguez-de-la-Torre</i> (Universidad de Salamanca), <i>Javier Mateos</i> (Universidad de Salamanca), <i>Daniel Pardo</i> (Universidad de Salamanca), <i>Tomás González</i> (Universidad de Salamanca), <i>Aimin Song</i> (University of Manchester).	
10:10	Monte Carlo Analysis of Thermal Effects in GaN HEMTs.	59
	<i>Javier Mateos</i> (Universidad de Salamanca), <i>Susana Pérez</i> (Universidad de Salamanca), <i>Daniel Pardo</i> (Universidad de Salamanca), <i>Tomás González</i> (Universidad de Salamanca).	
10:30	Optimization of Low Voltage Field Plate LDMOS Transistors.	61
	<i>Ignacio Cortes</i> (LAAS-CNRS), <i>Frédéric Morancho</i> (LAAS-CNRS), <i>David Flores</i> (CNM-CSIC), <i>Salvador Hidalgo</i> (CNM-CSIC), <i>José Rebollo</i> (CNM-CSIC).	

10:50	High Temperature SiC Blocking Diodes for Solar Array. <i>Enrique Maset</i> (University of Valencia), <i>Esteban Sanchis-Kilders</i> (University of Valencia), <i>José Jordán</i> (University of Valencia), <i>Juan Bta. Ejea</i> (University of Valencia), <i>Agustín Ferreres</i> (University of Valencia), <i>Vicente Esteve</i> (Universidad de Valencia), <i>José Millán</i> (CNM), <i>Philippe Godignon</i> , <i>Xavier Jordá</i> .	63
11:10	Capacitance Estimation of PN Varactors Based on Unit Cells. <i>Margarita Marrero Martín</i> (Universidad de Las Palmas de Gran Canaria), <i>Benito González Pérez</i> (Universidad de Las Palmas de Gran Canaria), <i>Javier García García</i> (Universidad de Las Palmas de Gran Canaria), <i>Antonio Hernández Ballester</i> (Universidad de Las Palmas de Gran Canaria).	65
11:30 Coffee break.		
12:00 Invited talk: <i>Concentración Fotovoltaica con Células Multiunión</i> , <i>Carlos Algora</i> (Universidad Politécnica de Madrid, Spain).		

### Session 7: Characterisation and reliability.

Chairperson: *Luis Bailón* (Universidad de Valladolid)

13:00	Characterization of a pH Sensor Based on an AlGaIn/GaN Transistor. <i>Javier Eroles</i> (ISOM), <i>Ana Bengoechea</i> (ISOM), <i>Miguel Ángel Sánchez</i> (ISOM), <i>Fernando Calle</i> (ISOM).	67
13:20	Channel Hot-Carrier Degradation in Short Channel Devices with High-K/Metal Gate Stacks. <i>Esteve Amat</i> (UAB), <i>Thomas Kauerauf</i> (IMEC), <i>Robin Degraeve</i> (IMEC), <i>Rosana Rodríguez</i> (UAB), <i>Montserrat Nafria</i> (UAB), <i>Xavier Aymerich</i> (UAB), <i>Guido Groeseneken</i> (IMEC).	69
13:40	Static and Dynamic Analysis of Split-Gate RESURF Stepped Oxide (RSO) MOSFETs for 35 V Applications. <i>Chin Foong Tong</i> (University of Warwick), <i>Ignacio Cortes</i> (LAAS-CNRS), <i>Philip Andrew Mawby</i> (University of Warwick), <i>James Anthony Covington</i> (University of Warwick), <i>Frédéric Morancho</i> (LAAS-CNRS).	71

14:00 Lunch.

### Session 8: Micro and nano-devices.

Chairperson: *Jaume Esteve* (IMB-CNM-CSIC)

16:00	UV Photo Sensors Based on Individual Semiconductor Nanowires. <i>J. Daniel Prades</i> (Universitat de Barcelona), <i>Roman Jimenez-Diaz</i> (Universitat de Barcelona), <i>Francisco Hernández-Ramírez</i> (Universitat de Barcelona), <i>Teresa Andreu</i> (Universitat de Barcelona), <i>Albert Cirera</i> (Universitat de Barcelona), <i>Albert Romano Rodríguez</i> (Universitat de Barcelona), <i>S. Mathur</i> , <i>A. Cornet</i> , <i>Joan Ramón Morante</i> (Universitat de Barcelona).	73
16:20	Monolithic Micro Fuel Cells as Integrated Power Sources in MEMS. <i>Nuria Torres</i> (Institut de Microelectrónica de Barcelona), <i>Marta Duch</i> (Institut de Microelectrónica de Barcelona), <i>Joaquín Santander</i> (Institut de Microelectrónica de Barcelona), <i>Neus Sabaté</i> (Institut de Microelectrónica de Barcelona), <i>Juan Pablo Esquivel</i> (Institut de Microelectrónica de Barcelona), <i>Albert Tarancón</i> , <i>Iñigo Garbayo</i> , <i>Isabel Gràcia</i> (CNM-IMB (CSIC)), <i>Carles Cané</i> (CNM-IMB (CSIC)).	75
16:40	Silicon Microcantilevers with Piezoresistive and MOSFET Detection. <i>Giordano Tosolini</i> (IMB-CNM (CSIC)), <i>Guillermo Villanueva</i> (was IMB-CNM (CSIC), currently EPFL(Lausanne)), <i>Joan Bausells</i> (IMB-CNM (CSIC)).	77
17:00	Technology Development of Polymer Ordered Micro and Nanostructures Based on Porous Templates. <i>Raquel Palacios</i> (Universitat Rovira i Virgili), <i>Pilar Formentín</i> (Universitat Rovira i Virgili), <i>Abel Santos</i> (Universitat Rovira i Virgili), <i>Trifon Trifonov</i> (Universitat Politècnica de Catalunya), <i>Lluís F. Marsal</i> (Universitat Rovira i Virgili), <i>Josep Pallarès</i> (URV), <i>Ramón Alcubilla</i> (UPC).	79

17:20 Closing remarks.

## Poster Sessions

### 11-02-2009, 18:30 - Poster session: Materials, technology and process simulation. Modeling and devices simulation.

Modeling and Simulation of CMOS APS. <i>Beatriz Blanco-Filgueira</i> (University of Santiago de Compostela), <i>Paula López Martínez</i> (University of Santiago de Compostela), <i>Diego Cabello Ferrer</i> (University of Santiago de Compostela), <i>J. Ernst</i> (Fraunhofer Institut fuer Integrierte Schaltungen), <i>H. Neubauer</i> (Fraunhofer Institut fuer Integrierte Schaltungen), <i>Johann Hauer</i> (Fraunhofer Institut fuer Integrierte Schaltungen).	81
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