

Forum Romanians in Micro- and Nanoelectronics

Romanian Academy, Bucharest, 6-7 November 2018

Forum speakers:

VIORREL BANU, D+T Microelectrónica A.I.E., Campus UAB, 080193 Bellaterra-Barcelona, Catalunya, Spain, *The wide band-gap semiconductors, a new trend of power semiconductor devices development.*



Viorel Banu received his M.Sc. degree in Microelectronics and Semiconductor Devices from Politehnica University of Bucharest, Romania in 1978. Since 1978 to 2005, he was with IPRS–Baneasa, Bucharest, as fabrication leader for high power thyristor's and diode's passivated structures. He was also charged with the device development and technology research of high–power devices (thyristors and diodes) and responsible for high vacuum technologies and PECVD deposition. In 1999, he was appointed as Leader of the Department of High Power Devices and Applications. In parallel with his main responsibilities, he worked from 2001 to 2007 as Associate Designer for Bi–CMOS analog–mixed integrated circuits with O2Micro–Ltd. Since June 2007 he joined the Group of Power Devices and Systems from IMB–CNM (CSIC) Barcelona as Technology Engineer for WBG semiconductors. Here he is dealing with research and characterization of silicon carbide (SiC) and gallium nitride (GaN) devices, new test methods conception, test instruments construction and also with the design of one of the first generation of integrated circuits on SiC. He has published more than 80 research papers.

GHEORGHE BREZEANU, University Politehnica of Bucharest, Romania, Silicon Carbide for Sensing: a continuous challenge.



Gheorghe Brezeanu (M'90) received the M.Sc. and Ph.D. degrees in electronic engineering from the Electronic and Telecommunications Faculty of the University “Politehnica” of Bucharest, Bucharest, Romania, in 1972 and 1981, respectively. He has been with the same Faculty since 1972, focusing on the development of semiconductor devices and integrated circuits. In 1992 he became a Full Professor at the Department of Electrical Devices and Circuits, within the Electronic and Telecommunications Faculty, teaching “Electronic Devices”, “Basic Electronic Circuits” and “Low–Power, Low–Voltage Analog ICs”. He was Scientific Chairman of the Faculty between 1996 and 2012 and since then he has been Director of the Ph.D. School.

He is also Head of the Microsystems Master Program. His main area of research includes physics, modelling and fabrication of power and sensor devices on Si and SiC, and design and electrical characterization of low–power analog ICs. He founded the SiC Devices Group in the Advanced Power Semiconductor Devices Laboratory in 1995. This group was focused on research activities regarding design, fabrication and modelling of silicon carbide and diamond devices. He is the author or coauthor of 16 books and more than 230 papers published in technical journals and conference proceedings. He also holds five patents. Prof. Brezeanu was Chairman of the Electron Devices Society Romania Chapter from 1996 to 2008. He has also been an active member of the IEEE Electron Devices Society for over 20 years.

CORNEL COBIANU, IMT Bucharest, Romania, From thin films to nanosensor technology



Dr. Cornel Cobianu is principal research scientist first degree at National Institute for Research and Development in Microtechnology -IMT Bucharest (since 2017), full member of Academy of Romanian Scientists (since 2012), co-founder of Honeywell Sensor Laboratory in Bucharest (2003), cofounder of the Center of Microtechnology Bucharest (1991), as well as Honeywell Fellow Engineering (2015). Before joining Honeywell, he was full Professor of Electrical Engineering at "Valahia" University Targoviste and part-time Professor Researcher at University of Twente, The Netherlands. During his work at Honeywell before 2017, Dr. Cobianu had a major contribution to the research and development of novel products and associated intellectual property.

Dr. Cobianu has been involved in EU-FP 4-7 programs being involved in projects like "PORSIS", e-CUBES", NEMSIC and recently in SOI-HITS project which received the innovation award above entire FP 7 competition.

Dr. Cornel Cobianu has an extended experience in micro-nanoelectronics microsystem technology with focus on MEMS/NEMS chemical and physical sensors, where he has published 3 book chapters, 150 papers in journals and conference proceedings and was granted with 36 US Patents, 18 EU Patents, 4 CN Patents and 3 RO Patents, while more than 40 patents applications are pending, being cited more than 1300 times for his papers and patents.

SORIN CRISTOLOVEANU, MINATEC, Grenoble, Franța, The growing family of electrostatically-doped devices.



Dr. Sorin Cristoloveanu received the PhD (1976) in Electronics and the French Doctorat ès-Sciences in Physics (1981) from Grenoble Polytechnic Institute, France. He is currently Director of Research CNRS. He served as the director of the LPCS Laboratory and the Center for Advanced Projects in Microelectronics, initial seed of Minatec center. He authored more than 1,100 technical journal papers and communications at international conferences (including 170 invited contributions).

He is the author or the editor of 36 books, and he has organized 35 international conferences.

His expertise is in the area of the electrical characterization and modeling of semiconductor materials and devices. He has supervised more than 100 PhD completions. He is the recipient of the IEEE Andy Grove award 2017. He is a Fellow of IEEE, a Fellow of the Electrochemical Society, and Editor of Solid-State Electronics.

MIRCEA DRAGOMAN, IMT Bucharest, Romania, Nanoelectronics at the atomic scale: computing, harvesting, networking.



Mircea Dragoman has graduated the Electronic Faculty, Polytechnical Institute in Bucharest, in 1980, and received the doctoral degree in electronics in 1991. During 1992–1994 he was the recipient of the Humboldt Fellowship award and has followed postdoctoral studies at Duisburg University, Germany. He was invited professor at: CNR– Istituto di Electronica dello Stato Solido–Roma (1996), Univ. Saint–Etienne –France (1997), Univ. Mannheim (1998–1999, 2001–2002), Univ. Frankfurt (2003), Univ. Darmstadt (2004); in the period 2005–2006 he was nominated directeur de recherche at CNRS LAAS Toulouse. He had more than 40 invited papers in UE and two university courses in France (Nanoelectronics, 2005) and in Germany (Nonlinear Phenomena, 1992).

He is Senior Researcher I with the National Research Institute for Microtechnologies. He co-authored more than 250 scientific papers and 6 monographies, such as M. Dragoman, D. Dragoman, Nanoelectronics. Principles and Devices, at Artech House, USA (2008) and M. Dragoman and D. Dragoman, 2D Nanoelectronics, Physics and Devices of Atomically Thin Materials, at Springer (2017). Dr. Dragoman was awarded the Gheorghe Cartianu prize of the Romanian Academy in 1999.

MIRCEA DUSA, ASML Belgium, Kapeldreef 75, B–3001 Leuven, Belgium, *Moore's Law and Optical Lithography Drive of Semiconductor Industry Progress.*



Mircea Dusa is a ASML Fellow and Staff Scientist with ASML. He is a founding member of ASML's Technology Development Center working on exploratory imaging solutions for advanced lithography tools seeking integration of tool functionality and with non-litho tool components, the photomask, patterning processes and control metrology. Prior to ASML, Mircea held various engineering positions in semiconductor industry, both in R&D and manufacturing, at National Semiconductor/Fairchild Research Center, SEEQ Technology, Zygo Corporation in USA and at ICCE-IPRS in Romania.

He has published over 200 papers in the fields of lithography science and technology at various conferences and in referenced journals. He is a member of IEEE and a SPIE Fellow.

He is an active member of SPIE, the International Society of Photo Instrumentation Engineers chaired the Advanced Lithography Symposium between 2013-2016 and Optical Microlithography Conference between 2008-2011.

From 2008 to today, Mircea is teaching SPIE's course on MultiPatterning Principles and Applications. Mircea Dusa graduated with MS in EE and Solid State Physics from Polytechnic University of Bucharest and holds a Ph. D Degree in Applied Optics from the same university.

ADRIAN IONESCU, EPFL Laussane, Elveția, Energy Efficient Electronics to Revolutionize Artificial Intelligence and its Applications.



Adrian M. Ionescu is a Full Professor at Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland. He received the BS & MS in Electronics and Telecommunications in 1989 from University 'Politehnica' Bucharest, Romania. He holds two PhDs: in Microelectronics, from University 'Politehnica' Bucharest (1994) and in Physics of Semiconductor Devices from the National Polytechnic Institute Grenoble (1997). He is director of Nanoelectronic Devices Laboratory of EPFL, and he served as Director of Doctoral Program in Microsystems and Microelectronics of EPFL. He holds positions at CNRS and CEA-LETI, France. He was a visiting scholar at Stanford University, USA, and an invited Professor at Tokyo Institute of Technology, Japan.

His research group at EPFL pioneered energy efficient steep slope devices and novel MEMS active resonators, with emphasis on low power digital and analog/RF nanoelectronics.

Prof. Ionescu published more than 600 articles. He is the recipient of IBM Faculty Award 2013 and of André Blondel Medal 2009, France. He also received the 2017 EDS George Smith Award. He served for 6 years as Editor of IEEE TED and as member of PUB committee of IEEE –EDS. Since 2015 he is member of Swiss Academy of Engineering Sciences (SATW). He is an IEEE Fellow and an ERC Advanced Grant awardee.

SORIN MELINTE, Université catholique de Louvain, Belgium, Nanoarchitectonics with Si nanowires



S. Melinte is Professor of Engineering in the Institute of Information and Communication Technologies, Electronics and Applied Mathematics at Université catholique de Louvain, Belgium. His current projects aim at developing novel nanodevices and hybrid inorganic-organic platforms for molecular electronics. In particular, his group uses high-resolution electron-beam nanolithography as well as soft-lithography and bottom-up nano- and micro-structuring techniques to engineer smart materials.

MIHAI MIHAILA, IMT Bucharest, Romania, Microscopic origin of 1/f noise.



Mihai Mihaila holds a Ph. D. in physical electronics (1997, Politech. Univ. Bucharest). From 1971 till 1996 he was with ICCE - Bucharest, while from 1996 to 2003 he was a principal research scientist at National Inst. of Microtechnology (IMT). In 2003, he joined Honeywell Advanced Technology Center, Sensors Laboratory – Bucharest and left it in 2015 as senior principal research scientist. In 2015, he came back to IMT as a research scientist I. He is recognized for the discovery of the phonon resonances in 1/f noise and phonon fluctuation spectroscopy (US patent 7612551B1, 2009). He has more than 125 publications, 20 USA patents (23 pending), 5 EU patents, 1-Japan. Since 1999, he is a member (associate) of the Romanian Academy.

ALEXANDRU MÜLLER, IMT Bucharest, Romania, *Novel high performance sensors using SAW resonators constructed on GaN/Si and operating at GHz frequencies.*



Alexandru Müller received his Ph.D degree in Semiconductor Physics from the University of Bucharest, in 1990.

He is the Head of the Microwave laboratory, in IMT–Bucharest, Romania. His early activity was focused on design and manufacturing of microwave diodes (pin, varactor step recovery, Schottky). After 1995 he was involved in developing of novel membrane supported microwave and millimeter wave circuits based on micromachining technologies of silicon and GaAs. In the recent years his research activity was focused on acoustic devices developed on III Nitrides, analysis of Rayleigh and Sezawa propagation modes in GaN/Si layers. He has developed GHz operating SAW devices based on micromachining and nanoprocessing of GaN/Si, targeting temperature and pressure sensor applications.

He is the author/coauthor of more than 150 papers in high ranked journals and conferences. In 2003 he was invited “Directeur de recherche” at LAAS CNRS Toulouse, France. He was involved in many European projects (in the frame of the research EU programs FP4, FP6, FP7, H2020) as coordinator or as responsible of the IMT team.

Dr. Müller has coordinated one of the first European projects in RF MEMS “MEMSWAVE” (1998–2001), nominated in 2002 between the 10 finalists for the Descartes Prize. He was awarded with the Tudor Tanasescu prize of the Romanian Academy in 2003 for the work: “Circuite microprelucrate pentru aplicatii in domeniul microundelor si undelor milimetrice – MEMSWAVE”, authors: A Muller, D Vasilache, S Iordanescu, D. Neculoiu, I Petrini, C Buiculescu, G Konstantinidis, F Giacomozzi.

MARIUS NEAG, Technical University, Cluj-Napoca, Romania, *Systematic and optimized design of analog ICs.*



Marius Neag received the Electronic Engineer Diploma from the Technical University of Cluj-Napoca, Romania, in 1991 and was awarded the PhD degree by the University of Limerick, Ireland, in 1999.

After working several years in Ireland and the US as a senior designer of RF, analog and mixed-signal ICs he returned to the Technical University of Cluj-Napoca where he lectures on the design of RF, Analog and Mixed-Signal ICs, as an Associate Professor.

There he has helped setting the “Digitally-Enhanced RF & Analog Integrated Circuits” research group. Marius Neag is the author and co-author of over 100 scientific publications, 2 books and 2 international patents.

IOAN-LUCIAN PREJBEANU, CEA, CNRS, INAC-SPINTEC, Grenoble, France, *Magnetoresistive random-access memory (MRAM) concepts for extended scalability and ultrafast switching*, Univ.Grenoble Alpes.



Ioan Lucian PREJBEANU has been conducting research on nanomagnetism and spintronics for 20 years. He holds a Physics degree from Babes Bolyai University in Cluj (Romania) and a PhD in Physics from Louis Pasteur University in Strasbourg on magnetic nanostructures.

He then joined SPINTEC in Grenoble, where he pioneered scientific work on thermally assisted MRAM. Based on this proof-of-principle of the scientific concepts, Crocus Technology was founded in 2006 to develop and commercialize thermally assisted MRAM technology.

Lucian Prejbeanu joined Crocus Technology mid-2006 as R&D director, where he made key contributions to the development and industrialization of thermally assisted MRAM for which he was awarded the SEE-IEEE Brillouin prize in 2012. In 2013, Lucian Prejbeanu returns to SPINTEC as deputy director and became executive director as of January 1st, 2016. He holds 44 international patents on magnetic memories and magnetic sensors and has authored more than 80 scientific publications and book chapters on nanomagnetism and spintronics.

IONUT RADU, Parc Technologique des Fontaines, 38190 Bernin, France, *Material physics and technologies for substrate engineering to address challenges of semiconductor nanotechnologies*, Soitec.



Ionut Radu is Director of Advanced R&D at Soitec being responsible for research and development efforts in the field of advanced substrate technologies. Prior to being appointed to his current position, he held various technology management positions with responsibility in development of new substrate technologies for advanced electronic devices.

Dr. Radu obtained his B.S. in physics from University of Bucharest in 1999 and Ph.D (Dr. rer. nat.) in physics from Martin-Luther University Halle-Wittenberg in 2003. He has co-authored more than 70 papers in peer-reviewed journals, conference proceedings and reference handbooks and holds more than 40 patents in the field of semiconductor technologies. Dr. Radu is senior member of IEEE society and involved in Technical Program Committees of international conferences (ESSDERC, VLSI-TSA) and industrial forums (Semicon Europa).

ANA RUSU, Royal Institute of Technology (KTH), Stockholm, Sweden, *Future Smart Connected Society Enabled by Electronics*.



Ana Rusu received the M.Sc. degree in electronics and telecommunications from the Technical University of Iași, Iași, Romania, in 1983, and the Ph.D. degree from the Technical University of Cluj-Napoca, Cluj-Napoca, Romania, in 1998. She has been with the KTH Royal Institute of Technology, Stockholm, Sweden, since 2001, where she is currently a Professor of Electronic Circuits for Integrated Systems. Her research interests spans from low/ultra-low power high-performance CMOS circuits and systems for a wide range of applications, to emerging technologies, such as graphene, SiC, spin torque oscillators and M3D integration.

FLORIN UDREA, Cambridge University, Cambridge CB3 0FA, *Challenges in power semiconductor devices: technologies of the future.*



Florin Udrea is a professor in semiconductor engineering and head of the High Voltage Microelectronics and Sensors Laboratory at University of Cambridge. He received his PhD degree in power devices from the University of Cambridge, Cambridge, UK, in 1995, his Master degree from University of Warwick, UK in 1992 and his BSc degree from University Politehnica of Bucharest, Romania in 1991. Since October 1998, Prof. Florin Udrea has been an academic with the Department of Engineering, University of Cambridge, UK. Between August 1998 and July 2003 he was an advanced EPSRC Research Fellow and prior to this, a College Fellow in Girton College, University of Cambridge.

He is currently leading a research group in power semiconductor devices and solid-state sensors that has won an international reputation during the last 25 years. Prof. Udrea has published over 500 papers in journals and international conferences. He holds 100 patents with 20 more patent applications in power semiconductor devices and sensors.

Prof. Florin Udrea founded five companies, Cambridge Semiconductor (Camsemi) in power ICs – sold to Power Integrations, Cambridge CMOS Sensors (CCS) in the field of smart sensors – sold to ams, Cambridge Microelectronics in Power Devices, Cambridge GaN Device in high voltage GaN technology and Flusso in Flow and temperature sensors. Prof. Florin Udrea is a board director in Cambridge Enterprise. For his ‘outstanding personal contribution to British Engineering’ he has been awarded the Silver Medal from the Royal Academy of Engineering in 2012. In 2018 he received the Nanosmat medal and the prestigious Mullard award from the Royal Society. In 2015 Prof. Florin Udrea was elected a Fellow of Royal Academy of Engineering.