**IEEE RTSI 2018 – Track 2 – 2.6**

**NANOTECHNOLOGIES FOR INDUSTRY 4.0**

Industry 4.0 is a technological revolution that will fundamentally alter the way we live, since it is mainly based on highly automated smart factories as well as smart products and services. It is anticipated that this revolution will lead to both an economy and society transformation through internet of things, robotics, autonomous vehicles, 3D printing, materials science, energy storage, and nanotechnology. The latter has attracted over the last years enormous research interests in many fields ranging from electronics to automotive industry, chemical industry, energy, textiles, medicine, mechanics, and construction. Understanding and precisely controlling the properties of materials at the nanoscale could indeed lead to innovations that impact nearly every industry. Moreover, the possibility to grow nanomaterials through a low-cost technique such as self-assembly, poses a new paradigm for high-volume cost-effective manufacturing at the nanoscale. Finally, biotechnology, i.e. integration of nanotechnology with biology, has opened the avenues toward the realization of advanced diagnostic devices and drug delivery vehicles for medical applications.
The focus of the proposed session is on the broad areas of nanotechnology and includes, but it is not limited to, the following topics: nanomaterials, nanoelectronics devices, non volatile Random Access Memory (RAM), supercapacitors, MEMS/NEMS, nanomedicine, lab on chip devices, nano-enhanced textiles, metamaterials, micro and nano robotics, advanced materials for transportation, smart sensors and probes, directed or programmable self-assembly, colloidal crystals and clusters, self-assembled monolayers, drug delivery, biosensors.
Due to the multidisciplinary of issues proposed in this session, valuable contributions are awaited form all the scientific community dealing with the broad field of Nanotechnology.

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Short Curriculum Vitae

Roberto Macaluso is Assistant Professor at the Department of Energy, Information Engineering and Mathematical models (DEIM) at the university of Palermo, Italy. He gained his master degree in Electronic Engineering from the University of Palermo in 1999 and received his Ph.D. degree in Applied Physics from the University of Strathclyde, UK, in 2003. He then moved to Infineon Technologies AG (Corporate Research Photonics), Munich, Germany, working on processing and fabrication of novel laser-modulator devices based on InGaAlAs-InP multi quantum wells structures for data transmission beyond 40 Gbit/s. From 2007 to 2009 he worked at the Department of Physics of Ben Gurion University, Beer Sheva, Israel, as a Marie Curie Fellow,

conducting research on fabrication and characterization of carbon nanotubes-based devices for atomchip applications.
His current research interests include design, fabrication and characterization of $TiO_2$, ZnO and $HfO_2$–based resistive switching memory devices, pulsed laser deposition (PLD) and characterization of semiconductor oxides and dielectrics for the realization of optoelectronics and electronics devices. He is author or co-author of more than 60 scientific papers published on peer-reviewed journals, book chapters, national and international conference proceedings. He serves as referee for outstanding international scientific journals.
He currently teaches Nanoelectronics (Master degree in Electronics Engineering), Materials and Technology for Micro and Nano Electronics (Master degree in Materials Engineering) and Digital Electronics (Bachelor degree in Electrical Engineering).

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Short Curriculum Vitae

Yogendra Kumar Mishra is leading a group with the focus on '3D Hybrid Nanomaterials' at Functional Nanomaterials (FUN) Chair, Institute for Material Science, Kiel University, Kiel, Germany. He received Ph.D. in Condensed Matter Physics (Plasmonics) in 2008 from Jawaharlal Nehru University, New Delhi and then migrated to Kiel as Alexander von Humboldt Fellow and since then has been working at FUN Chair. In 2015, he finished his Habilitation (Priv.- Doz./Venia Legendi) degree in Materials Science from Kiel University. During his research period in Kiel, he introduced a new fabrication technique, the 'Flame Transport Synthesis Approach', which allows versatile nanostructuring of metal oxides and their 3D interconnected networks as 'Flexible Ceramic Materials'. The introduced tetrapodal 3D shaped ZnO nanostructures by him have found lots of application scopes in engineering and biomedical fields. Also the sacrificial nature of ZnO enables tetrapods to be used as templates for the growth of hollow tetrapodal structures from other new materials, like Carbon-Aerographite, Si, GaN, h-BN, etc. which offered wide range of multifunctional applications. The recent invited review in Materials Today (https://www.sciencedirect.com/science/article/pii/S1369702117304443) by him gives a glimpse about the research and application opportunities with ZnO Tetrapods. He is also advising the startup company, Phi-Stone AG (http://www.phi-stone.de/) Kiel which is dealing with commercial applications of flame made ZnO tetrapods.
Dr. Mishra, has published more than 100 papers including many in top ranked magazines, such as Materials Today, Advanced Materials, Nature Communications, ACS Applied Materials & Interfaces and others. He is editorial board member in Nature-Scientific Reports, PLoS ONE, MDPI-nanomaterials and in several others and also serves as referee for various prestigious journals, funding agencies, faculty promotions, etc. For his research papers and interest, please visit the scholar google link below:
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