



1st EDITION IMM DOCTORAL SUMMER SCHOOL

FROM MICRO TO NANO: SYNTHESIS, CHARACTERIZATION AND MODELING FOR FUTURE ELECTRONICS AND SENSING

We are pleased to announce the first edition of the Doctoral Summer School organized by the Institute for Microelectronics and Microsystems of the National Research Council, which will be held in **Castro Marina**, a wonderful seaside location in Puglia, southern Italy, **from 13th to 17th May 2024**.

The one-week course is dedicated to PhD students and post-doc researchers and will cover very timely and cutting edge research areas in the fields of **electronics** and **sensing**, with particular regard to advanced methodologies aimed at facing the **transition from the micro to the nanoscale**.

The program will include several contributions dedicated to synthesis, characterization and modelling of materials and devices, illustrating the institute ongoing activities and facilities.

The final aim of the summer school is to create a fruitful environment with occasions for both formal and informal fora, to discuss and exchange ideas, so as to advance multilevel debate and enrich participants' perspectives. Presentation of poster contribution from students is encouraged, and will be awarded.

The school will take place at the Hotel Panoramico in Castro Marina (www.hotelpanoramico.net) and will host up to 50 students. Several double rooms and few single rooms are available at the hotel and will be assigned on request, following the course registration. The total cost for the participation, including room and meals, is comprised between 300 and 400 euro depending on the specific accommodation. No additional fee is required.

Applications must be sent at scuolaIMM2024@imm.cnr.it by the 15th of March and will be evaluated and approved until available places are filled.

Further information can be found on the School website, www.imm.cnr.it/scuolaIMM2024, or writing at scuolaIMM2024@imm.cnr.it

See you in Castro!



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FROM MICRO TO NANO: SYNTHESIS, CHARACTERIZATION AND MODELING FOR FUTURE ELECTRONICS AND SENSING							
timing		Monday 13th May 2024	Tuesday 14th May 2024	Wednesday 15th may 2024	Thursday 16th may 2024	Friday 17th may 2024	
Fundamentals	9:00 - 9:45	A R R I V A L S	SYNTHESIS P. Prete, <i>Synthesis of epitaxial nanostructures (MOVPE, VLS, SAE)</i>	CHARACTERIZATION F. Liscio, <i>Surfaces, interfaces and nanostructures: structure and morphology probed by X-ray scattering technique</i>	MODELLING E. Paladino, <i>Introduction to quantum technologies</i>	Last remarks and comments, assessment questionnaire	
	9:45 - 10:30		R. Lo Nigro, <i>Chemical vapour deposition techniques (CVD, MOCVD and ALD): precursors, deposition mechanisms and microelectronic applications.</i>	G. Pellegrino, <i>XPS Techniques: principles and potentialities for the surfacxe analys of functional materials</i>	C. Degli Esposti Boschi, <i>Lattice Model Hamiltonians to study the effect of strong correlations in many-body quantum systems</i>		
	10:30 - 11:00		coffe break	coffe break	coffe break		
	11:00 - 11:45		F. La Via, <i>SiC fast growth rate epitaxy by chloride precursors</i>	A. Lamperti, <i>Fundamentals of Secondary Ions Mass Spectrometry (SIMS): probing chemistry with high sensitivity.</i>	A. Debernardi, <i>First principles spectroscopy for the study of innovative materials: from nanoelectronics to sensors</i>		
	11:45 - 12:30		F. Roccaforte, <i>Wide band gap semiconducotors SiC & GaN for energy efficient power devices: physics and technology</i>	A. Taurino, <i>Electron microscopy as a tool to study morphology, structure and chemistry of materials and devices from micro to nano scale and beyond</i>	F. Della Sala, <i>Computational nanoplasmonics</i>		
LUNCH TIME							
			APPLICATIONS 1: NEUROMORPHIC DEVICES AND NEUROSCIENCE	APPLICATIONS 3: ELECTRON MICROSCOPY	APPLICATIONS 5: SOLAR CELLS		
Applications	15:30 - 16:15	WELCOME SESSION: presentation of the institute sites, facilities, projects; presentation of the school	S. Brivio, <i>Emerging memory devices based on migration of ions in solid electrolytes for neuromorphic applications</i>	Andrea Parisini, <i>From colors to number: applications of quantitative Energy Dispersive Spectroscopy (EDS) in STEM to ultra-shallow junctions, ultra-thin defects and nanoparticles</i>	I. Deretzis, <i>Bridging length scales in perovskites solar cells: density functional theory, atomistic kinetics and devices</i>	D E P A R T U R E S	
	16:15 - 17:00		A. Convertino, <i>Innovative Applications of Nanomaterials and Microelectronics in Neuroscience Research</i>	A. Gradone, <i>In-liquid transmission electron microscopy</i>	S. Valastro, <i>Perovskite Solar Cells from materials to devices</i>		
	17:00 - 17:30	coffe break	coffe break	coffe break			
				APPLICATIONS 2: TWO-DIMENSIONAL MATERIALS	APPLICATIONS 4: OPTICAL SENSING and PHOTONIC DEVICES		APPLICATIONS 6: ELECTRONIC DEVICES
	17:30 - 18:15	POSTER SESSION/FLASH TALKS	C. Martella, <i>Two-dimensional materials beyond graphene</i>	S. Lombardo, <i>Single Photon Detectors: Technologies and Applications</i>	A. La Magna, <i>Technological design with atomistic simulations: how to make difficult things simple</i>		
	18:15 - 19:00		A. Liscio, <i>Graphene-Related Materials for Industrial Applications: from Standardization to Space and Environmental Applications</i>	V. Mussi, <i>Raman micro-spectroscopy: from high resolution micrometric thermography to nano-biosensing</i>	A. Valletta, <i>Numerical simulation of micro- and nano-electronic devices: TCAD and compact modelling</i>		
	19:00 - 19:45		M.A. Signore, L. Velardi, <i>Piezoresponse Force Microscopy (PFM): a non-destructive technique to investigate electromechanical responses at the nanometer length scale. From theory to practical applications</i>	M.G. Manera, <i>Versatile plasmonic nanostructures as smart optical sensing platforms: from design to Point-of-Need diagnostic devices</i>	W. Fuscaldo, <i>Terahertz Leaky-Wave Antennas</i>		
		DINNER	DINNER	SOCIAL DINNER	DINNER		