Università di Genova

MSCA IF 2020 @UniGe

Supervisor Expression of Interest

MSCA domain Chemistry (CHE)

1. Prof. Antonio Barbucci
2. Prof. Diego Colombara
3. Prof. Paolo Oliveri
4. Prof. Davide Peddis

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1.

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Other information	https://rubrica.unige.it/personale/VUZCXllt
MSCA domain	Chemistry (CHE)
Research focus area	Solid oxide electrolyser and fuel cells (SOEC/SOFC)
Department	Department of Civil Chemical and Environmental Engineering (DICCA)
Short description of the department/laboratory/research group	The laboratory of applied electrochemistry of DICCA is devoted to the study of electrochemical systems. In the Lab are active 7 researchers expert in electrochemistry and material science. The Lab is equipped with all the instrumentation necessary to perform research on electrochemical material and processes. Special focus is the development of electrodic/electrolytic materials and cells for solid oxide cell useful for the storage of renewable energy or the production of energy with high efficiency and low/zero environmental impact.
Candidate fellows must send their candidature with a short description of their profile to the following email address	barbucci@unige.it

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2.

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MSCA domain	Chemistry (CHE)
Research focus area	Chalcogenide semiconductors for photovoltaic applications, with a specific focus on alkali metal extrinsic doping of Cu (In, Ga)Se2 and its effect on atomic diffusion. Keywords: PV; Solar cells; CIGS; electrochemistry; chemical vapour transport; atomic diffusion
Department	Department of Chemistry
Short description of the department/laboratory/research group	The laboratory is equipped with SEM-EDS with EBSD detector, XRD with Bragg-Brentano geometry, DSC-DTA-TGA, equipment for metallographic sample preparation, a range of furnaces for thermal treatments and single crystal growth, nitrogen-filled glovebox, Autolab potentiostat. A new transtemp furnace is being installed for reactive annealing aimed at converting metallic precursor films into chalcogenide thin films or for extrinsic doping studies.
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3.

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MSCA domain	Chemistry (CHE)
Research focus area	Analytical spectroscopy (NIR, MIR, UV-VIS, Fluorescence); NIR hyperspectral imaging (NIR-HSI); Chemometrics; Food Analytical Chemistry; Forensic Analytical Chemistry.
Department	Department of Pharmacy (DIFAR)
Short description of the department/laboratory/research group	The Laboratory of Analytical Chemistry and Chemometrics has a wide array of spectroscopic instruments, including FT-NIR equipped with solid and liquid modules, portable NIR, NIR hyperspectral imaging (NIR-HSI), FT-MIR equipped with transmission and ATR modules, UV-Vis equipped with integrating sphere, fluorescence equipped with front-face module and optical microscopies. Moreover, the research group have access to several heavy-duty computers and workstations for large-scale computations, and a broad selection of data, full access to Matlab (The MathWorks, Inc.), including the PLS-toolbox (Eigenvector Researches, Inc.).

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4.

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MSCA domain	Chemistry (CHE)
Research focus area	Nanostructured Magnetic Materials
Department	Department of Chemistry and Industrial Chemistry
Short description of the department/laboratory/research group	The research group at the Nanostructured Magnetic Materials Lab (nM2-Lab) is a Unit collecting personnel from the Department of Chemistry and Industrial Chemistry - DCCI – of the University of Genova and the Institute of Structure of Matter – ISM – (Roma) of the Italian National Research Council – CNR. The Nanostructured magnetic materials group (Nm2) has gained international reputation in the study of magnetic nanoparticles, in the investigation of their magnetization processess and in the analysis of interactions and interface effects in exchange-coupled systems . Prof. Davide Peddis is leading the research line Hybrid organic/inorganic magnetic nano-architectures (HMN), In Particular Research activity of HMN has been developed in the framework of Solid State Physical-Chemistry and Condensed Matter Physics, studying the relationship between physical properties, crystalline structures and morphological features of nanostructured magnetic

	materials. HMN activity focuses on the design of magnetic nano –hetero-structures (nanoparticles, particles embedded in matrix, core shell structures, hollow nanoparticles, anisometric particles) and the study of their magnetic properties. Particular attention has been devoted to the investigation of fundamental properties of magnetic nanoparticles (static and dynamical properties) with particular interest in materials for applications in biomedicine (MRI, drug delivery, hyperthermia), catalysis, and energy field (permanent magnets, hydrogen production). Specific research topics are briefly outlined in the following: Synthesis of nanostructured materials An important part of HMN's research activity is focused on the synthesis by chemical methods of magnetic nano–hetero-structures of metals (Fe, Co), metal alloys (FePt, CoFe) and metal oxides (Fe_2O_3, $CoFe_2O_4$, NiO, $LaCaMnO_4$; $BaFeO_3$). Magnetic Properties of nanostructured materials. HMN's activity is mainly devoted to the study of static and dynamical properties of magnetic nano-hetero-structures by AC/DC magnetization measurements and Mössbauer spectroscopy. Particular attention has been devoted to the influence of magnetic interactions on equilibrium and out-of-equilibrium dynamic of magnetization in nano-hetero-structure materials (particles embedded in magnetic and non magnetic matrix; core shell systems). Magnetic Structure at the nanoscale Among the relevant features of the size reduction of magnetic particles, the presence of a non-collinear spin structure (spin canting) deserves special

	attention, as it determines relevant modifications in the magnetic properties. Hence, HMN's research activity is also focused on the study of influence of spin canting and, more generally, of surface magnetism on the magnetic properties of the materials. The study of the correlation between spin canting, crystalline and magnetic structure has been also performed for ferrites with spinel structure by Mössbauer spectroscopy under intense magnetic and Neutron Powder Diffraction (NPD). Interface Magnetism antiferromagnetic materials (i.e. exchange bias) at the nanoscale (thin films, ferromagnetic particles embedded in antiferromagnetic matrix, core shell particles In the last years HMN focused his attention on interface exchange coupling between Ferro(ferri)magnetic and.)
Candidate fellows must send their candidature with a short description of their profile to the following email address	davide.peddis@unige.it