

JOB ADVERTISEMENT AREA Science Park, Trieste, Italy

We have now multiple openings to work at LAME (Laboratorio di Microscopia Elettronica) in the newly establishing world-class Electron Microscopy Center at Area Science Park in Trieste (Italy).

Valuable research associates will be given the opportunity to work in an international and multidisciplinary environment to perform cutting-edge research and be involved in competitive research projects.

For a full description of LAME, go to the next page.

Highly motivated candidates will be selected to fill the following professional profiles:

Position N. 1 - Research Technologists (18 months, with possible permanent career prospects)

In situ/in operando characterization of materials systems by electron microscopy and combined synchrotron spectroscopies in multiple environments

Experience in electron microscopy and characterization of chemical and physical properties of materials, as well as good knowledge of sample preparation techniques for electron microscopy. Prior experience in instrumentation development for TEM/STEM characterization in a controlled environment, in operating materials handling systems using Focused Ion Beam for deep chemical/physical measurements of materials (e.g., slice-and-view, lamellae extraction), of developing instrumentation for correlative approaches will also be positively evaluated.

Research activity

The successful candidate will work at the experimental activities concerning in operando characterization by transmission electron microscopy of different materials systems (e.g. catalysts, liquid/solid interfaces, batteries) in different environments (liquid, ambient pressure, etc...). He/she will contribute to the design of MEMS nanoreactors for operando TEM on different applications (batteries research as well catalytic applications) in combination with other techniques also including synchrotron spectroscopy. He/she will work in strong synergy with the research groups working in cleanrooms on nanofabrication techniques as well as with the groups working on synchrotron radiation spectroscopy within the AREA Science Park campus in Basovizza.

Ideal start of the activity: January 1st 2024

Position N.2 - Research Technologist (18 months, with possible permanent career prospects)

Advanced characterization by electron microscopy of nanostructured materials and on heterostructures based on strongly correlated systems

Experience in transmission electron microscopy and characterization of chemical and physical properties of materials as well as good knowledge of typical materials science research topics generally addressed by electron microscopy and its complementarity with other experimental techniques. Prior experience in TEM/STEM characterization of complex oxide systems, EELS, data analysis and simulation of TEM/STEM images, and on in-situ TEM/STEM experiments will also be positively valued.

Research activity

The successful candidate will work at the experimental activities concerning characterisation by scanning and transmission electron microscopy of nanostructured materials in strong connection with the research groups devoted to thin films growth and synchrotron-based advanced electronic characterization operational within the AREA Science Park campus in Basovizza.

Ideal start of the activity: January 1st 2024

Additional information on the general framework of the Research activities

In line with the specific characteristics of the profiles of the different open positions, successful candidates will work on competitive research projects in the area of electron microscopy applied to materials science as well as on instrumentation development for correlative approaches between different instrumental techniques, including the design of advanced sample preparation methods for electron microscopy and devices for in-situ/in-operando analysis on different instrumentation and their transfer to controlled environment. They will be involved in training and access provision to national and international academic and industrial users and will contribute to scientific dissemination seminars and events to promote collaborations at national and international level. They will actively contribute to the

installation and commissioning of the instrumentation being acquired in the electron microscopy laboratories.

Candidates are encouraged to contact Dr. Regina Ciancio – Head of LAME - (preferably as soon as possible) for further information about the position, technical issues regarding the application, and perspectives (regina.ciancio@areasciencepark.it)

DESCRIPTION OF LAME

The Electron Microscopy Center (LAME, LABORATORIO di Microscopia Elettronica) at AREA Science Park in Trieste has formally established in 2022 and focuses its activities on the advanced characterization of materials, as part of the Innovative Materials Platform. The main research activities at LAME are:

- Advanced analysis of materials using TEM instrumentation capable of carrying out nanostructural analyzes using a corrected probe up to sub-Angstrom resolution and electron loss energy spectroscopy up to resolution lower than 300meV;
- Fine analysis of materials using TEM instrumentation capable of carrying out high resolution TEM and STEM analyses, tomographic and chemical compositional analyses;
- Nanomanipulation, growth of nanostructures and in-situ preparation of lamellae for TEM microscopy using dual beam focused technology (Dual Beam FIB-SEM);
- Morphological and chemical-compositional analysis of materials by scanning electron microscopy (SEM);
- In-situ/In-operando TEM/SEM analysis of transient states inside materials such as structural transitions, effects of corrosive processes, etc.

These research activities are presently carried out at the existing [Electron Microscopy Facilities](#) which operate in full synergy with the Research Infrastructures [Elettra Synchrotron and FERMI Free Electron Laser](#) as well as and with the other institutes and companies within the Area Science Park Campus in Basovizza.

Toward the establishment of a world-class Electron Microscopy Center.

LAME is facing a groundbreaking transition, which is to set up an international microscopy center equipped with state-of-the-art instrumentation for the advanced characterization of materials by electron microscopy. Here a list of some of instrumentation now in course of acquisition:

- a JEOL Grand Arm 300 KV (cold FEG), state-of-the art double corrected TEM/STEM microscope equipped with tools for low dose TEM and STEM imaging modes; phase contrast methods in TEM and STEM, including techniques based on 4D STEM; optimized bright field and DPC for visualization of light elements (e.g. Li), advanced data processing, EDX and EELS; high resolution EELS spectrometer coupled to a hybrid pixelated detector for low background noise spectroscopy and measurements at high energy range; advanced data analysis based on open-source python-based packages.
- a JEM F200 TEM/STEM (cold FEG) equipped for advanced chemical analysis, EDX and EELS, tomography and in-situ applications
- a latest generation plasma FIB-SEM for ultimate sample preparation, advanced slice and view (including sample transfer);
- a SEM/STEM, equipped with all analytical detectors including EBSD applications.

LAME is currently part of many research national and EU programs and works in close collaboration with the academic and industrial world as well as with national and international bodies, providing open access to electron microscopy laboratories also in combination with other instrumentation. LAME is deeply involved in the IMPRESS project (coordinator Regina Ciancio) which aims to revolutionize the field of electron microscopy. For more info about the IMPRESS project, please go to: www.e-impres.eu or follow the e-impres LinkedIn page.