Elettra Sincrotrone Trieste Scientific Computing IT Group



PhD Funding opportunities

while working in a multidisciplinary research center of excellence

Elettra Sincrotrone Trieste (<u>www.elettra.eu</u>) may partially fund the PhD of young researchers while providing them with the opportunity to work in challenging research topics in world-class laboratories. This opportunity is for graduates who are planning to pursue a PhD program or are already in the early stages of attending one. The PhD should be with any faculty of the University and supervised by members of it but the candidate is expected to work and be present

on-site in Elettra Sincrotrone Trieste in a regular basis. The selected candidates will become members of the **Scientific Computing** team and will collaborate with its researchers. The available opportunities are for each of the following topics:



Computational Imaging as in i) software development for instrument control and data acquisition, and ii) mathematical and algorithm aspects of Coherent Diffraction Imaging. These will be done for the TwinMic and DiProl labs (<u>https://www.elettra.eu/it/lightsources/elettra/elettra/elettra-beamlines/twinmic/twinmic.html</u> and <u>https://www.elettra.eu/lightsources/fermi/fermi-beamlines/diproi/diproihome.html</u>). It will require strong mathematical command, software development in Python, and general interest on the physics of the techniques.

Artificial Intelligence for the analysis of scientific data: the researcher is expected to get familiar with multiple experimental techniques used in various Elettra labs (e.g. X-ray microscopy) and propose and implement useful applications of AI in their data. It will require advanced knowledge of a broad spectrum of AI topics, software development in Python, and willingness to learn about the various techniques used in the Elettra laboratories.

Computational Workflows for data processing pipelines. Special types of labs (called beamlines) acquire massive amounts of data which should be processed in fast and efficient ways. This requires partially automated data processing workflows of high complexity. The candidate is required to work for the development of such workflows for the beamlines Xpress, XRD-1 and XRD-2 (<u>http://www.elettra.eu/it/lightsources/elettra/elettra-beamlines/xrd1/xrd1.html</u>). It will require knowledge of advanced software engineering, Shell scripting and familiarity with Unix systems.

Computed Tomography as in i) advanced use of existing CT software systems, ii) providing support and data analysis services, iii) participation in projects, and iv) development of new algorithms. These will be done for the SYRMEP CT lab (<u>https://www.elettra.eu/it/lightsources/elettra/elettra-beamlines/syrmep/syrmep.html</u>). It will require knowledge of CT and imaging, software development in Python and C.

This working experience in a research facility should enrich the thesis of the candidates but will not interfere with their supervision. The initiative is expecting dissemination of the obtained results in the form of publications. This is a standard practice of the Scientific Computing team and the Elettra beamlines (http://www.elettra.trieste.it/it/lightsources/labs-and-services/scientific-computing/publications/all.html).

This opportunity is offered by the *Advanced Integrated Imaging Initiative* (AI³); project #P2017004 of Elettra Sincrotrone Trieste.

For further information and clarifications please contact us at <u>roberto.pugliese@elettra.eu</u>