

Integrated Systems for Molecular Profiling of Circulating Tumor Cells

Proposers

Paulo Freitas, Inês Pinto (INL), Susana Freitas (INESC MN,) in collaboration with IPATIMUP.

Circulating Tumor Cells (CTCs) are emerging tumor biomarkers that can be detected from the peripheral blood of cancer patients, and are viewed as “liquid” biopsy samples for cancer prognosis and diagnosis. In addition to their prognostic value, the molecular characterization of CTCs offers an exciting opportunity to better understand the biology of metastatic development and resistance to established therapies in cancer patients. However, because CTCs are very rare, their detailed analysis presents technical challenges.

This project aims to develop an integrated Lab-on-a-Chip (LOC) device for the detection, and recovery of CTCs from blood samples in a format optimized for downstream molecular characterization. This system can be envisaged as complimentary diagnostic and follow-up tool, functioning both as a rare cell cytometer as well as a phenotypic and genotypic profiler *in situ*. The proposed system results from the integration of diverse state-of-the-art micro- and nano-fabricated components, allowing unprecedented automation and high throughput processing of samples from body fluids. Having a tool capable to accurately identify and monitor in real time these biomarkers at the point-of-care, will be critical to provide an early and precise diagnosis of cancer.

Profile sought: preference, but not limited, to students with a background in Systems Biology, Biomedical Engineering, Biochemistry and Biology with an interest in Devices, and Micro and Nanofabrication.