

Postdoctoral position opening

Droplet microfluidics platform for metatranscriptomics analysis by single-cell barcoding

Physics and Astronomy Department & Molecular Medicine Department
University of Padova, Italy

Project and job description

Our planet faces significant changes: regional shifts, global warming, **spreading of antimicrobial resistance** and biodiversity loss marked by an increase in variability of environmental conditions. As highlighted in the **Biodiversity Strategy of the European Green Deal**, there is an increasing awareness about the impact that these changes have on the planet. The advent of modern genome sequencing techniques generates an increasing volume of ecologically and biologically relevant data spanned over a wide range of scales. However, the **heterogeneity** of bacteria populations cannot be investigated by conventional approaches. As largely demonstrated during the past ten years, droplet microfluidics offers a unique set of tools for achieving information at the single-cell level. This project aims to develop a **droplet microfluidics platform for single-cell barcoding** devoted to **metatranscriptomic analysis**. To reach this goal, the project is divided in three steps: (i) set up the microfluidic platform for transcriptomics based on microfluidics approach; (ii) validate the infrastructure with well-established mammalian cell lines; (iii) modify and validate the platform for investigating different bacterial strains grown under different conditions at the single-cell level. The aim of this activity is to produce new knowledge addressed to both biological and microfluidic communities, develop a new platform for single cell barcoding and create new collaborations based on this technology. Therefore, publications in high impact peer-reviewed international journals are expected. The candidate will work closely with the Principal Investigators of the project (prof. Matteo Pierno, Dr. Davide Ferraro) and in close collaboration with the department of Molecular medicine at the University of Padova, having full access to the laboratory of prof. Paola Brun. The selected applicant will join a highly cooperative group active in different research fields, such as soft-matter, surface phenomena, optical manipulation (www.lafsi-unipd.it).

Required qualifications

Applicants must hold a **PhD** or a **Master** degree in *Physics, Materials Science, Chemistry, Biotechnology or related discipline*. Applicants should provide documented academic and/or professional experience of at least three years. Applicants are expected to have a strong background in microfabrication and microfluidics. Experience in molecular biology and sequencing will be highly considered.

Responsibilities

The applicant will be the main responsible for the biological validation of the microfluidic platform. Tasks includes but are not limited to microfabrication and validation of the microfluidic devices, molecular biology workflow optimization and sample preparation for downstream sequencing, in collaboration with the department of Molecular Medicine of the University of Padova. The candidate is expected to supervise possible Bachelor and Master students involved in the project.

How to apply

Interested applicants should send their CV along with a cover letter (max one A4 page) to matteo.pierno@unipd.it and davide.ferraro@unipd.it by the 30th June 2021.

Starting date: within the time period September-December 2021.

Contract period: two-year fixed term contract (1+1 years).

Gross Salary: 24.330 Euros/year.