DC 1: Development and characterisation of a system for multispectral DOT implementing adaptive strategies.

Project Description: Diffuse optical tomography (DOT) is an imaging modality where the optical properties of a biological sample are estimated from boundary measurements of visible or near-infrared light. The objective of the work is to develop a system for time-resolved multi-spectral diffuse optical tomography implementing structured light illumination and single-pixel camera detection working for biological tissues on the macro scale. This system will enable the implementation of adaptive, data-driven strategies to strongly reduce the number of acquisitions without information loss. The candidate will collaborate with DC2 for the modelling of light propagation in the tissue and image reconstruction, and with DC3 for the implementation of deep-learning strategies.

Expected Results: Construction of a system for multispectral diffuse optical tomography based on structured illumination and compress sensing. Implementation of an adaptive, data-driven acquisition strategy for maximizing the information content. Performance assessment and validation of the system with dedicated phantoms mimicking the optical properties of biological tissues (work performed jointly with DC2).

Requirements

- Internationally recognised Master-equivalent degree in fields of science or engineering related to optics or photonics. The degree must be completed by the start of the PhD.
- Good programming skills in commonly used languages (e.g. Matlab, Python, C/C++, LabView).
- Ability to work both independently and in a team.
- Previous research experiences are positively evaluated.
- English fluency* (Both written and oral). English fluency can be demonstrated by providing evidence of any of the following: TOEFL (CBT) – >= 210; TOEFL (iBT) – >= 78; TOEFL (PBT) – >= 547; TOEFL (ITP®) – >= 543; TOEIC – >= 720; IELTS – >= 6; Trinity College London – >= ISE II.

Exceptions for native speakers and applicants having completed a prior cycle of studies in English apply. Click here to learn more about your specific requirements!

Host Institution: CNR (Milan, Italy)
Supervisor: Dr. Andrea Farina

Estimated gross allowance: 38,217 €/year

PhD awarding institution: POLIMI

Secondment 1	Secondment 2	Secondment 3
Partner: VIALUX	Partner: UEF	Partner: DATATRIX
Supervisor: Dr. Jens Kümmel	Supervisor: Prof. Tanja Tarvainen	Supervisor: Dr. Matteo Bergonzio

Planned Starting Date: 12/09/2023 or 01/11/2023   **Application Deadline:** 15/05/2023

Contact: andrea.farina@polimi.it