DC11

Project title: Data-driven methods for experimental guidance and image analysis

Place of employment and planned mobility*:* Technical University Munich (TUM), Germany: 36 months

- AMU (Margeat): 4 months, from M18; Purpose: Bayesian optimization for ink formulation.
- Fluxim (Jenatsch); 3 months, from M30; Purpose: inclusion of data augmentation to CNNs.

Supervisory team: Prof. Alessio Gagliardi (TUM)

Project tasks and objectives:

1) Develop a state-of-the-art Bayesian Optimization (BO) scheme, based on standard and deep Gaussian processes (GP) for the optimization of solution processed perovskite devices fabrication. This will include concentration and composition optimization in a tight loop with experimentalists.

2) Applying Convolutional Neural Networks (CNN) for the segmentation and analysis of experimental images for films and devices, e.g., plain RGB pictures and PL maps, for the prediction of optical and electrical properties. The model will be also extended to analyze videos by embedding the CNN model into a sequence-to-sequence model like LSTMs or Temporal Fusion Transformer (TFT) Networks.

The DC will acquire an interdisciplinary knowledge of data-driven methodologies applied to novel photovoltaic materials and devices.

The DC will also be involved in dissemination through social media promotion of the network, such as project webpages, LinkedIn groups, YouTube video channels and blogging.

Starting date: March 1st, 2025. Negotiable.

Duration of the work contract: 36 months/full-time contract

Trial period: 12 months

Target degree: PhD degree from Technical University Munich, Germany

Approximate gross salary: about 3342 EUR/month (+ a topping mobility allowance is possible). With a family allowance of about 495 EUR/month.

Eligibility: Recruited researchers can be of any nationality. Doctoral Candidate must be eligible to be enrolled into Doctoral Program at Technical University Munich and have not been awarded a doctoral degree. The researcher must not have resided or carried out his/her main activity (work, studies, etc) in the country of his/her employer (TUM, Germany) for more than 12 months in the 3 years immediately prior to his/her recruitment.

Required qualification skills:

- experience with using machine learning methods;
- hands-on experience with data generation and engineering;
- excellent oral and written communication skills in English;
- willing to work collaboratively;

This project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie Grant Agreement nro. 101169056

The applicant must be in possession of Master of Science (MSc) diploma at the beginning of the employment.

English language requirements: Proficiency in written/spoken English is mandatory. In certain cases, we may ask for a language certificate.

Application

Closing date: 10.12.2024

The applicant must submit the following documents through **alessio.gagliardi@tum.de** (clear copy only of the documents will be considered):

- **Certified copies of the bachelor's and master's degree certificates with the Diploma Supplement (DS)** as approved by the EU Commission for degrees completed in European universities (when applicable) Official translations into English (if the original documents are in a language other than English)
- **Curriculum Vitae/CV** (preferably in Europass format)
- **List of publications (if any)** your contributions in the publication
- **References**: Contact details of 2 or more referees included in the CV
- **Motivation letter**: maximum 1 page where you introduce yourself and present your qualifications; you may include also your previous research fields and main research results. Please emphasize your future goals career-wise
- **Proof of residence**: Statement and certificates/documents demonstrating your residence(s) in the last 4 years

Please note that we will begin conducting interviews during the application period, so early applications are encouraged. This allows us to get to know candidates as soon as possible and keep the process moving efficiently. Please apply at your earliest convenience!

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