ENERGETICS

Università Tor Vergata/Denerg - Use of Artificial Intelligence Techniques for the Optimization of Innovative Solar Cell Production

Funded By	UNIVERSITA' DI ROMA - TOR VERGATA [P.iva/CF:02133971008] Dipartimento DENERG

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Context of the research activity	We aim at developing and use state-of-the-art data driven and artificial intelligence algorithms (i.e., sequential or active learning approaches) for optimally orchestrating highly scalable production processes of new photovoltaic (PV) solar cells.

Objectives	In this doctoral work we aim at developing and use state-of-the-art artificial intelligence algorithms (i.e., sequential or active learning approaches) for optimally orchestrating the automatic production of new photovoltaic (PV) solar cells. In particular, this project aims at optimizing highly scalable synthesis processes of solar cells and other solar devices, and is perfectly aligned with the objectives of the European Green Deal, to help supporting the ecological transition and de-carbonization of the economy, with the goal of achieving climate neutrality by 2050. The project is partly funded by the Department of Energy at Politecnico di Torino (i.e. Multi-Scale Modeling Laboratory – SMaLL: www.polito.it/small), and partly the University of Tor Vergata in Rome (Dipartimento di Ingegneria Elettronica) and it benefits of both national and international collaborations with other leading research groups in Italy and Europe. The successful candidate will have the following duties: 1. Use state-of-the-art artificial intelligence algorithms to optimize the production of new PV solar cells; 2. Orchestrate the automatic production of new solar devices, and optimize the synthesis processes of solar cells and other solar devices; 3. Analyze and interpret simulation and experimental results to gain insights into the mechanisms governing cell performance;

	4. Collaborate with experimental researchers to validate simulation results and guide the design of new materials/devices.

Skills and competencies for the development of the activity	Basic knowledge on applied thermodynamics; Some prior experience on machine learning and artificial intelligence algorithms; Some prior experience on computational modelling and simulations