MIREL AI

PhD position 11: Intelligent inline failure analysis based on thermal imaging and AI

Employers

Prof. Bernhard Wunderle from Technische Universität Chemnitz (TU Chemnitz) in Chemnitz, Germany and Dr. Mohamad Abo Ras from Berliner Nanotest und Design GmbH (Nanotest) in Berlin, Germany are looking for a PhD candidate to join a 22 months research training within the EU-funded MCSA industrial doctorate MIRELAI. You will be enrolled in the PhD programme of Technische Universität Chemnitz (TU Chemnitz) and supervised by Prof. Bernhard Wunderle and Dr. Daniel May (TU Chemnitz).

Project description

Thermal imaging is a topical method to detect buried flaws (as e.g. material inhomogeneities, cracks, delamination and artefacts or geometric tolerances) in electronic packages which are caused by processing or during operation and thus represent quality and reliability concerns and have to be detected inline by non-destructive techniques. To allow classification of these defects, AI-based methods are to be employed after post-processing of the thermographs for contrast enhancement. One of the partners (Nanotest) addresses as an SME the Inline Inspection Equipment market for micro,- opto,- and power-electronic module production and has been successfully receiving scientific support from TU Chemnitz in longstanding cooperation with many contancts to industry, the local ecosystem of SMEs and academia as well as the international scientific community. So the task is to develop a methodology consisting of numerical and experimental techniques for defect detection using thermographic image processing and AI-based methods (Neural Networks). In more detail this involves: (1) IR- or thermo-reflection based detection methods enhanced by adaptable hardware (different high energetic excitation sources as for example laser, current, flashlight or eddy current) on advanced stress testing equipment (e.g. grease pump-out testing), (2) Physical understanding generated by multi-field modelling of various defects using finite element modelling to interpret the results obtained from thermography. (3) Extraction and identification of each defect unique thermal signature over time using both, physics as well as AI-based methods. (4) Validation on defects of various kind on benchmark samples.

International mobility

As a PhD candidate, you will be employed for 4 months by TU Chemnitz and 18 months at Nanotest.

Requirements

Specific Eligibility Criteria on the Horizon Europe: Marie Skłodowska-Curie (MSCA) programme apply, including the mobility rule and PhD rules. Applicants of any nationality are welcome.

Additional requirements

· Master's degree in Physics, Material Science or Electrical Engineering
· Background in AI-Methods, Finite Element Simulation, Materials, Failure Analysis, Packaging desirable
· English proficiency: fluent

The monthly support and benefits

· The successful candidate will benefit from an excellent technical and scientific environment, well equipped and staffed. Both academic as well as SME/industrial partner work in international and interdisciplinary teams eager to share their experience and welcome a new member in our friendly and communicative team. We offer international and scientific flair, the best of both worlds in science and technology, true integration into the team, working on an applied subject and get to know SME/industrial boundary conditions. Possibility of attend conferences on the topic to meet the scientific community.
· Personalised career development plans will be established to support the needs of the PhD candidate
· The Phd candidate will receive an attractive salary in accordance with the MSCA regulations. The financial package will include: 1) Living allowance of €3,450 (country correction coefficient applies), 2) Mobility allowance of €600, 3) Family allowance (€660), if applicable. The exact (net) salary will be confirmed upon appointment and is dependent on local tax, social and health insurance regulations and the country correction factor and be subject to deductions of employment costs.

Application

Required documents:	Complete applications in English should include:
	· CV, incl. Letter of motivation, and incl. Letter(s) of recommendation
	· English language proficiency certificate(s) (not for native speakers)
	· Transcripts of Student Records

Selection process:	· Our selection procedure for PhD position is open, transparent, merit-based and in line with the principles set out in the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers · The application dossier needs to be submitted as a single PDF file to Nanotest by Oct-15-2024. Please indicate in the subject line: 'MIRELAI: **PhD position 11** - your name' · Pre-selected candidates will be invited for interviews by Nov-01-2024. Unsuccessful applicants will not receive any notification
Application deadline:	Oct-15-2024
Expected start date:	The PhD project is set to start between Nov-01-2024 and Dec-01-2024
Contact person for enquiries:	Dr. Mohamad Abo Ras Email address: aboras@nanotest.du Phone: +49 30 6392 3880