



Industrial Postgraduate Programme (IPP) PhD Thesis - Machine Learning-based Atomistic Modelling for Material Imaging and Recognition in IC Devices

Job description

Industrial Postgraduate Programme (IPP) PhD Thesis

Infineon is offering a PhD thesis topic on "Machine Learning-based Atomistic Modelling for Material Imaging and Recognition in IC Devices" under the Industrial Postgraduate Programme (IPP) from the Economic Development Board (EDB).

Background/ Objective:

Rapid advances in scaling and aggressive design requirements have produced nanoscale integrated circuit (IC) devices using a variety of innovative materials and structures. However, electrical, mechanical, and thermal modes of failure continue to pose huge reliability risks for semiconductor devices, and there is thus a strong need to elucidate the physics that control performance. Computational atomistic modeling and simulation have proven to be a robust tool for supplementing experimental methods, and have greatly advanced the understanding of many systems at the nanoscale. To directly overcome existing bottlenecks in model development and improve the acquisition of representative material information for simulating targeted scenarios, this project will apply state-of-the-art machine learning techniques on image datasets to accelerate and simplify materials characterization in IC devices.

Scope of Work:

Students will get to embark on use case-inspired research where they will apply machine learning algorithms to efficiently post-process and understand images generated via existing characterization methods such as SEM and STEM. The image recognition capabilities developed will then be used to resolve, model, and investigate material systems of interest in IC packaging at the atomic level.

Key responsibilities include:

- Conducting literature reviews on current research progress in machine learning for materials science.
- Designing computational workflows and identifying dataset requirements for target applications and use cases.
- Training, testing, and developing robust deep learning models for material recognition from experimentally obtained images.
- Performing atomistic simulations on deep learning-derived material models to investigate the properties and performance of the target system.
- Preparing and presenting progress reports and publications.

At a glance

Location: **(Singapore)**
Job ID: **49593**
Start date: **immediately**
Entry level: **0-1 year**
Type: **Full time**
Contract: **Temporary**

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Job ID: **49593**

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The candidate will receive:

- A monthly stipend of S\$4,000
- Full sponsorship of school fees

Profile

To be eligible for the IPP Scholarship, candidates must:

- Be a Singaporean Citizen or Permanent Resident at the time of application
- Be eligible for full-time PhD studies
- Have an interest in computational materials science, physics, and engineering
- Knowledge in IC packaging and semiconductor device fabrication

