



Background information

ASML's metrology solutions aim at inspecting the quality of semiconductor devices such as memory or logic chips. This is done by measuring certain physical parameters, for example the misalignment between different layers in the semiconductor stack or feature sizes. These measurements are based on inferring physical parameters of interest from optical signals acquired with the YieldStar system. Inference uses data-driven mathematical models that relate the physical parameters to the optical signals. The quality of such models is critical to ensure a high accuracy of the measured parameters.

Your assignment

This project aims at exploring new machine learning techniques which can improve the accuracy of the measured parameters. A key to achieve this goal is to enhance the models' capability to extract relevant signal components and the models' resistance to variations in the manufacturing process.

To enhance model accuracy, additional terms are incorporated into the cost function to embed physical prior knowledge about the system. These priors are currently designed by engineers with domain expertise. This project aims to develop an automated pipeline that leverages advanced large language models (LLMs) to generate such priors.

Educational level:

- Close to graduation of a MSc program

Required skills:

- Solid understanding in linear algebra, calculus and statistics
- Good understanding in machine learning and mathematical modeling
- Good working knowledge of Python (previous exposure to MLOps is preferred but not necessary)

Change the world – one nanometer at a time

This assignment will be carried out in the Modeling & Inference Group at ASML in Eindhoven. This is a graduation internship for 5 days a week with a duration of 6-12 months.

In addition to a monthly internship allowance of maximum €600 (plus a possible €450 housing allowance), you'll get practical guidance from experts at ASML D&E and experience the difference between industry D&E and academia research. Working in a stimulating team environment at the cutting edge of technology, you'll gain valuable experience in a highly innovative environment that sparks your imagination and creativity.

In addition, you will have the chance to enhance your skills in:

- Collaborative code development with Python
- Cutting-edge classical and modern (generative) AI-based approaches
- Development of mathematical concepts/bounds with concrete applications for cutting-edge products

ASML: be part of progress

Headquartered in the Netherlands, we manufacture the complex lithography machines that chipmakers use to produce integrated circuits, or computer chips. What we do is at the heart of all the electronic devices that keep us informed, entertained and connected. Every day, you use electronics that simply wouldn't exist without our machines.

Behind ASML's innovations are engineers who think ahead. The people who work at our company include some of the most creative minds in physics, electrical engineering, mathematics, chemistry, mechatronics, optics, mechanical engineering, and computer science and software engineering.

We believe we can always do better. We believe the winning idea can come from anyone. We love what we do – not because it's easy, but because it's hard.

How will you be part of progress?

Contacts

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