FRM II
Forschungs-Neutronenquelle
Heinz Maier-Leibnitz

Technische Universität München

The Technical University of Munich (TUM) operates the Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) in Garching near Munich, which is one of the most powerful and modern neutron sources. The leading position in science in the field of research with neutrons is achieved by a cooperation between the TUM and the Helmholtz Centres in Jülich and Geesthacht under the name Heinz Maier-Leibnitz Zentrum (MLZ).

We are offering a:

Master Thesis:
GPU accelerated high resolution neutron imaging

We offer a master thesis for neutron imaging with CUDA at the Research Neutron Source Heinz Maier-Leibnitz (FRM II) Technical University of Munich. You will be involved in our NeutroSense BMBF project at the Antares beamline, which integrates a wide-field microscope with a high speed camera to enable high resolution neutron imaging. Specifically, our goal is to improve the achievable spatial resolution for neutron imaging based on event-based reconstruction via centroiding.
You will be working in close collaboration with the research scientist in this project. Your task will be to conduct and optimize CUDA programming to process the images streaming from the high speed camera via Nvidia GPU(s) in real time. A validated image processing code in Python is already available. Your task will be to implement and optimize the algorithms into CUDA. The image processing pipeline for a single frame mainly includes image denoising, events segmentation (i.e. via region growing) and center of mass calculation of each region to get the accurate event position.

Your qualification profile:

- Very good programming skills with C++, CUDA and Python
- Good knowledge on image processing
- High degree of motivation and ability to work independently and complete tasks efficiently
- Excellent communication skills with a focus on teamwork, willingness to work closely with team members
- Good ability to communicate and write in English.

If you are interested and want to get more information, please send us a short motivation letter and your CV to: Dr. Yiyong Han (yiyong.han@frm2.tum.de) and Dr. Michael Schulz (michael.schulz@frm2.tum.de)

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