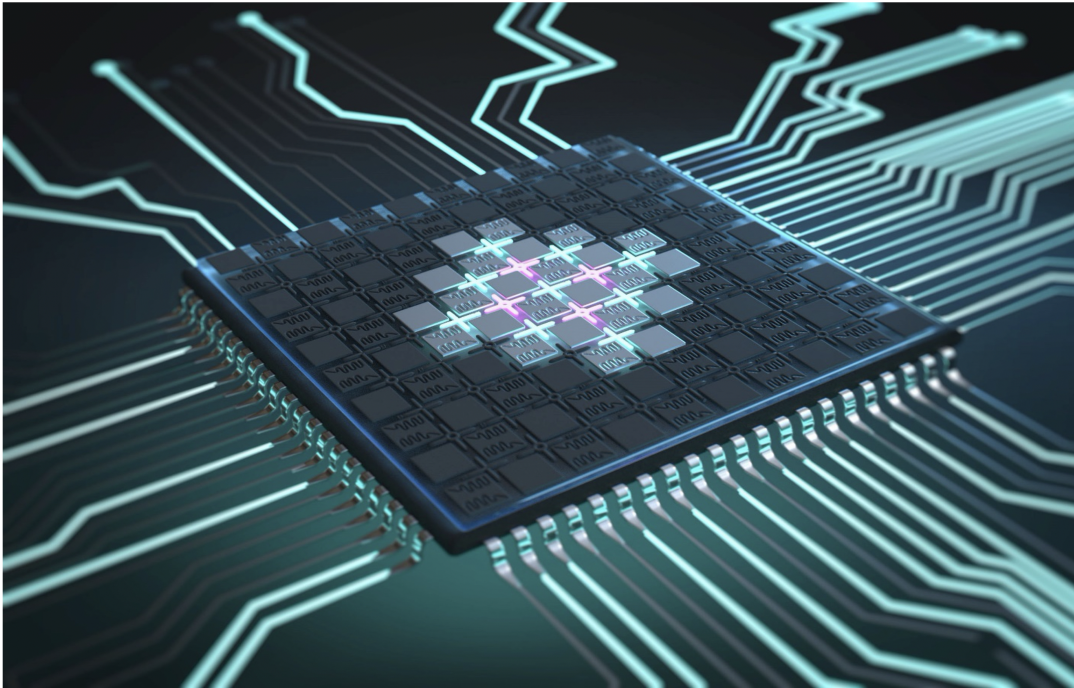




Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,500 employees in one of Europe's biggest research centres and help us to shape change!

The Peter Grünberg Institute – Neuromorphic Software Eco Systems (PGI-15), led by Prof. Dr. Emre Neftci, investigates neuromorphic computing technologies that learn and operate in ways inspired by the brain. Guided by this vision, we draw on the structure and function of biological neurons to design more efficient and powerful learning systems. The event camera, a neuromorphic vision sensor inspired by the human eye, captures brightness changes asynchronously with high temporal resolution and extremely low power consumption. These unique properties make it particularly well-suited for robotics. This thesis project leverages event cameras and multi-modal sensor data to advance neuromorphic computer vision for robotic perception, with a focus on motion prediction and energy-efficient neural network models.

We are looking to recruit a

Master thesis - Neuromorphic Computer Vision for Robot Perception

Your Job:

This thesis focuses on designing, evaluating, and deploying algorithms for robot perception and control. The main task is predicting both self-motion and the motion of surrounding agents to enable safe navigation, using the event camera as the primary sensor. The approach leverages prior information such as object detection, optical flow, and depth, while also integrating multimodal inputs including IMUs, radar, and standard cameras to ensure robust perception in complex environments.

Experiments are conducted using established outdoor benchmark datasets as well as a custom indoor dataset created for this work. Data is collected in a laboratory with a robotic platform equipped with state-of-the-art sensors.

The project evaluates SNNs, RNNs, and Transformers to exploit the temporal resolution of event cameras, with the goal of achieving accuracy, efficiency, and real-time performance on robotic platforms powered by edge-computing hardware. In addition,

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application via our

Online-Recruitment-System!

Questions about the vacancy?

Get in touch with us by using **our contact form**.

Please note that for technical reasons we cannot accept applications via email.
www.fz-juelich.de

knowledge of Model Predictive Control (MPC) is considered valuable for integrating perception with control during deployment.

Your Profile:

- Current master studies in physics, computer mathematics, electrical/electronic engineering or a related topic
- Prior programming experience in Python is a must, C++ and CUDA experience are a plus
- Familiarity with PyTorch and modern deep learning frameworks
- Experience in training and evaluating computer vision models
- Experience with event-based cameras, neuromorphic vision concepts, spiking neural networks, and/or neuromorphic computing is a plus
- Experience with, or willingness to learn, ROS 2 for robotic system integration, and a strong interest in robot perception, computer vision, and sensor fusion

Please feel free to apply for the position even if you do not have all the required skills and knowledge. We may be able to teach you missing skills during your induction.

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We support you in your work with:

- A world-leading, interdisciplinary and international research environment, provided with state-of-the-art experimental equipment and versatile opportunities
- Qualified support through your scientific colleagues
- The chance to independently prepare and work on your tasks
- Flexible working hours as well as a reasonable remuneration

In addition to exciting tasks and a collegial working environment, we offer you much more: <https://go.fzj.de/benefits>

Place of employment: Aachen

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.

Further information on diversity and equal opportunities: <https://go.fzj.de/equality>