Radio detection and ranging (radar) is a system for measuring the distance between two objects. It operates well under variable weather and lighting conditions. Radar can therefore be utilized for tasks in autonomous driving. An inertial measurement unit (IMU) gives inertial information, which can be integrated to represent the relative movement between successive radar scans. Combining measurements from IMU and radar improves the robustness of systems. In this thesis, a radar-inertial odometry and mapping system is to be established. More specifically, the thesis is divided into the following work packages:

- Establishment of a sliding window optimization scheme for state estimation.
- Construction of a map of the environment.
- Evaluation on public data sets w.r.t. tracking accuracy.

Requirements:
Students with a background in computer science, mathematics or other engineering majors. Solid C++ programming skills are required. Pre-knowledges in state estimation, computer vision and ROS are welcome. The thesis can also be tailored to HiWi-jobs.

Emphasis:
- Theoretical Study
- Software Implementation
- Hardware Implementation

We offer:
- good support and advice
- highend infrastructure
- contact to industry and research partners

Contact:
- Ziyu Cao
  E-Mail: ziyu.cao@kit.edu
- Dr.-Ing. Kailai Li
  E-Mail: kailai.li@liu.se