



# Building an Open-Source Autonomous Vehicle Research Platform

## Masters Project Opportunity at Cyber-physical Systems Lab

### Project Overview

Design and develop a small-scale autonomous vehicle platform for robotics research and education at Uppsala University. This cutting-edge project combines systems design, embedded systems, sensor integration, and autonomous control algorithms, creating a versatile testbed for future robotics research.

### What You'll Work On

- Design and construct a robust 1/5 to 1/10 scale vehicle platform
- Integrate sensors (IMU, cameras, LiDAR) and compute hardware
- Implement ROS2-based software architecture
- Develop basic autonomous capabilities (path following, obstacle avoidance)
- Document and open-source the entire platform for future research

### Required Background

- Strong programming skills (C++/Python)
- Interest in robotics and autonomous systems
- Basic understanding of control systems
- Experience with ROS/ROS2 (preferred)

### Reference Projects for Inspiration

- AutoRally (Georgia Tech)
  - <https://github.com/AutoRally/autorally>
  - Scale: 1/5
  - Features: High-speed autonomy, aggressive maneuvers
- Cambridge Minicar
  - <https://www.semanticscholar.org/reader/fc62147a3dfbab9a55a26434ae24450a1abfd9d9>
  - Focus: Multi-agent decision making
- ORCA (ETH Zurich)
  - <https://github.com/idsc-frazzoli/retina>
  - Focus: Modular design, research flexibility

