



Open PhD Position at the AASS Learning Systems Lab

Active Safety for Autonomous Transportation in Unstructured Environments

Open PhD Position

A new PhD position is available at the AASS Learning Systems Lab, University of Örebro, Sweden. The 3-year PhD position is fully funded within the KKS project ALL-4eHAM (Project Leader: [Achim J. Lilienthal](#)).

Örebro University

The University of Örebro (<http://www.oru.se>) is a young university currently enrolling more than 14000 students. It is located in Örebro, a city with 100'000 inhabitants, which is situated in central Sweden at 59°16'N 15°13'E. More information about Örebro can be found, for example, at <http://en.wikipedia.org/wiki/Örebro>.



The AASS Learning Systems Lab

The Centre for Applied Autonomous Sensor Systems (AASS Research Centre, <http://aass.oru.se>) carries out multi-disciplinary research at the intersection of robotics, machine learning, artificial intelligence, computer vision, computer science,



and measurement technology. The research and human environment at AASS is young and enthusiastic. Researchers come from different countries and have different scientific and cultural backgrounds. AASS also frequently hosts international researchers and is involved in several international projects. This means that, particularly in the DIADEM project, the enrolled PhD candidates will have the opportunity to travel and to cooperate with people in other countries.

The Learning Systems Lab is one of three research groups within AASS. Our research is recognized world-wide with its focus generally on the development of algorithms and robotic/sensor systems for real-world tasks.

Major directions are Mobile Robot Olfaction, Robotic Map Learning, Robot Vision, Autonomous Transportation Systems, Programming-by-Demonstration and Tactile Exploration.



Further information can be found at <http://www.aass.oru.se/Research/Learning>. Currently, the Learning Systems Lab has a staff of 9 PhD students, 5 post-docs, 3 part-time professors and one associate professor.

The ALL-4-eHAM Project - Fully Autonomous Wheel Loaders for Efficient Handling of Heterogeneous Materials



The aim of the ALL-4-eHAM project is to develop a generic, modularized system for autonomous wheel loaders that deals with all aspects of the material handling cycle. The particular scenario studied is material handling at an asphalt production site. Scientific challenges of this project include the safety aspects of the whole system; perception and navigation in dynamic, unstructured outdoor environments; and loading heterogeneous materials from piles that are continuously heaped up by human operators and thus constantly change their shape. The optimal loading procedure has to be determined from a simulation of material behaviour and the current state of the pile. A further aspect is to optimize the system in terms of speed and energy efficiency to make it more environmentally friendly and economically superior to current solutions based on human operators. The project is a collaborative effort between Örebro University, NCC and Volvo CE.

PhD Studies

The focus of this PhD project is twofold. First, the task is to develop autonomous functions required for the ALL-4-eHAM wheel loader. Second, the PhD project will address internal safety (guaranteed behaviour of the software) and active safety (measures to prevent damaging objects/people in the environment based on multi-sensor input) of the system. The primary sensor modalities studied are 2D and 3D laser-range scanners, TOF cameras and stereo cameras. ALL-4-eHAM aims at novel solutions which are expected to have a significant impact on robotics and active safety in the automotive sector.

Prerequisites and Application Process

In addition to interest in the topic and solid programming skills, applicants should have the equivalent of a Masters degree in an appropriate field (for example: Robotics, Computer Science, Applied Mathematics, Physics). It is not necessary to be familiar with the Swedish language but proficiency in written/spoken English is mandatory.

To apply for the position, please send a motivation letter along with an updated CV (including at least two academic references) by e-mail to Achim Lilienthal (achim.lilienthal@oru.se). Applications can be sent immediately and will be considered until the position is fixed.

We are looking forward to *your* application!



Practical Information – PhD Studies in Sweden

PhD students in Sweden are University employees and they have all the social and financial rights of other employees. Among these: a fixed monthly salary adequate to the cost of living in Sweden, inclusion in the Swedish social security system, and at least 28 days of paid vacation each year. These conditions are guaranteed for three years as long as the requirements for the PhD studies are fulfilled.

PhD students in Sweden have to take advanced courses during their study program. These are typically technical courses relevant to their research project, but may also be courses about other related disciplines, including scientific methodology and project management. Courses at AASS are meant to provide students with a unique educational background in autonomous sensor systems.

PhD candidates in Sweden must devote up to 20% of their time to institutional work. This work typically consists in helping with the undergraduate education. The percentage of time spent with institutional work is added to the total duration of the PhD studies.

In summary, the PhD students at AASS will be doing four sorts of things during their PhD: work on their research project; take graduate courses; contribute to undergraduate education; and participate in the scientific life of AASS and of the international community.

More information about the PhD studies at AASS can be found under <http://www.aass.oru.se/Research/Learning/openphdposfaq.html>.

More Information

- Learning Systems Lab: <http://www.aass.oru.se/Research/Learning/index.html> (get to know us here!)
- ALL-4-eHAM, Web Page: <http://www.aass.oru.se/Research/all4eham/index.html>
- Contact Person: Achim J. Lilienthal, PhD, Assoc. Professor
- Contact Person, E-mail: achim.lilienthal@oru.se
- Contact Person, Web Page: <http://www.aass.oru.se/Research/Learning/amll.html>
- AASS: <http://www.aass.oru.se>
- PhD studies at AASS: <http://www.aass.oru.se/Research/Learning/openphdposfaq.html>
- Örebro University: <http://www.oru.se>