



# Information Application

The course will be taught in English. Participants can be awarded with 4 ECTS credit points on completion of the ROS Summer School.

## ROS Summer School location

FH Aachen | University of Applied Sciences

- > Faculty of Mechanical Engineering and Mechatronics, Goethestraße 1 in 52064 Aachen, Germany
- > Faculty of Electrical Engineering and Information Technology, Eupener Straße 70 in 52066 Aachen, Germany

**Requirements** | Applicants should have a basic knowledge of at least one programming language such as Python or C++.

**For more information** please refer to our ROS homepage [www.fhac.de/aaa/ros](http://www.fhac.de/aaa/ros)

The registration fee is 750 Euro and includes beverages and the social program (excursions included).

**For registration and further information** please contact: [ros@fh-aachen.de](mailto:ros@fh-aachen.de)



FH AACHEN  
UNIVERSITY OF APPLIED SCIENCES



# Robot Operating System (ROS) Summer School 2017

## 6<sup>th</sup> ROS Training and Competition at FH Aachen



organized by MASCOR (Mobile Autonomous Systems and Cognitive Robotics)



ZERTIFIKAT 2014



Vielfalt gestalten in NRW

Gemeinsames Diversity Audit des Stilverbandes und des Ministeriums für Innovation, Wissenschaft und Forschung des Landes Nordrhein-Westfalen

**HAWtech**  
HochschulAllianz für Angewandte Wissenschaften

ROS.org

ubuntu



FH Aachen | Bayernallee 11 | 52066 Aachen | [www.fh-aachen.de](http://www.fh-aachen.de)  
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# Why ROS?

There has been remarkable progress in the field of mobile robotics over the last couple of years due to advanced hardware like 3D sensors and powerful embedded systems for processing. However, the software has been upgraded as well: when Willow Garage launched the first version of ROS (Robot Operating System) in 2010, they started a standardization of the „middleware“ which drives the world of mobile robotics. ROS is open source and offers the required services of an operating system. It is fine grained and consists of numerous reusable modules. It also provides tools and libraries for obtaining, building, writing, and running code across multiple computers with a powerful communication engine. ROS offers solutions for the main problems in mobile robotics: localisation, mapping, path planning, locomotion and perception.



# Why another ROS

## Summer School?

Our first ROS Summer School in 2012 showed that a lot of students are interested in mobile autonomous systems, but do not know how to start. Our ROS Summer Schools provide the right starter kit by using our robotic hardware and – of course – ROS software. We first start with some days of introductory courses, before we tackle the main task of mobile robotics, i.e. perception, localization, mapping and path planning.

A highlight is a competition at the end of the second week: Summer School participants form different teams that have the task to design a typical mobile robotic application like indoor/outdoor exploration. They all use the same hardware, powered by their learnt ROS skills.

The ROS Summer School includes also some leisure activities, such as trips to Bonn, Cologne or Paris. Last but not least, we have a farewell barbecue at the end.



# Preliminary program planned for 14<sup>th</sup> August until 27<sup>th</sup> August 2017

## First week: 14<sup>th</sup> until 20<sup>th</sup> August

**14<sup>th</sup> August** | Registration, ROS Show, welcome barbecue

**15<sup>th</sup> August** | ROS Basics: Navigating in Linux and ROS Filesystem

**16<sup>th</sup> August** | ROS Basics: ROS internal Communication

**17<sup>th</sup> August** | Hardware interfaces, Transforms in ROS

**18<sup>th</sup> August** | Introduction to GAZEBO simulator, AR tag recognition

**19<sup>th</sup> August** | Day trip to Paris (France)

**20<sup>th</sup> August** | Day at leisure

## Second week: 21<sup>st</sup> until 27<sup>th</sup> August

**21<sup>st</sup> August** | Localization & mapping

**22<sup>nd</sup> August** | Path Planning

**23<sup>rd</sup> August** | Industrial exhibition

**24<sup>th</sup> August** | Exam, free hacking

**25<sup>th</sup> August** | Free hacking, competition, farewell BBQ

**Option** | UAV Workshop (please register in advance)

**26<sup>th</sup> August** | Basic principles of UAV design, components and functions, example setup of a multi-copter, first flight setup guide

**27<sup>th</sup> August** | Flight modes, GPS based behaviours, Interfacing with ROS, AR tags and UAVs

**Additionally, we offer excursions during the week to explore Aachen and other nearby cities (e.g. Cologne, Maastricht, Bonn).**