



# Leonard Bruns

*Doctoral Student in Robotics*

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## Personal Details

E-Mail leonardb@kth.se  
Date of birth 5th September 1994 in Nastätten, Germany

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## Education

- since 2019 **Doctor of Philosophy**, *KTH Royal Institute of Technology*, Stockholm  
Computer Science  
Division of Robotics, Perception and Learning, supervised by Prof. Patric Jensfelt
- 2017–2019 **Master of Science**, *KTH Royal Institute of Technology*, Stockholm  
T.I.M.E. Double Degree in Systems, Control and Robotics  
Track: Robotics and Autonomous Systems  
GPA 3.94<sup>1</sup>
- 2016–2019 **Master of Science**, *RWTH Aachen University*, Aachen  
Electrical Engineering, Information Technology and Computer Engineering  
Track: Information and Communication Technology  
German grade 1.0 (excellent) / GPA 4.0
- 2013–2016 **Bachelor of Science**, *RWTH Aachen University*, Aachen  
Electrical Engineering, Information Technology and Computer Engineering  
Track: Micro- and Nanotechnology  
German grade 1.3 (excellent) / GPA 3.8

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## Experience

- since 10/2019 **Doctoral Student**, *KTH Royal Institute of Technology*, Stockholm  
researching approaches to build object-level map representations to facilitate higher level planning and manipulation of the environment
- 03/2019 – 09/2019 **Master Thesis Student**, *Robert Bosch GmbH*, Renningen  
investigated the use of deterministic sequences and precomputed sets to achieve provable guarantees for sampling-based motion planning algorithms for nonholonomic systems, results were published in *IEEE Robotics and Automation Letters*
- 10/2018 – 01/2019 **Extracurricular Activity**, *KTH Formula Student*, Stockholm  
planned a new SLAM system from scratch, introduced proper git workflow in the team and improved the software architecture
- 11/2018 – 12/2018 **Teaching Assistant**, *KTH Royal Institute of Technology*, Stockholm  
taught in the course *Image Analysis and Computer Vision*, helped and examined students in the labs, topics covered: Fourier transform, edge detection, Hough transform, k-means clustering, mean shift segmentation, ...
- 06/2018 – 08/2018 **Internship**, *Ericsson Research*, Stockholm  
researched state-of-the-art calibration of mixed reality headsets, implemented calibration algorithms, cross-platform development for both iOS and Microsoft HoloLens, estimation of eye offset by mounting a camera inside the headset using OpenCV for image analysis, lead-authored related patent application

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<sup>1</sup>Swedish grades: A→4.0, B→3.5, ..., E→2.0; German grades: 1.0→4.0, 4.0→2.0 (ECTS weighted, linear)

- 04/2017 – 08/2017 **Internship**, *Bosch Deepfield Robotics*, Renningen  
performed multibody simulation and parameter identification of robot arm, implemented trajectory generation in Matlab, implemented and tested trajectory generation in ROS using C++, reduced latencies in ROS Control using PluginLib
- 11/2016 – 01/2017 **Student Assistant**, *RWTH Aachen University, Chair of Navigation*  
involved in the development of the Satellite Navigation Lab, implemented GPS signal decoding and subsequent calculation of the position, added visualization of the process with Matlab UI
- 10/2015 – 02/2016 **Student Assistant**, *RWTH Aachen University, Chair of Electrical Engineering and Computer Systems*  
analysis and layout of an integrated circuit for testing resistive switches
- 04/2015 – 07/2015 **Teaching Assistant**, *RWTH Aachen University, Institute of Man-Machine-Interaction*  
led practical exercise sessions of up to 30 students in the course *Fundamentals of Computer Science 2 - Principles of Digital Computers*, topics covered: boolean functions, simplification algorithms, microcontroller programming and assembler to second semester students, ...
- 10/2014 – 02/2015 **Teaching Assistant**, *RWTH Aachen University, Chair for Software for Systems on Silicon*  
led practical exercise sessions of up to 30 students in the course *Fundamentals of Computer Science 1 - Programming, Algorithms and Data Structures*, topics covered: programming fundamentals, C, sorting and search algorithms, ...

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## Languages

- German Native  
English Fluent (C1)  
Swedish Basic knowledge (B1/B2)

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## Technologies

- Languages C/C++, Python, Matlab, C#, JavaScript,  $\LaTeX$ , HTML/CSS, SQL  
Programs & Libraries ROS, OMPL, PyTorch, OpenCV, Matlab Simulink, TensorFlow, Unity3D, React, Cadence Spectre, Cadence Virtuoso, Gnuplot, Microsoft Office  
OS Linux, Microsoft Windows, macOS

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## Awards

- 2014–2019 Scholarship of the RWTH Education Fund  
2014–2019 Dean's List of RWTH Aachen (top 5% in the program)  
2013 Naspa-Schulpreis for outstanding performance in the subject maths  
2013 DMV-Abiturpreis

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## Publications

- 2019 Luigi Palmieri<sup>1</sup>, Leonard Bruns<sup>1</sup>, Michael Meurer & Kai O. Arras. Dispartio: Optimal Sampling For Safe Deterministic Motion Planning. *IEEE Robotics and Automation Letters*, 5(2), 362-368. (also accepted for presentation at *IEEE International Conference on Robotics and Automation*)

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<sup>1</sup>Equal contribution