Leonard Bruns

Doctoral Candidate

Personal Details

Address 11550 Stockholm, Sweden
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Education

2019 – 2025 **Doctoral Candidate**, *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[1]

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 / Top 4%

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 / Top 2%

Experience

10/2019 – 07/2025 **Doctoral Candidate**, *KTH Royal Institute of Technology*, Stockholm
conducted research on shape and pose estimation of objects and SLAM with neural scene representations; further collaborations on visual relocalization and Bayesian inference in dynamic environments; completed doctoral courses required for graduation (totaling 60 ECTS)

08/2024 – 03/2025 **Research & Development Intern**, *Niantic*, London
investigated large-scale pretraining for visual relocalization using scene coordinate regression; manuscript accepted for presentation at *IEEE/ CVF International Conference on Computer Vision (ICCV)* and filed patent application

03/2023 – 07/2024 **Software Engineer**, *Rerun*, Stockholm
worked part-time on visualizing recent computer vision algorithms with Rerun's open-source software to showcase what can be done, providing feedback, and testing its functionality

03/2019 – 09/2019 **Master's 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, published in *IEEE Robotics and Automation Letters* and was granted a patent

06/2018 – 08/2018 **Intern**, *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, authored and was granted a patent

04/2017 – 08/2017 **Intern**, *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*
designed layout and analyzed an integrated circuit to test resistive switches

11/2018 – 12/2018, 04/2015 – 07/2015, 10/2014 – 02/2015 **Teaching Assistant**, *RWTH Aachen University & KTH Royal Institute of Technology*
led practical exercise sessions and labs of up to 30 students in various computer science-related courses, covering programming fundamentals, various algorithms, and computer vision fundamentals

Languages

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

Skills

Languages	**Python**, **C/C++**, Matlab, C#, JavaScript, LaTeX, HTML/CSS
Programs & Libraries	**PyTorch**, **ROS**, **OpenCV**, **Open3D**, **OMPL**, Blender, Unity3D, Microsoft Office
OS	**Linux**, Microsoft Windows, macOS

Awards

2020	Friedrich Wilhelm Award for outstanding master's thesis
2020	Springorium Denkmünze for graduating with honors
2014 – 2019	Scholarship of the RWTH Education Fund
2014 – 2019	Dean's List of RWTH Aachen (top 5% in the program)
2013	DMV-Abiturpreis & Naspa-Schulpreis for outstanding performance in maths

[1] Swedish grades: A→4.0, B→3.5, ..., E→2.0; German grades: 1.0→4.0, 4.0→2.0 (ECTS weighted, linear)

Publications

2025 **Leonard Bruns**, Jun Zhang, Patric Jensfelt. Neural Graph Map: Dense Mapping with Efficient Loop Closure Integration. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV).

2025 José Manuel Gaspar Sánchez, **Leonard Bruns**, Jana Tumova, Patric Jensfelt, Martin Törngren. Transitional Grid Maps: Efficient Analytical Inference of Dynamic Environments under Limited Sensing. IEEE Open Journal of Intelligent Transportation Systems.

2024 Fereidoon Zangeneh, **Leonard Bruns**, Amit Dekel, Alessandro Pieropan, Patric Jensfelt. Conditional Variational Autoencoders for Probabilistic Pose Regression. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*.

2024 **Leonard Bruns**, Kai O. Arras, Luigi Palmiri. Method and device for deterministic sampling-based motion planning. *US Patent*.

2023 José Araújo, **Leonard Bruns**, Diego G. Morin, Ioannis Karagiannis, Amir H. T. Kouhestani. Calibration of mobile electronic devices connected to headsets wearable by users. *US Patent*.

2023 **Leonard Bruns**, Patric Jensfelt. RGB-D-Based Categorical Object Pose and Shape Estimation: Methods, Datasets, and Evaluation. *Robotics and Autonomous Systems*.

2023 Fereidoon Zangeneh, **Leonard Bruns**, Amit Dekel, Alessandro Pieropan, Patric Jensfelt. A Probabilistic Framework for Visual Localization in Ambiguous Scenes. *IEEE International Conference on Robotics and Automation (ICRA)*.

2022 **Leonard Bruns**, Patric Jensfelt. SDF-based RGB-D Camera Tracking in Neural Scene Representations. *IEEE ICRA Workshop on Motion Planning with Implicit Neural Representations of Geometry*.

2022 **Leonard Bruns**, Patric Jensfelt. SDFEst: Categorical Pose and Shape Estimation of Objects From RGB-D Using Signed Distance Fields. *IEEE Robotics and Automation Letters*.

2022 **Leonard Bruns**, Patric Jensfelt. On the Evaluation of RGB-D-Based Categorical Pose and Shape Estimation. *Intelligent Autonomous Systems 17*. **Best paper finalist**.

2021 Eric Heiden[1], Luigi Palmieri[1], **Leonard Bruns**, Kai O. Arras, Gaurav S. Sukhatme & Sven Koenig. Bench-MR: A Motion Planning Benchmark for Wheeled Mobile Robots. *IEEE Robotics and Automation Letters*.

2019 Luigi Palmieri[1], **Leonard Bruns**[1], Michael Meurer & Kai O. Arras. Dispertio: Optimal Sampling For Safe Deterministic Motion Planning. *IEEE Robotics and Automation Letters*.

[1]Equal contribution