

# Javier Macias Sola

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## About Me

My passion for robotics is driven by the excitement of seeing things work optimally on their own. I am mostly interested in developing advanced perception systems and mobile robots and have extensive experience bringing early prototypes to stable series production. With broad international experience and equipped with self-initiative and T-shaped skills, I am enabled to continue being a leading voice in challenging interdisciplinary projects.

## Experience

### Error Management Lead, Bosch Rexroth AG

Coordinating the activities of the different teams to design and improve the management of operational errors in robot fleets with direct report to 2nd level management.

Stuttgart, Germany

Dec 2024 – present

### Senior Robotics Software Engineer, Bosch Rexroth AG

*Perception and vision expert:* leading the planning and development of the perception capabilities of an industrial mobile robot (AMR).

Stuttgart, Germany

July 2022 – present

- Designed a line segmentation algorithm that achieved 10x more precision at 1.66x processing speed, freeing necessary resources for other features.
- Boosted the profitability of the AMR by redesigning the line control algorithm to reach 3x greater speeds in confined spaces.
- Unleashed advanced navigation capabilities by designing a 2.38x faster robust point cloud-based ground segmentation algorithm.
- Developed stereo-matching failure detector that secured the sales to customers whose infrastructure had repetitive structures.
- Prevented unnecessary servicing costs of robots in the field by coordinating and designing a novel marker pose-based extrinsic camera calibration method.
- Supervised several interns in AI-based semantic segmentation and control engineering topics.

### Scrum Master, Bosch Rexroth AG

Leading a team of 10 experienced robotics software engineers to increase throughput by encouraging better team collaboration and communication culture.

Stuttgart, Germany

June 2021 – present

### Junior Robotics Software Engineer, Bosch Rexroth AG

- Developed an obstacle detection system based on stereo-vision cameras and point-clouds necessary to secure the marketability of the robot.
- Reduced the manufacturing failure rate of monocular cameras by developing a camera lens calibration tool to assist operators.

Stuttgart, Germany

Mar 2021 – June 2022

### Robotics Software Engineer Intern, Bosch Rexroth AG

- Developed an industrial Master's Thesis proposing a novel image-based localization system using ground textures, which also led to a publication.
- Coordinated and developed an innovation project (from prototype to final product) with other international business units. The results led to a patent application.
- Developed a novel line segmentation algorithm leading to 3.6x fewer false negatives while conserving real-time processing capabilities.

Stuttgart, Germany

Mar 2020 – Feb 2021

## Technologies and Domains

**Languages:** (Modern) C++, Python, Bash, MATLAB.

**Libraries and frameworks:** OpenCV, Point Cloud Library (PCL), ROS-like middlewares, Eigen, Magnum Graphics, ImGui, NumPy, SciPy, Pandas, PyTorch, Agile methodologies.

**Tools:** Git, CMake, Make, Linux, Docker, Ubuntu Core.

**Domains:** sensor fusion, calibration and 3D reconstruction, (AI) segmentation, feature detection, drivers, visualization, simulation.

## Other Skills and Languages

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**Soft-skills and qualities:** Team leadership, team player, creativity, innovation, problem solver, adaptability.

**Languages:** Spanish (native), English (C2), German (B1), French (B1), Italian (B1).

## Publications and Patents

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### A Ground Texture-based Mapping and Localization Method for AGVs

Nov 2021

*Javier Macías-Solá*, Sarah Uttendorf, Jan O. Blech

[10.1109/IPIN51156.2021.9662556](https://doi.org/10.1109/IPIN51156.2021.9662556) (2021 International Conference on Indoor Positioning and Indoor Navigation (IPIN), 2021, pp. 1-6)

### Automatically operated industrial truck with a load sensor device

June 2021

*Javier Macias Sola*, Stefan Leibold, Markus Brodt, Sarah Uttendorf

[patents.google.com/patent/DE102021206411A1](https://patents.google.com/patent/DE102021206411A1)

## Open Source Contributions

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**OpenCV:** Enhance cv:::TickMeter to be able to get the last elapsed time (#26212).

## Education

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### MSc. Autonomous Systems

Helsinki, Finland

• **Master's Thesis:** ['Indoor Localization of AGVs: A Ground Texture Based Solution'](#) at Bosch Rexroth AG.

Sept 2019 – Nov 2020

### MSc. Mechatronics Engineering

Trento, Italy

Note: joint programme with Aalto University

Sept 2018 – Aug 2019

### BSc. Electronics Engineering and Automation

La Laguna, Spain

• **Bachelor's Thesis:** ['Mechanical, electronic and software prototype of a low-cost autonomous rover for agriculture'](#). **Awards:** Accesit Prize by the Engineers Association of Tenerife (COITITF).

Sept 2014 – July 2018

• **Erasmus+ Programme:** Politechnika Wrocławska, Poland.

• **Extracurricular activities:** Formula Student Electronics Team Lead.