Jannik **Zürn**

Doctoral Researcher in Robotics and AI

University of Freiburg, Georges-Koehler-Allee 80, 79110 Freiburg im Breisgau, Germany

+49 1578-8744143 | jannik.zuern@gmail.com | jannik-zuern.com | github.com/jzuern | linkedin.com/jannik-zuern | Jannik Zürn

Summary

Doctoral robotics researcher at the University of Freiburg, Autonomous Intelligent Systems. I am interested in working on intelligent machines that are able to autonomously operate in complex environments. I like developing algorithms and models from a theoretical angle but I am also passionate about bringing them to life at scale from the software engineering perspective.

Skills

Research Interests Robotics, Perception, Self-Supervised Robot Learning, Computer Vision, Multi-Modal Learning, Scene Understanding

Programming Linux, Python, PyTorch, ROS, OpenCV, LaTeX, C/C++, TensorFlowe

Languages German (native), English (business fluent), Spanish (elementary)

Education

University of Freiburg, Germany
Freiburg, Germany

Ph.D. Robotics and Artificial Intelligence — *Dec. 2018 – Now*

- Advisor: Prof. Dr. Wolfram Burgard
- Research Focus: Self-Supervised Robot Learning, Perception for Autonomous Robots

Karlsruhe Institute of Technology (KIT), Germany
Karlsruhe, Germany

M.S. Theoretical Mechanical Engineering (GPA: 3.7/4.0) — *Aug. 2015 – Aug. 2018*

- Thesis topic: Neural Networks for Steady-State Fluid Flow Prediction
- Advisors: Dr. S. Suwelack, Dr. Christof Megnin. Grade: 1.0

Karlsruhe Institute of Technology (KIT), Germany
Karlsruhe, Germany

B.S. Mechanical Engineering (GPA: 3.1/4.0) — *Oct. 2011 – Aug. 2015*

- Thesis topic: Numerical Solution of the Chemical Master Equation
- Advisor: M.Sc. A. Koksharov. Grade: 1.0

Work Experience

Visiting PhD Student
Oxford, England

Oxford Robotics Institute, University of Oxford — *Oct. 2022 – Feb. 2023*

- Advisor: Prof. Dr. Ingmar Posner
- Research Focus: Self-supervised learning for lane graph estimation in the context of automated driving.

Graduate Research Assistant
Karlsruhe, Germany

Renumics GmbH — *Jun. 2018 – Aug. 2018*

- Development of machine learning models for steady-state-fluid flow approximation leveraging data-driven computational fluid dynamics.

Summer Internship, Robotics Software Engineering
Redwood City, CA, USA

Mayfield Robotics — *Jul. 2017 – Oct. 2017*

- Development and implementation of a machine learning model for visual place recognition in a companion robot product.

Graduate Research Assistant
Karlsruhe, Germany

FZI Research Center for Information Technology — *Sep. 2016 – Apr. 2018*

- Development of CUDA Kernels for GPU model inference and model optimization for improved performance with NVIDIA TensorRT

Graduate Research Assistant
Karlsruhe, Germany

Institute for Biomedical Engineering, KIT — *Jan. 2016 – Aug. 2018*

- Implemented 3D surface reconstruction algorithms for organic tissue from CT images.
- Conducted electrophysiological simulations of human hearts for atrial fibrillation research.

Summer Internship, Software Engineering — *San Diego, CA, USA*

ANSYS, Inc. — *May 2015 – Sep. 2015*

- Performed large-scale computational fluid dynamics experiments and parameter studies to optimize internal combustion engine fuel injector models.

Undergraduate Research Assistant — *Karlsruhe, Germany*

Institute for Technical Thermodynamics, KIT — *Oct. 2014 – Apr. 2015*

Undergraduate Research Assistant — *Karlsruhe, Germany*

Institute for Applied Computer Science, KIT — *Jun. 2013 – Jun. 2014*

- Implemented computer vision algorithms for automated geometry detection in MATLAB and Simulink.

Selected Publications

Zürn, Jannik, Sebastian Weber, and Wolfram Burgard. "TrackletMapper: Ground Surface Segmentation and Mapping from Traffic Participant Trajectories." Conference for Robot Learning *CoRL) (2022)

Zürn, Jannik, and Wolfram Burgard. "Self-Supervised Moving Vehicle Detection from Audio-Visual Cues." IEEE Robotics and Automation Letters 7.3 (2022): 7415-7422.

Zürn, Jannik*, Johan Vertens*, and Wolfram Burgard. "Lane Graph Estimation for Scene Understanding in Urban Driving." IEEE Robotics and Automation Letters 6.4 (2021): 8615-8622.

Vertens, Johan*, **Jannik Zürn***, and Wolfram Burgard. "Heatnet: Bridging the day-night domain gap in semantic segmentation with thermal images." 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2020.

Zürn, Jannik, Wolfram Burgard, and Abhinav Valada. "Self-supervised visual terrain classification from unsupervised acoustic feature learning." IEEE Transactions on Robotics 37.2 (2020): 466-481.

Megnin, C., Moradi, B., **Zürn, J.**, Ossmer, H., Gueltig, M., and Kohl, M. (2020). Shape memory alloy based controllable multi-port microvalve. Microsystem Technologies, 26(3), 793-800.

Software & Datasets

TrackletMapper

Ground Surface Segmentation and Mapping from Traffic Participant Trajectories

`http://trackletmapper.cs.uni-freiburg.de`

AudioVisual Vehicles Dataset

Self-Supervised Moving Vehicle Detection from Audio-Visual Cues

`http://av-vehicles.cs.uni-freiburg.de`

Self-Supervised Visual Terrain Classification

A Self-Supervised Terrain Classification Framework using Sound and Vision

`http://deepterrain.cs.uni-freiburg.de`

Semantic Segmentation of Thermal Images

Bridging the Day-Night Domain Gap in Semantic Segmentation with Thermal Images

`http://thermal.cs.uni-freiburg.de`

LaneGraphNet

Lane Graph Estimation for Scene Understanding in Urban Driving

`http://lanegraph.cs.uni-freiburg.de`

Reviewing Activites

- **Journals**: IEEE Transactions on Robotics (T-RO), IEEE Robotics and Automation Letters (RA-L)
- **Conferences**: IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), AAAI Conference on Artificial Intelligence (AAAI), IEEE International Conference on Multisensor Fusion and Integration (MFI), International Conference on Ubiquitous Robots (UR)

Teaching

WS 22/23 **Seminar Robot Perception for Navigation**, Teaching Assistant
SS 21 **FreiCar: Practical Autonomous Driving**, Co-Organizer, Lecturer
WS 20/21 **FreiCar: Practical Autonomous Driving**, Co-Organizer, Lecturer
SS 19 **Deep Learning Lab**, Teaching Assistant

Thesis Supervision

2021-2022 **S. Weber**, Self-Supervised Drivable Surface Segmentation for Pedestrian Robots, MS Thesis
2020-2021 **S. Al-Rawi**, Sound Event Localization and Detection, MS Thesis
2020 **G. Stief**, Optical Flow based Window Detection, BS Thesis
2019 **T. Krautschneider**, Multimodal Object Tracking with Deep Learning, BS Thesis
2019 **Y. Satyawan**, Semantic Segmentation of Curb and Curb Cuts in Street Imagery, BS Thesis