

# SEBASTIAN KOCH, M.Sc.

PhD Candidate (2<sup>nd</sup> year)

University of Ulm & Bosch Center for Artificial Intelligence (BCAI)

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## EDUCATION

**PhD Computer Science**, *University of Ulm*. Advisor: *Prof. Timo Ropinski*.

Apr 2022 – present PhD topic: ‘Understanding 3D scenes using Scene Graphs’, collaboration with BCAI.  
*The goal of my PhD is to develop 3D scene representations such as 3D Scene Graphs of the real world that enable robots to navigate and complete tasks in real-world environments.* [1],[2],[3]

**M. Sc. Computer Science**, *University of Tübingen*.

Apr 2020 – Mar 2022 Computer Science major with focus on machine learning, computer vision and robotics.  
Thesis: ‘Multi-View RGB-D Fusion for 6D Pose Estimation’  
supervised by *Gerhard Neumann & Andreas Geiger*. GPA: 1.4 (1.0 is the best)

**B. Eng. Computer Science**, *Baden-Württemberg Cooperative State University*.

Oct 2016 – Mar 2020 Computer Science major with additional automotive orientated courses. GPA: 1.8 (1.0 is the best)  
Bachelor-Thesis: ‘Improvement of the robustness of a SLAM system with Computer Vision’

## EXPERIENCE

**BCAI Master-Thesis (6D Pose Estimation)**

Oct 2021 – Mar 2022

- Designed a multi-view RGB-D fusion method for 6D Pose Estimation achieving SOTA results.
- Proposed a symmetry-aware keypoint voting approach for improved estimation of object poses. [4]

**University of Tübingen Research Assistant (Embedded Object Detection)**

Sep 2020 – Oct 2021

- Conducted research on optimizing deep learning models for real-time object detection in high-resolution images using optimized *CUDA* and *TensorRT* implementations on embedded GPUs.
- Studied the effect of on-device image processing for remote sensing object detection accuracy.

**Bosch Research Working Student (Simulation & Integration for SLAM)**

Apr 2020 – Oct 2020

- Integrated object detection pipeline directly into a *ROS* system for improved localization & mapping.
- Responsible for synthetic data generation with *Unreal Engine* for reproducible mapping evaluation.

Oct 2019 – Jan 2020 **Bachelor-Thesis (Semantic Features for SLAM)**

- Demonstrated the benefit of object detection and semantic aware features for a *SLAM* pipeline.
- Evaluated different deep learning models based on accuracy and speed in a systematic manner.

**Bosch Group Cooperative Study Program**

Oct 2016 – Mar 2020 The Cooperative Study Program at Bosch provides the possibility to work on scientific projects in different departments at Bosch while I pursued my Bachelor’s degree. I contributed in many projects in the software development using *C/C++* and *Python* in different automotive and robotics areas.

## SERVICE

**Reviewing** ECCV 2024, CVPR 2024 Workshops, ICCV 2023 Workshops

2019 – present I work as a volunteer and referee at RoboCup Junior events on a national and international level.

## PUBLICATIONS

For a complete list of all publications see [kochsebastian.com/publications](http://kochsebastian.com/publications).

- 2024 [1] **S Koch**, P Hermosilla, N Vaskevicius, M Colosi, T Ropinski: *Open3DSG: Open-Vocabulary 3D Scene Graphs from Point Clouds with Queryable Objects and Open-Set Relationships*. **CVPR 2024**
- 2024 [2] **S Koch**, P Hermosilla, N Vaskevicius, M Colosi, T Ropinski: *Lang3DSG: Language-based contrastive pre-training for 3D scene graph prediction*. **3DV 2024**
- 2024 [3] **S Koch**, P Hermosilla, N Vaskevicius, M Colosi, T Ropinski: *SGRec3D: Self-Supervised 3D Scene Graph Learning via Object-Level Scene Reconstruction*. **WACV 2024**
- 2023 [4] F Duffhauss, **S Koch**, H Ziesche, NA Vien, G Neumann: *SyMFM6D: Symmetry-aware Multi-directional Fusion for Multi-View 6D Object Pose Estimation*. **RA-L 2023 / ICRA 2024**

## HONORS & AWARDS

- 2021 1<sup>st</sup> place in the AI Chess Variant Competition conducted by the Cognitive Systems Lab of Prof. Zell.
- 2021 3<sup>rd</sup> place in the RL Hockey Competition of the MPI Autonomous Learning Group of Georg Martius.
- 2020 Accepted into the Students@Bosch program for students who excelled at Bosch internships.
- 2014 4<sup>th</sup> place at the RoboCup World Cup 2014 in João Pessoa in the *super-team Rescue* competition.
- 2013 1<sup>st</sup> place at the RoboCup World Cup 2013 in Eindhoven in the *Rescue* competition.

## SKILLS

**Languages** English: fluent

German: native

**Technical**

Computer Vision

Deep Learning

3D Scene Representation

Embodied Vision

Robotics

Python

Numpy

PyTorch

Lightning

GNU/Linux

ROS

Git

LaTeX