Pascal **Roth**

Witellikerstrasse 20, 8008 Zürich, Switzerland

(+41) 076 7996686 | roth.pascal@outlook.de | pascal-roth | pascal--roth

Education

Robotics Systems Lab, ETH Zurich
Zurich, Switzerland

PH.D. IN ROBOTIC LEARNING — *Feb. 2024 - Present*

- Focus on Robotic Navigation and Autonomy Research
- *Advisor:* Prof. Marco Hutter

Swiss Federal Institute of Technology (ETH Zurich)
Zurich, Switzerland

M.S. IN MECHANICAL ENGINEERING (GPA: 5.70/6 (A-)) — *Sep. 2021 - Jul. 2023*

- Focus on Robotics, Control and Artificial Intelligence
- Thesis: *ViPlanner: Visual Semantic Imperative Navigation in Urban Environments*
- Semester Project: *Self-Supervised Panoptic Segmentation for Improved Scene Understanding*
- Relevant Courses: Advanced Machine Learning, Vision Algorithms for Mobile Robotics, Deep Learning for Autonomous Driving, Robot Dynamics, Planning and Decision Making for Autonomous Robots, Recursive Estimation, Machine Perception
- Relevant Projects: Visual Inertial Odometry Pipeline, Path Planning in Dynamic Environment, Object Detection from LIDAR Point-Clouds, Multi-Task Learning for Depth and Semantics estimation

Tsinghua University
Beijing, China

EXCHANGE SEMESTER (GPA: 3.91/4.00 (A)) — *Sep. 2019 - Jan. 2020*

- Developed intercultural experience and switch focus to Artificial Intelligence
- Relevant Courses: Machine Learning, Machine Design Process, Introduction to Artificial Intelligence
- Relevant Projects: Soft robotic Earth Worm Model, Deep-Learning Cancer Segmentation

Technische Universität Darmstadt
Darmstadt, Germany

B.S. IN MECHANICAL AND PROCESS ENGINEERING (GPA: 1.48/6.0 (A-) - WITH HONOURS) — *Oct. 2017 - Dec. 2020*

- Thesis: *Data-driven modeling of the self-ignition properties of the renewable fuel PODE using methods of machine learning*
- Relevant Courses: Robot Learning, Motor Vehicles, Control Theory
- Relevant Projects: PyTorch/ PyTorch Lightning Wrapper, Development of Autonomous Forklift

Franziskaner-Gymnasium Kreuzburg
Großkrotzenburg, Germany

ABITUR (GPA: 1.0/6.0 (A+)) — *Jul. 2008 - Apr. 2016*

Research Experience

Robotics Systems Lab (RSL), ETH Zurich
Zurich, Switzerland

RESEARCH ENGINEER — *Aug. 2023 - Jan. 2024*

- Research on Forward Dynamics Models for quadrupedal navigation and locomotion learning with real-world data
- Development of the *ORBIT* framework for interactive robot learning within NVIDIA Isaac Sim
- Student supervision for Semester and Master Thesis projects

MASTER THESIS - VIPLANNER: VISUAL SEMANTIC IMPERATIVE PLANNER IN URBAN ENVIRONMENTS — *Oct. 2022 - June 2023*

- Fusion of geometric and semantic information for local path planning in semi-structured environments
- Enable planner to distinguish between the traversability of different terrains and accurately identify obstacles
- Demonstrated noise-resistance and zero-shot sim-to-real transfer in diverse experiments on the quadrupedal robot platform ANYmal

SEMESTER PROJECT - SELF-SUPERVISED PANOPTIC SEGMENTATION FOR IMPROVED ENVIRONMENT UNDERSTANDING — *Apr. 2022 - Aug. 2022*

- Investigated self-supervised pre-training strategies for environment-specific segmentation models
- Showcase improved segmentation quality when combined with supervised fine-tuning
- Deployment on real-world hardware for navigation tasks in construction environments

ETH Robotics Summer School
Zurich, Switzerland

PARTICIPANT — *Jul. 2022*

- Search and Rescue competition using an autonomous rough-terrain UGV
- Build of autonomy pipeline including state-estimation, SLAM, motion planning, and object detection

Ansys Inc.
Munich, Germany

RESEARCH INTERNSHIP — *Jan. 2021 - Aug. 2021*

- Investigated numerical errors introduced by mesh coarsening operations in turbulent Large-Eddy-Simulations
- Error modeling and compensation using Machine Learning under latency constraints

Institute for Simulation of Reactive Thermo-Fluid Systems, TU Darmstadt *Darmstadt, Germany*

Research Assistant *Jun. 2020 - Mar. 2021*

- Conducted research projects on applications for machine learning in Computational Fluid Dynamics simulations
- Designed a PyTorch Wrapper to accelerate Machine Learning research applications

Extracurricular Activity

Konrad-Adenauer-Foundation *Germany*

Scholarship Holder *Apr. 2018 - Present*

- Organized seminars with topics such as *Cybersecurity* and *The Future of Aerospace*
- Participated in seminars in political, social, and intercultural disciplines as well as rhetoric training

RSL (ETHZ) and MEMS, FDY (TU Darmstadt) *Germany and Switzerland*

Teaching Assistant *Oct. 2018 - Present*

- Design of midterm exams and leading of exercise sessions (RSL)
- Teaching Assistant: Leading of weekly recitation and Q&A sessions (MEMS & FDY)

Mechanical and Process Engineering Student Association *Darmstadt, Germany*

Member *Apr. 2018 - Sep. 2019*

- Representative in the student council conference and active role in other committees
- Participation in study fairs and aptitude assessment procedures for study applicants
- Organization of the annual scholarship fair with all major German foundations participating

Sabbatical *South-East Asia and Australia*

Work and Travel *Oct. 2016 - Jul. 2017*

- Improved language skills and intercultural competence

Publications

ImRL-Planner: Reinforcement Learning Empowered Kinodynamic Imperative Planner *Abu Dhabi ,UAE*

submitted to IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2024) *October 2024*

Pascal Roth, Pascal Sutter, Fan Yang, Joonho Lee, Marco Hutter

ViPlanner: Visual Semantic Imperative Learning for Local Navigation *Yokohoma, Japan*

2024 IEEE International Conference on Robotics and Automation (ICRA 2024) *May 2024*

Pascal Roth, Julian Nubert, Fan Yang, Mayank Mittal, Marco Hutter

Skills

Programming Languages		Languages		Software	
Python	Expert	German	Mother Tongue	NVIDIA Omniverse	Expert
C++	Advanced	English	Fluent (IELTS: 8.0)	ROS	Advanced
Matlab	Advanced	French	Advanced (DELF: B1)	Docker	Advanced
C	Basics	Mandarin	Basic	Git	Expert

Awards

2017 **Deutschlandstipendium (German Scholarship)** *Darmstadt, Germany*

2016 **Award for the best possible Abitur** *Großkrotzenburg, Germany*

2016 **Award for special achievements in Physics from the German Physics Society** *Großkrotzenburg, Germany*