

Timo Hinzmann

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 Github ▪ LinkedIn ▪ Google Scholar ▪ Website

EDUCATION

- **Doctor of Science (Dr. Sc.)**
 02/2015 – 08/2020
 Autonomous Systems Lab, ETH Zurich, Switzerland
 – Title: “Perception and Learning for Autonomous UAV Missions”
 – Supervised by Prof. Roland Siegwart
- **Master of Science (M. Sc.)**
Robotics, Systems and Control
 10/2012 – 11/2014
 ETH Zurich, Switzerland
 – Master’s Thesis “Robust Vision-based Navigation for Micro Air Vehicles”
 Jet Propulsion Laboratory, CalTech/NASA
 Supervised by Stephan Weiss and Roland Brockers.
 Final grade: 5.75/6.0 (Swiss system)
 – Semester Project “Adaptive control of multirotor aerial vehicles”
 Autonomous Systems Lab, ETH Zurich
 Supervised by Michael Burri, Sammy Omari, Markus Achtelik.
 Final grade: 6.0/6.0 (Swiss system)
- **Bachelor of Science (B. Sc.)**
Information Technology and Electrical Engineering
 10/2008 – 10/2011
 Karlsruhe Institute of Technology (KIT), Germany
 – Bachelor’s Thesis “Path planning and state estimation for a differential drive ground robot”
 Institute of Systems Optimization (ITE), KIT
 Supervised by Justus Seibold
 Final grade: 1.0/1.0 (German system)
- **High School of Natural Sciences, 1.0/1.0 (Highest achievable grade)**
 07/1999 – 07/2008
 Kepler Gymnasium, Pforzheim, Germany
 – 08/2005 – 07/2006: Exchange student at High School in Holliday, TX, USA.

RESEARCH AND WORK EXPERIENCE

- **Postdoctoral Researcher**
 08/2020 – today
 Autonomous Systems Lab, ETH Zurich, Switzerland
- **Researcher**
 12/2014 – 08/2020
 Autonomous Systems Lab, ETH Zurich, Switzerland
 - Ph.D. Thesis “Perception and Learning for Autonomous UAV Missions”
 - Split into three parts: 1) Localization and Mapping 2) Long-range depth estimation 3) UAV Missions
 - Covered research topics: Visual-inertial and Multi-Sensor State Estimation/Odometry/SLAM, 2D/3D Vision, Image segmentation/classification, 3D Reconstruction, Cam-IMU calibration, Optical-Infrared calibration, Filter- and Smoothing-Based Optimization, EKF, Particle Filter, Factor Graphs, Machine/Deep Learning (DL), DL-based Image Alignment, Object Detection/Tracking/3D Localization, DL-based Object Detection.
 - Publications: Published in top conferences (e.g., ICRA, IROS) and journals (e.g., RA-L, JFR);
 391 citations; h-index: 10; i10-index: 10
 - Associate Editor (AE) for IROS (SLAM). Reviewer for ICRA, IROS, RA-L, T-RO, JFR, MFI, TCST.
 - Research proposals: (Co-)authored proposals for Rega (Swiss Air-Rescue Organization), ETH Grant, Microsoft SJRC, Innosuisse, SNF
 - Involved in the projects: ICARUS, SHERPA, AtlantikSolar, SolAIR, armasuisse Science & Technology, Rega, Google’s Tango, Microsoft: Project ALTAIR

- Supervised over 30 students during their Bachelor's thesis, Master's thesis, Semester project, Focus project, Seminar, and other courses.
 - Teaching: Perception & Learning for Robotics (Ex. 2018, 2019), Autonomous Mobile Robots (Ex. 2015-2018), AI for Robotics (Ex. 2017), Robot Dynamics (Ex. 2015)
- **Master Thesis**
04/2014 – 10/2014
Jet Propulsion Laboratory, CalTech/NASA
 - Master's Thesis "Robust Vision-based Navigation for Micro Air Vehicles"
 - Implementation of A. Mourikis' [Multi-State Constraint Kalman Filter \(MSCKF\)](#)
 - Implementation of vision front-end
 - Integration into S. Lynen's [Multi Sensor EKF Framework](#)
 - Implementation with ROS and Asctec Hummingbird quadcopter
 - Performance comparison to G. Klein's [PTAM](#)
 - Implemented in C/C++. Simulations and visualizations in Matlab.
 - **Semester Project**
09/2013 – 01/2014
Autonomous Systems Lab, ETH Zurich
 - Semester Project "Adaptive control of multirotor aerial vehicles"
 - Adaptive rate controller with online inertia and mass estimation
 - Simulation and real-world experiments with Asctec Hummingbird quadcopter
 - Implemented in Matlab/Simulink with Asctec's SDK
 - **Internship**
01/2012 – 09/2012
BMW Group Research & Development, Project Connected Drive, Munich, Germany
 - Integration of advanced driver assistance systems into one superior system to anticipate and avoid dangerous situations.
 - Implementation of assistance system in a driving simulator using SIMULINK.
 - Technical organization of a test group study (70 persons) to evaluate the performance and acceptance of the system.
 - Implementation in an experimental vehicle and successful demonstration of the performance on a test track
 - Supervised by Philipp Reinisch and Moritz Werling
 - **Bachelor Thesis**
04/2011 – 10/2011
Institute of Optimization (ITE), Karlsruhe Institute of Technology
 - Bachelor's Thesis "Path planning and state estimation for a differential drive ground robot"
 - Multi-sensor (GPS, IMU, magnetometer, wheel odometry) EKF fusion
 - Implementation and evaluation of different path planners
 - Path smoothing with splines while considering distance to obstacles
 - Implemented in C++. Visualizations in Matlab.
 - **Research Assistant**
09/2010 – 04/2011
Institute of Optimization (ITE), Karlsruhe Institute of Technology
 - Design of printed circuit boards (PCB) for indoor pedestrian navigation systems
 - Supervised by Christian Ascher
 - **Research Assistant**
09/2009 – 07/2011
Fraunhofer Institute of Optonics, System Technologies and Image Exploitation (IOSB) Karlsruhe
 - Assistance for the project "Model predictive control for fuel consumption reduction of heavy trucks"
 - Supervised by Prof. Michael Heizmann
 - **Teaching Assistant**
03/2010 – 08/2010
Institute of Measurement and Control Systems (MRT), Karlsruhe Institute of Technology
 - Teaching assistant for practical course on measurement and control systems ("Messtechnisches Praktikum")
 - Signal analysis via Fourier transformation
 - **KaRacelng formula student, team member**
09/2009 – 09/2010
 - Team electronics
 - Design of printed circuit boards (PCB)

INVOLVEMENT IN RESEARCH PROJECTS

- EU FP7-Project [SHERPA](#): Smart collaboration between Humans and ground-aerial Robots for improving rescuing activities in Alpine environments
- EU FP7-Project [ICARUS](#): Integrated Components for Assisted Rescue and Unmanned Search Operations
- [AtlantikSolar](#): A UAV for the first-ever autonomous solar-powered crossing of the Atlantic Ocean
- [SolAIR](#): Solar-powered Automated Aerial Imaging and Reconnaissance Using Infrared Cameras
- [armasuisse Science & Technology](#): Vision-based landing, obstacle avoidance, SLAM, and low-altitude flights
- [Rega – Swiss Air Rescue](#): Human detection, tracking, and localization
- Google's Project Tango: Visual-inertial Localization and Mapping
- Mars helicopter project at the Jet Propulsion Laboratory
- Microsoft Research (SJRC): "Project ALTAIR: Infrared Vision and AI Decision-Making for longer drone flights".

HONORS AND AWARDS

- Accepted to JPL's Visiting Student Researchers Program (JVSRP)
- Finalist at Airbus Scholarship Program in Hamburg, Germany.
- [e-fellows.net](#) scholar
- Ranked best 8.1% for final B.Sc. GPA at Karlsruhe Institute of Technology.
- Graduated with Honorary Diploma from High School in Holliday, Texas, USA.
- Award from the German Mathematician Society
- Nominated for a scholarship of the German National Academic Foundation
- Several school awards for final High School GPA of 1.0/1.0.

LICENSED SOFTWARE

- The visual-inertial estimator [16] has been licensed by the ETH spin-off [sevensense](#) for commercial applications.
- The DL-based optical-infrared human detection system has been licensed by the Swiss Air Rescue Organization [Rega](#) [4].

MEDIA

- SRF ("10 vor 10"): News report on Learning-based Human Detection system, October 2020
- SRF Kids news: News report on Learning-based Human Detection system, October 2020
- SRF: "Rega drones as saviours in times of need", October 2020
- [higgs.ch](#): "Artificial Intelligence – Intelligent drones will soon be our lifesavers", April 2020
- Microsoft Research: "Project Frigatebird: AI for Autonomous Soaring", 2019
- Microsoft Research: "Autonomous soaring – AI on the fly", May 2019
- Digital Switzerland: "The Swiss Smart Farming Matterhorn project flies on!", March 2019
- Swisscom: "A milestone for drones in Switzerland", January 2019
- [euronews](#): "Dealing with danger: busy geniuses and watchful robots", May 2016

OPEN-SOURCE REPOSITORIES

[aerial_mapper](#), [robust_point_cloud_registration](#), [aslam_cv2](#), [kalibr](#), [maplab](#), [rotors_simulator](#)

PROFESSIONAL SERVICES AND MEMBERSHIPS

- Associate Editor (AE) for IEEE International Conference on Intelligent Robots and Systems (IROS) (Profile SW: Visual-Inertial SLAM, Localization, Range Sensing, Data Sets for SLAM, View Planning for SLAM, Audio-Visual SLAM)
- Reviewer for IEEE International Conference on Robotics and Automation (ICRA)
- Reviewer for IEEE International Conference on Intelligent Robots and Systems (IROS)
- Reviewer for IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)
- Reviewer for IEEE Transactions on Control Systems Technology (TCST)
- Reviewer for IEEE Robotics and Automation Letters (RA-L)
- Reviewer for IEEE Transactions on Robotics (T-RO)
- Reviewer for Journal of Field Robotics (JFR)
- IEEE Membership
- IEEE Young Professionals

PUBLICATIONS

Citations: 391 ■ h-index: 10 ■ i10-index: 10

Published in top conferences (e.g., ICRA, IROS) and journals (e.g., RA-L, JFR).

See publication list on [Google Scholar](#)

- [1] Florian Achermann, Andrey Kolobov, Debadeepta Dey, Timo Hinzmann, Jen Jen Chung, Roland Siegwart, and Nicholas Lawrance. Multipoint: Cross-spectral registration of thermal and optical aerial imagery. In *Conference on Robot Learning (CoRL)*, Proceedings of Machine Learning Research. PMLR, 2020.
- [2] Timo Hinzmann and Roland Siegwart. Deep UAV localization with reference view rendering. *CoRR*, 2020.
- [3] Timo Hinzmann and Roland Siegwart. Sparse and deep inverse compositional Lucas-Kanade algorithm on SE(3). *CoRR*, 2020.
- [4] Timo Hinzmann, Tobias Stegeman, Cesar Cadena, and Roland Siegwart. Deep learning-based human detection for UAVs with optical and infrared cameras: System and experiments. *CoRR*, 2020.
- [5] Timo Hinzmann, Cesar Cadena, and Juan Nieto. Flexible trinocular: Non-rigid multi-camera-IMU dense reconstruction for UAV navigation and mapping. In *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1137–1142, 2019.
- [6] Timo Hinzmann, Johannes L Schönberger, Marc Pollefeys, and Roland Siegwart. Mapping on the fly: Real-time 3d dense reconstruction, digital surface map and incremental orthomosaic generation for unmanned aerial vehicles. In *Field and Service Robotics*, pages 383–396. Springer, 2018.
- [7] Timo Hinzmann, Thomas Stastny, Cesar Cadena, Roland Siegwart, and Igor Gilitschenski. Free LSD: Prior-free visual landing site detection for autonomous planes. *IEEE Robotics and Automation Letters*, 3(3):2545–2552, 2018.
- [8] Timo Hinzmann, Tim Taubner, and Roland Siegwart. Flexible stereo: Constrained, non-rigid, wide-baseline stereo vision for fixed-wing aerial platforms. In *2018 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2550–2557. IEEE, 2018.
- [9] Marius Huber, Timo Hinzmann, Roland Siegwart, and Larry H Matthies. Cubic range error model for stereo vision with illuminators. In *2018 IEEE International Conference on Robotics and Automation (ICRA)*, pages 842–848. IEEE, 2018.
- [10] Ruben Mascaro, Lucas Teixeira, Timo Hinzmann, Roland Siegwart, and Margarita Chli. GOMSF: Graph-optimization based multi-sensor fusion for robust UAV pose estimation. In *2018 IEEE International Conference on Robotics and Automation (ICRA)*, pages 1421–1428. IEEE, 2018.
- [11] Mathias Gehrig, Elena Stumm, Timo Hinzmann, and Roland Siegwart. Visual place recognition with probabilistic voting. In *2017 IEEE International Conference on Robotics and Automation (ICRA)*, pages 3192–3199. IEEE, 2017.
- [12] Timo Hinzmann, Johannes L. Schönberger, Marc Pollefeys, and Roland Siegwart. Mapping on the fly: Real-time 3d dense reconstruction, digital surface map and incremental orthomosaic generation for unmanned aerial vehicles. In *Field and Service Robotics, Results of the 11th International Conference, FSR 2017, Zurich, Switzerland, 12-15 September 2017*, pages 383–396, 2017.
- [13] Philipp Oettershagen, Amir Melzer, Thomas Mantel, Konrad Rudin, Thomas Stastny, Bartosz Wawrzacz, Timo Hinzmann, Stefan Leutenegger, Kostas Alexis, and Roland Siegwart. Design of small hand-launched solar-powered UAVs: From concept study to a multi-day world endurance record flight. *Journal of Field Robotics*, 2017.
- [14] Patrick Doherty, Jonas Kvarnstrom, Piotr Rudol, Marius Wzorek, Gianpaolo Conte, Cyrille Berger, Timo Hinzmann, and Thomas Stastny. A Collaborative Framework for 3D Mapping using Unmanned Aerial Vehicles. *Int. J. Comput. Vision*, 2016.
- [15] Timo Hinzmann, Thomas Schneider, Marcin Dymczyk, Amir Melzer, Thomas Mantel, Roland Siegwart, and Igor Gilitschenski. Robust map generation for fixed-wing UAVs with low-cost highly-oblique monocular cameras. In *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3261–3268. IEEE, 2016.
- [16] Timo Hinzmann, Thomas Schneider, Marcin Dymczyk, Andreas Schaffner, Simon Lynen, Roland Siegwart, and Igor Gilitschenski. Monocular visual-inertial SLAM for fixed-wing UAVs using sliding window based nonlinear optimization. In *International Symposium on Visual Computing*, pages 569–581. Springer, 2016.
- [17] Timo Hinzmann, Thomas Stastny, Gianpaolo Conte, Patrick Doherty, Piotr Rudol, Marius Wzorek, Enric Galceran, Roland Siegwart, and Igor Gilitschenski. Collaborative 3D reconstruction using heterogeneous UAVs: System and experiments. In *International Symposium on Experimental Robotics*, pages 43–56. Springer, 2016.
- [18] Julius Kümmerle, Timo Hinzmann, Anurag Sai Vempati, and Roland Siegwart. Real-time detection and tracking of multiple humans from high bird's-eye views in the visual and infrared spectrum. In *International Symposium on Visual Computing*, pages 545–556. Springer, 2016.
- [19] Philipp Oettershagen, Amir Melzer, Thomas Mantel, Konrad Rudin, Thomas Stastny, Bartosz Wawrzacz, Timo Hinzmann, Stefan Leutenegger, Kostas Alexis, and Roland Siegwart. Design of small hand-launched solar-powered uavs: From concept study to a multi-day world endurance record flight. *Journal of Field Robotics*, 2016.
- [20] Joern Rehder, Janosch Nikolic, Thomas Schneider, Timo Hinzmann, and Roland Siegwart. Extending kalibr: Calibrating the extrinsics of multiple IMUs and of individual axes. In *2016 IEEE International Conference on Robotics and Automation (ICRA)*, pages 4304–4311. IEEE, 2016.

INVITED TALKS

- 05/09/2015, Zurich, Switzerland
Scientifica 2015
"Unmanned Solar Aircrafts"
- 08/10/2015, Sao Paulo, Brazil
DroneShow Latin America 2015
"3D Reconstruction with AtlantikSolar"

ATTENDED COURSES

- **Dr.Sc. (ETH Zurich)**
 - 3D Vision
 - Artificial Intelligence for Robotics
 - Deep Learning

- **M.Sc. Robotics Systems and Control (ETH Zurich)**
 - Autonomous Mobile Robots
 - Control Systems II
 - Dynamic Programming and Optimal Control
 - ETH Zurich Distinguished Seminar in Robotics, Systems and Control
 - Embedded Control Systems
 - Image Analysis and Computer Vision
 - Machine Learning
 - Model Predictive Control
 - Nonlinear Dynamics and Chaos I
 - Nonlinear Systems and Control
 - Probabilistic Artificial Intelligence
 - Recursive Estimation
 - Regelungstechnik II
 - System identification
 - Theory of Robotics and Mechatronics
 - Unmanned Aircraft Design, Modeling and Control

- **B.Sc. Electrical Engineering and Information Technology (KIT)**
 - Advanced Mathematics I/II/III
 - Analysis and Design of Multisensor Systems
 - Automation of Discrete and Hybrid Systems
 - Communication Engineering I
 - Complex Analysis and Integral Transformations
 - Digital Technology
 - Electric Energy Systems
 - Electrical Machines and Power Electronics
 - Electromagnetic Fields and Waves
 - Electronic Devices and Circuits
 - Fundamentals on High Frequency Techniques
 - Image Processing for Navigation and Object Tracking Applications
 - Information Technology
 - Interference-resistant Communication
 - Laboratory Course for Fundamental Electrical Engineering
 - Laboratory in Information Technology
 - Linear Electronic Devices
 - Measurement Engineering
 - Passive Components
 - Physics I/II
 - Principles of Flight Dynamics and Control
 - Radar Systems Engineering
 - Semiconductor Devices
 - Sensors
 - Signals and Systems
 - Solid State Electronics
 - Space Electronics and Telemetry
 - Stochastic Control Systems
 - System Dynamics and Control Engineering
 - Theory of Probability

STUDENT SUPERVISION & TEACHING

- **Master Thesis** (*Master student, 6 months full-time*)
 - Pascal Schoppmann (2020): “Multi-Resolution Elevation Mapping and Safe Landing Site Detection for an Autonomous Rotorcraft”, supervised by Roland Brockers (JPL), Michael Pantic, and Timo Hinzmann
 - Sandro Berchier (2019): “Experimental Validation of State Estimation and Localization for Hybrid MAVs in Perceptually Degraded Environments”, supervised by Abel Gawel, Timo Hinzmann, Luca Carlone (MIT), and Ali Agha (JPL).
 - Daniel Hentzen (2018): “Robust Multirotor Precision Landing in Outdoor Environment”, supervised by Thomas Stastny, Timo Hinzmann and Roland Brockers (JPL).
 - Andreea Lutac (2018): “Optimal Pose Selection for Aerial Dense Reconstruction and Localization”, supervised by Timo Hinzmann and Rik Bähnemann.
 - Tobias Stegemann (2018): “Deep Learning-based Human Detection in Optical and Thermal Aerial Imagery”, supervised by Timo Hinzmann and Cesar Cadena.
 - Ruben Mascaro (2017): “Graph-Optimization Based Multi-Sensor Fusion for Robust UAV Pose Estimation”, supervised by Lucas Teixeira (Vision for Robotics Lab, ETH Zurich) and Timo Hinzmann.
 - Adam Radomski (2017): “Closed-Loop Multi-Sensor SLAM for Fixed-Wing UAVs”, supervised by Timo Hinzmann and Thomas Schneider.
 - Marius Huber (2017): “Autonomous Rotorcraft Landing with Structured Light Stereo Vision”, supervised by Larry Matthies (JPL), Roland Brockers (JPL), Timo Hinzmann, and Thomas Stastny.
 - Danylo Malyuta (2017): “Guidance, Navigation, Control and Mission Logic for Quadrotor Full-cycle Autonomy”, supervised by Roland Brockers (JPL), Thomas Stastny, and Timo Hinzmann.
 - Ryen Elith (2017): “Design of a Radar System for Sense and Avoid Applications”, supervised by Amir Melzer and Timo Hinzmann.
 - Ricardo Zurfluh (2016): “GNSS-Based Attitude Determination for Automatic Magnetometer Calibration Ricardo Zurfluh”, supervised by Timo Hinzmann and Amir Melzer.
 - Julius Kümmerle (2016): “Real-time Detection and Tracking of Multiple Human Targets from Aerial Vehicles Using Thermal Imagery”, supervised by Timo Hinzmann and Anurag Vempati.

- Bastien Chatton (2016): “Thermal Updraft Prediction for a Fixed-Wing UAVs”, supervised by Philipp Oettershagen and Timo Hinzmann.
 - Nicolas El Hayek (2016): “Ridge Lift Exploitation for Small Unmanned Fixed-Wing Aircraft”, supervised by Thomas Stastny, Philipp Oettershagen, and Timo Hinzmann.
 - Mathias Gehrig (2016): “Robust and Efficient Loop-Closure Detection for Aerial Images”, supervised by Timo Hinzmann and Elena Stumm.
 - Pavel Vechersky (2016): “Development of a Comprehensive, Hardware-in-the-Loop Simulation Environment for Fixed-Wing UAVs”, supervised by Timo Hinzmann, Thomas Stastny, and Philipp Oettershagen.
 - Andreas Forster (2016): “Tightly Coupled GNSS Integration into a SLAM Framework”, supervised by Timo Hinzmann and Amir Melzer.
 - Felix Renaut (2015): “Vision-Based Autonomous Landing of an Unmanned Fixed-Wing UAV”, supervised by Timo Hinzmann and Thomas Stastny.
 - Andreas Schaffner (2015): “Demonstration of Visual Navigation with Fixed-Wing UAVs”, supervised by Timo Hinzmann, Gabriel Agamennoni, and Tim Dawson-Townsend (Aurora).
- **Semester Thesis** (*Master student, 3-4 months part-time*)
 - Juliette Bromet (2020): “Dynamic Object Detection for Drone Delivery”, supervised by Lucas Teixeira, Fabiola Maffra, Timo Hinzmann.
 - Felix Graule (2019): “Towards Robust Cross-Spectral Optical-Thermal SLAM onboard a fixed-wing UAV”, supervised by Timo Hinzmann, Florian Achermann, and Nicholas Lawrence.
 - Balazs Nagy (2017): “Constrained, Non-rigid, Wide-baseline Stereo Vision for Fixed-wing Aerial Platforms (Continued)”, supervised by Timo Hinzmann.
 - Rudolf Metzler (2017): “High-quality Ground-Truth Generation for Fixed-Wing UAVs”, supervised by Guillaume Sébastien (ETHZ, IGP) and Timo Hinzmann.
 - Jingwei Tang (2017): “Mutual-Information-Based Direct Visual-Inertial Odometry”, supervised by Timo Hinzmann.
 - Patrik Frey (2017): “Multi-Sensor Multi-State Constraint Kalman Filter for Fixed-Wing UAVs”, supervised by Timo Hinzmann.
 - Tim Taubner (2017): “Constrained, Non-rigid, Wide-baseline Stereo Vision for Fixed-wing Aerial Platforms”, supervised by Timo Hinzmann and Thomas Stastny.
- **Bachelor Thesis** (*Bachelor student, 3-4 months part-time*)
 - Laurent Braun (2016): “Robust Vision-Based Localization for Fixed-Wing UAVs”, supervised by Timo Hinzmann.
- **Seminar** (*Bachelor or Master student, 3-4 months part-time*)
 - Jingwei Tang (2017): “Long Range Landmark Observations and their Influence on the Convergence of Bundle-Adjustment Problems”, supervised by Timo Hinzmann.
- **Focus Project** (*6-8 Bachelor students, 1 year project full-time*)
 - Michael Arigoni (2015): “Control of a Wall Racing Robot for Agile Ground Maneuvers”, supervised by Timo Hinzmann and Lennon Rodgers (MIT).
- **Programming Exercises** (*Master students, 1 semester part-time*)
 - Emilk Sempertegui, Cliff Li, and Giancarlo Di Biase (2019): “Towards Semi-Supervised Learning for Human Detection from Aerial Images”, supervised by Timo Hinzmann, within the course “Perception and Learning for Robotics”.
 - Hrishikesh Gupta (2019): “Semantic Segmentation for Autonomous landing site detection using RGB Aerial Images”, supervised by Timo Hinzmann, within the course “Perception and Learning for Robotics”.
 - Adrian Ruckli and Alberto Pennino (2018): “Deep Learning Enhanced Human Detection using RGB and Infrared Imagery onboard of Fixed-Wing UAVs”, supervised by Timo Hinzmann, within the course “Perception and Learning for Robotics”.
- **Teaching**
 - **Perception and Learning for Robotics** (Exercises, 2018 and 2019, ASL, ETH Zurich).
Lecture by C. Cadena, I. Gilitschenski, Prof. R. Siegwart.
 - **Autonomous Mobile Robots** (Exercises, 2015-2018, ASL, ETH Zurich).
Lecture by Prof. R. Siegwart, Prof. D. Scaramuzza, Prof. M. Chli et al.
Exercises: “Line extraction”, “Line-based EKF”, “EKF SLAM”
 - **Artificial Intelligence for Robotics** (Exercises, 2017, ASL, ETH Zurich).
Lecture I. Gilitschenski, C. Cadena, Prof. R. Siegwart
Exercises: “Pose Graph Optimization”, “Iterative Closest Point”
 - **Robot Dynamics** (Exercises, 2015, ASL ETH Zurich)
Lecture by Prof. R. Siegwart, Prof. M. Hutter et al.
Exercise: “Aircraft aerodynamics/flight mechanics”
 - **“Messtechnisches Praktikum”** / Practical course on measurement and control systems (2010, MRT, KIT).
Experiment: Signal analysis via Fourier transformation

SKILLS

Main Languages: C/C++, Python, Matlab
Coding Tools: GIT, CI, Jenkins
Optimization: GTSAM, ceres, g2o
Graphics: OpenCV, Cuda, OpenGL, UnrealEngine, Microsoft AirSim
Deep Learning: pytorch, tensorflow, keras
GPU/CPU cluster: Leonhard GPU Cluster, Amazon Web Services (AWS, EC2 instances)
Simulation: Matlab/Simulink, Maple
PCB/CAD/Circuits: EAGLE, Siemens NX, LabView, LTSpice, PSpice
Website: HTML, PHP, CSS, JS
Hardware: UP board, UP board Squared, Jetson TX1/TX2/Xavier AGX, GeForce RTX 2080 Ti, Arduino,

Odroid, PiZero, PixHawk Autopilot, Oculus Rift DK2 with Unity.
Robotics/Middleware: ROS, ROS2, Gazebo, rviz, ZeroMQ
Low-level communication: UART, SPI, I2C
Open-source tools: Kalibr, maplab, vins-mono, colmap, rovio, okvis, ORB-SLAM etc.
Commercial photogrammetry: Pix4D, Agisoft
Others: GPU programming, CPU multi-threading
Developed VI-sensor with Arduino for multiple cameras and multiple IMUs; Simple PCB design for sensor readings, camera triggering; 3D printing, e.g. camera mounts with Ultimaker S3; RC pilot;

LANGUAGES

German (Native)
English (Fluent, TOEFL iBT 113/120)
French (Advanced)
Italian (Basic)
Spanish (Basic)