

Timo Hinzmann

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MAIN FOCUS

Visual-inertial and Multi-Sensor State Estimation/Odometry/SLAM, 2D/3D Vision, Image processing, Image segmentation/classification, 3D Reconstruction, 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, Optical and Infrared Cameras, System design for autonomous robot missions.

SKILLS

Main Languages: C/C++ (10+yrs), Python (3+yrs);
Coding Tools: GIT, CI, Jenkins; **Optimization:** GTSAM, ceres; **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 (10+yrs), Maple; **PCB/CAD/Circuits:** EAGLE, Siemens NX, LabView, LTSpice; **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:** ROS/ROS2, ZeroMQ, Gazebo, rviz; **Open-source tools:** Kalibr, maplab, vins-mono, colmap, 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.

LANGUAGES

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

LICENSED SOFTWARE

- The visual-inertial estimator [1] has been licensed by an ETH spin-off for commercial applications.
- The DL-based optical-infrared human detection system has been licensed by the Swiss Air Rescue Organization REGA.

MEDIA (SELECTION)

- "Rega drones as saviours in times of need", SRF, Oct 2020
- "Artificial Intelligence – Intelligent drones will soon be our lifesavers", higgs.ch, Apr 2020
- "A milestone for drones in Switzerland", Jan 2019

OPEN-SOURCE REPOSITORIES**(SELECTION)**

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

PUBLICATIONS (SELECTION)

Citations: 391 ▪ h-index: 10 ▪ i10-index: 10
 Published in top conferences (e.g., ICRA, IROS) and journals (e.g., RA-L, JFR). [Full publication list](#)

- [1] T. Hinzmann, T. Schneider, M. Dymczyk, A. Schaffner, S. Lynen, R. Siegwart, and I. Gilitschenski. Monocular visual-inertial SLAM for fixed-wing UAVs using sliding window based nonlinear optimization. In *Intern. Symposium on Vis. Computing*, pages 569–581. Springer, 2016.

EDUCATION**Postdoctoral Researcher**

08/2020 – today

Autonomous Systems Lab, ETH Zurich, Switzerland

Doctor of Science (Dr. Sc.)

12/2014 – 08/2020; enrolled as Ph.D. candidate since 02/2015

Autonomous Systems Lab, ETH Zurich, Switzerland

- Supervised by Prof. Roland Siegwart
- Title: "Perception and Learning for Autonomous UAV Missions"

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
 JPL's Visiting Student Researchers Program (JVS RP); Mars helicopter project
 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 of 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. Graduated with Honorary Diploma.
- Award from the German Mathematician Society; nominated for a scholarship of the German National Academic Foundation; several school awards for final GPA of 1.0/1.0.

EXPERIENCE**During the Doctoral Studies**

- Teaching: Perception & Learning for Robotics (Ex. 2018, 2019), Autonomous Mobile Robots (Ex. 2015-2018), AI for Robotics (Ex. 2017), Robot Dynamics (Ex. 2015)
- (Co-)authored research proposals to Rega (Swiss Air-Rescue Organization), ETH Grant, Microsoft SJRC, Innosuisse, SNF
- Involved in the projects: ICARUS, SHERPA, AtlantikSolar, SolAIR, armasuisse, Rega (Human Detection), Microsoft SJRC
- Supervised over 30 students during their Bachelor's thesis, Master's thesis, Semester project, Focus project, Seminar, and other courses.
- Associate Editor (AE) for IROS. Reviewer for ICRA, IROS, RA-L, T-RO, JFR, etc.

Further work experience (Selection)

- 01/2012 – 09/2012: Internship at BMW Group Research & Development; Development of advanced driver assistance systems (Matlab/Simulink)
- 09/2010 – 04/2011: Research Assistant at Institute of Optimization (ITE, KIT); PCB design for indoor pedestrian navigation systems
- 09/2009 – 07/2011: Research Assistant at Fraunhofer IOSB, Karlsruhe; project "Model predictive control (MPC) for fuel consumption reduction of heavy trucks"
- 09/2009 – 09/2010: KaRacelng formula student, team member; Team electronics; Design of printed circuit boards (PCB)