Timo Hinzmann

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Website ▪ Github ▪ LinkedIn ▪ Google Scholar

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, caffe; **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, PSpice/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, 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
- "Artifical 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: 336 ▪ 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 *Awaiting official doctorate conferral*
08/2020 – today
Autonomous Systems Lab, ETH Zurich, Switzerland

Doctor of Science (Dr. Sc.) *Awaiting official doctorate conferral*
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 (JVSRP)
  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
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 and Learning for Robotics (Exercises, 2018 and 2019), Autonomous Mobile Robots (Exercises, 2015-2018), Artificial Intelligence for Robotics (Exercises, 2017), Robot Dynamics (Exercises, 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.

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; Research help for project "Model predictive control (MPC) for fuel consumption reduction of heavy trucks"
- *09/2009 – 09/2010*: KaRaceIng formula student, team member; Team electronics; Design of printed circuit boards (PCB)