

Andreas Ziegler

Robotics & Computer Vision
Researcher/Engineer

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in andreas-ziegler



Summary

I am passionate about a mix of robotics and computer vision research and industrial/commercial applications. My vision is to develop novel algorithms and make them work on real robots. My dedication extends to fostering a collaborative work environment, one that celebrates failures, promoting a culture of psychological safety where individuals feel empowered to take ownership. I appreciate the opportunity to exchange ideas with a variety of individuals from various backgrounds.

Personal details

Date of birth 25.03.1988

Nationality Swiss

Education

05.2021– **PhD Candidate**, *University of Tübingen*, Tübingen, Germany

Thesis: Event-based computer vision for fast robot control

○ In collaboration with Sony AI Zürich

○ Thesis supervisors: Prof. Dr. Andreas Zell and Prof. Dr. Andreas Geiger

09.2014–04.2018 **MSc ETH in EEIT**, *ETH Zürich*, Zürich, Switzerland

Specialized in: Robotics, Computer Vision and Machine Learning

Master Thesis: A Representation for Exploration that is Robust to State Estimate Drift

○ Examiner: Prof. Dr. Roland Siegwart and Prof. Dr. Davide Scaramuzza

○ Resulted in [7]

Semester Project 2: Map Fusion for Collaborative UAV SLAM

○ Examiner: Prof. Dr. Roland Siegwart and Prof. Dr. Margarita Chli

Semester Project 1: Robust object tracking in 3D by fusing ultra-wideband and vision

○ Examiner: Prof. Dr. Luc Van Gool and Prof. Dr. Otmar Hilliges

09.2009–09.2013 **BSc FHO in Electrical Engineering**, *University of Applied Science Eastern Switzerland (HSR)*, Rapperswil, Switzerland

Specialized in: Digital Signal and Image Processing, Embedded Systems and Software Engineering, and Mobile Communication

09.2011–08.2012 **Exchange year**, *Shanghai Jiao Tong University*, Shanghai, China

Courses taken: Chinese language, Electrical engineering and Computer Science

Independent Coursework

edX DT-01x: Self-Driving Cars with Duckietown by ETHx on edX. Specialization Certificate earned on August 15, 2021

Coursera Deep Learning, a 5-course specialization by deeplearning.ai on Coursera. Specialization Certificate earned on March 16, 2018

edX Autonomous Mobile Robots by ETHx on edX. Certificate earned on April 17, 2014

Work experience

- 06.2021–present **PhD Candidate**, *University of Tübingen*, Tübingen, Germany, 100%
- Working on event-based computer vision for fast robot control in collaboration with Sony AI Zürich
 - Supervision of MSc and BSc students
 - Teaching Assistant
- Technologies used: C++, Python, Julia, PyTorch, OpenCV, numpy, Eigen, ROS1/2, git, L^AT_EX
- 11.2023–03.2024 **Research Scientist Intern**, *Sony AI*, Zurich, Switzerland, 100%
- Worked on multi modal camera calibration.
- Technologies used: C++, Python, OpenCV, Ceres, git
- 08.2022–10.2022 **Computer Vision & ML Research Intern**, *Prophesee*, Paris, France, 100%
- Worked on slow motion from frame and event data under the supervision of Dr. Amos Sironi.
- Technologies used: Python, PyTorch, OpenCV, numpy, git, Atlassian tools
- 09.2018–05.2021 **Robotics Engineer**, *MT-Robot AG*, Zwingen, Switzerland, 100%
- Accomplished tasks:
- Development of a computer vision based safety field intrusion detection system
 - Improvement of a multi robot collision avoidance system
 - Development and maintenance of software for autonomous mobile robots (AMRs), including topics such as multi sensor fusion, mapping, path planning, (multi robot) obstacle avoidance, etc.
 - Deputy Scrum Master
- Technologies used: C++, Python, ROS1/2, DDS, OpenCV, CMake, git, Atlassian tools
- 06.2018–09.2018 **Research Assistant**, *University of Zürich, Robotics and Perception Group*, Zurich, Switzerland, 100%
- Continued working on my master thesis project which lead to [7].
- 04.2018–06.2018 **Research Associate Intern**, *Disney Research Zürich*, Zürich, Switzerland, 100%
- Integrated a Leica total station in an existing ROS setup within the PaintCopter project.
- Technologies used: C++, Python, ROS, Ceres, CMake, git
- 02.2018–03.2018 **Research Assistant**, *Laboratory for Orthopaedic Biomechanics at the University and ETH Zürich*, Zürich, Switzerland, 100%
- Developed an LED light controller for a microscope setup which contributed to [6].
- Technologies used: C++, Qt, wxWidgets, CMake, git
- 03.2017–08.2017 **Computer Vision & Robotics Research Intern**, *Pix4D SA*, Lausanne, Switzerland, 100%
- Accomplished tasks:
- Worked on indoor navigation for UAVs
 - Implementation of a filtering method for a robust target detection
 - Participation on an indoor mapping project with an industrial partner
 - Investigation of barcode localization and detection algorithms for automatic inventory
 - Participation on a development of a target detection library for radiometric corrections
 - Worked on various computer vision applications (Barcode localization/detection, 3D reconstruction, Camera calibration)
- Technologies used: C++, ROS, OpenCV, Eigen, Conan, CMake, Jenkins, git

- 08.2015–06.2018 **Software Engineer & System Administrator**, *Accelerom AG*, Zürich, Switzerland, 20%-30%
Technologies used: Java, Groovy, JavaScript, jQuery, CSS, Grails, Hibernate, MySQL, git, Redmine, Tomcat, Apache, SAMBA
- 02.2014–08.2015 **Research Assistant**, *Laboratory for Orthopaedic Biomechanics at the University and ETH Zürich*, Zürich, Switzerland, 100%/20%
Continued my work, provided further consulting and maintenance.
- 11.2013–02.2014 **Research Assistant (Civil service)**, *Computer Assisted Research and Development, University Hospital Balgrist*, Zürich, Switzerland, 100%
Worked on segmentation algorithms for computer-assisted surgical planning.
Technologies used: Matlab, C#, VTK, CVS
- 08.2013–11.2013 **Research Assistant (Civil service)**, *Laboratory for Orthopaedic Biomechanics at the University and ETH Zürich*, Zürich, Switzerland, 100%
Accomplished tasks:
 - Extended and adapted a microscope control software which contributed to [5]
 - Developed and implemented a stretcher control software
Technologies used: C++, Qt, wxWidgets, CMake, git
- 08.2008–03.2009 **Computer Science Intern**, *ERP sourcing AG*, Wallisellen, Switzerland, 100%
- 08.2004–08.2008 **Electronics Engineer Apprentice**, *Hch. Kündig & Cie. AG*, Rüti ZH, Switzerland, 100%

Publications

- [1] T. Gossard, A. Ziegler, L. Kolmar, J. Tebbe, and A. Zell, “Ewand: A calibration framework for wide baseline frame-based and event-based camera systems,” in *2024 International Conference on Robotics and Automation (ICRA)*, IEEE, 2024. [Online]. Available: <https://arxiv.org/pdf/2309.12685.pdf>.
- [2] T. Gossard, J. Tebbe, A. Ziegler, and A. Zell, “Spindoe: A ball spin estimation method for table tennis robot,” in *IEEE/RSJ Int. Conf. Intell. Robot. Syst. (IROS)*, IEEE, 2023. DOI: 10.48550/ARXIV.2303.03879. [Online]. Available: <https://arxiv.org/abs/2303.03879>.
- [3] A. Ziegler, T. Gossard, K. Vetter, J. Tebbe, and A. Zell, “A multi-modal table tennis robot system,” in *RoboLetics: Workshop on Robot Learning in Athletics @CoRL 2023*, 2023. DOI: 10.48550/arXiv.2310.19062. [Online]. Available: <https://arxiv.org/abs/2310.19062>.
- [4] A. Ziegler, D. Teigland, J. Tebbe, T. Gossard, and A. Zell, “Real-time event simulation with frame-based cameras,” in *2023 International Conference on Robotics and Automation (ICRA)*, IEEE, May 2023, pp. 11 669–11 675. DOI: 10.1109/ICRA48891.2023.10160654. [Online]. Available: <https://arxiv.org/pdf/2209.04634.pdf>.
- [5] A. Horvath, A. Ziegler, S. Gerhard, *et al.*, “Focus on time: Dynamic imaging reveals stretch-dependent cell relaxation and nuclear deformation,” *Biophysical Journal*, Jan. 2021. DOI: 10.1016/j.bpj.2021.01.020.
- [6] A. N. Horvath, A. A. Ziegler, S. Gerhard, *et al.*, “Time-controlled multichannel dynamic traction imaging of biaxially stretched adherent cells,” Mar. 2020. DOI: 10.1101/2020.03.02.972919. [Online]. Available: <https://doi.org/10.1101/2020.03.02.972919>.
- [7] T. Cieslewski, A. Ziegler, and D. Scaramuzza, “Exploration without global consistency using local volume consolidation,” in *IFRR International Symposium on Robotics Research (ISRR)*, Hanoi, 2019, IFRR: IEEE, Oct. 2019. [Online]. Available: <https://doi.org/10.5167/uzh-197724>.

Supervised thesis

Bachelor thesis	Simulating event-based cameras with frame-based cameras, Daniel Teigland Deep-learning based table tennis ball tracking with an event camera, Genc Ahmeti Event-camera, camera and robot arm calibration, Levin Kolmar 3D trajectory prediction from event data, Julian John Pushing an event-simulator towards its limit, Laura Schiller Adding noise and artifacts to the event-simulator, Steven Krämer Event-based camera bias optimization, Eric Langlouis
Master thesis	Spikin neural network for event based ball detection, Karl Vetter

Teaching activities

SS 2023	Seminar: Robotics and Robot Vision
FS 2022	Teaching Assistant: Introduction to Computer Engineering
SS 2022	Teaching Assistand: Mobile Robots
FS 2021	Teaching Assistant: Deep Learning

Languages

German	Mother tongue
English	Excellent, Level C1
French	Good, Level B1,
Korean	Basics, Level A2
Chinese	Basics, Level A1

Technical skills

Languages	C++, Python, Julia, C, Java
Software packages	OpenCV, ROS1/2, PyTorch, Eigen, boost, DDS, pcl, scikit-learn, wxWidgets, Qt, MATLAB

Hobbies

Sports	Wing Chun Kung Fu, Yoga, Jogging, Mountaineering
Music	Drums, Piano, Vocals

Extra-Curricular activities

- Foodsaver at Foodsharing, managing a Labdoo hub