

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. I appreciate the opportunity to collaborate and exchange ideas with a variety of individuals from various backgrounds. 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.

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 [8]

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 & Training

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
University of Tübingen	From Chaos to Structure: Time- and Self-Management for a More Efficient Work Style. Certificate earned on March 9, 2022
University of Tübingen	Setting and Achieving Goals Efficiently. Certificate earned on May 5, 2022
University of Tübingen	Slidewriting and Storytelling. Certificate earned on May 16, 2022
SIY	Search Inside Yourself: Emotional Intelligence for Leadership. Certificate earned on May 28, 2024

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 [8].
- 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 [7].
- 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 [6]
 - Developed and implemented a stretcher control software
- Technologies used: C++, Qt, wxWidgets, CMake, git
- 08.2008–03.2009 **Computer Science Intern**, *ERPsourcing AG*, Wallisellen, Switzerland, 100%
- 08.2004–08.2008 **Electronics Engineer Apprentice**, *Hch. Kündig & Cie. AG*, Rüti ZH, Switzerland, 100%

Publications

- [1] T. Gossard, J. Krismer, A. Ziegler, J. Tebbe, and A. Zell, “Table tennis ball spin estimation with an event camera,” in *2024 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, IEEE, Jun. 2024. DOI: 10.48550/arXiv.2404.09870.
- [2] 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>.
- [3] T. Gossard, J. Tebbe, A. Ziegler, and A. Zell, “Spindoe: A ball spin estimation method for table tennis robot,” in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, Oct. 2023. DOI: 10.1109/iros55552.2023.10342178. [Online]. Available: <http://dx.doi.org/10.1109/IROS55552.2023.10342178>.
- [4] 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>.
- [5] A. Ziegler, D. Teigland, J. Tebbe, T. Gossard, and A. Zell, “Real-time event simulation with frame-based cameras,” in *2023 IEEE International Conference on Robotics and Automation*

(ICRA), IEEE, May 2023. DOI: 10.1109/icra48891.2023.10160654. [Online]. Available: <http://dx.doi.org/10.1109/ICRA48891.2023.10160654>.

- [6] 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.
- [7] 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>.
- [8] 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>.

Media coverage

Schwäbisches Tagblatt Forscherteam der Uni Tübingen entwickelt Tischtennis-Roboter

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 Multi object tracking via event-based motion segmentation with event cameras, Zhiyu Han
Master thesis	Spikin neural network for event based ball detection, Karl Vetter Event-based spin estimation, Julian Krismer

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
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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

- Food saver at Foodsharing, managing a Labdoo hub