Andreas Ziegler

Robotics & Computer Vision Researcher/Engineer

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▬▬▬ Summary

I consider myself a full-stack roboticist, passioned about an (application-driven) mix of robotics, computer vision, and machine learning research. I develop novel algorithms and make them work on real robots.

Having lived, studied, and worked in diverse environments—including Zurich, Basel, Lausanne, Tübingen, Paris, Shanghai, and Seoul/Incheon—I appreciate the opportunity to collaborate and exchange ideas with individuals from diverse backgrounds. Diverse perspectives foster creativity and innovation, helping teams overcome challenges and achieve impactful results.

I am committed to contributing to a collaborative work environment that embraces experimentation, celebrates learning from failures, and fosters psychological safety. I believe such a culture empowers individuals to take ownership, enabling both personal and collective growth.

In my next role, I aim to further develop as an individual contributor while leveraging my leadership experience to amplify team efforts. By transitioning from individual successes to driving collective achievements, I aspire to make a meaningful impact in advancing the field of robotics, computer vision and machine learning as a Postdoctoral Researcher.

▬▬▬ Personal details

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

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] 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`.

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, LaTeX

11.2023–03.2024 **Research Scientist Intern**, *Sony AI*, Zurich, Switzerland, 100%
Worked on multi modal camera calibration under the supervision of Dr. Raphaela Kreiser and Dr. Naoya Takahashi.
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 **Horvath2020**.
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
- ○ Investigation of barcode localization and detection algorithms for automatic inventory

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%*

Independent Coursework & Training

University of Tübingen	Leadership Talent Academy. Certificate earned on November, 2024
SIY	Search Inside Yourself: Emotional Intelligence for Leadership. Certificate earned on May 28, 2024
Center for Nonviolent Communication	NVC Workshops. Certificate earned on October 6, 2024
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	Slidewriting and Storylining. Certificate earned on May 16, 2022
University of Tübingen	Setting and Achieving Goals Efficiently. Certificate earned on May 5, 2022
University of Tübingen	Speedreading. Certificate earned on April 14, 2022
edX	DT-01x: Self-Driving Cars with Duckietown by ETHx on edX. Specialization Certificate earned on Augusts 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

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
	Automatic bias optimization for event cameras using Reinforcement Learning, Emil Moldovan
	Automatic bias optimization for event cameras using offline Reinforcement Learning, David Joseph
	Grasping a table tennis ball using Model Predictive Control, David Grawe
Master thesis	Spiking neural network for event based ball detection, Karl Vetter
	Event-based spin estimation, Julian Krismer

Teaching activities

AS 2024	Teaching Assistant: Foundations of Robotics
SS 2024	Teaching Assistant: Mobile Robots
AS 2023	Seminar: Robotics and Robot Vision
AS 2022	Teaching Assistant: Introduction to Computer Engineering
SS 2022	Teaching Assistant: Mobile Robots
AS 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

Hobbies

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

Extra-Curricular activities

- Foodsaver at Foodsharing, managing a Labdoo hub
- Co-clerk at Quaker Swiss Yearly Meeting