Tim Salzmann

ML & Robotics Researcher

29 May 1993

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About me

I am about to graduate with a PhD in Artificial Intelligence and Robotics. I am passionate about discovering and researching new technology and transferring these skills to new fields. In recent years, I was able to gather experience in AI and technology-related fields through multiple research projects and I have homed my working practice by working on several consulting projects. Having lived on four continents and experienced many cultures I consider my self very social, open-minded and a team player.

Skills

- Machine Learning
- Programming
- Technical Creativity
- Agile Methods
- Teamwork
- English (TOEFL)
- Dedication & Determination

↓ more

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Experience

↓ more details

2022 - 2024	Google DeepMind (W) *PhD Researcher*
2021	Alphabet | X - The Moonshot Factory | Intrinsic (W) *PhD Resident Artificial Intelligence*
2020	epap - Start-Up (W) *Freelancer Consultant for Development and Data Science*
2012 - 2018	BMW *Research Intern for Autonomous Driving* *Prev. Track Engineering Intern BMW Motorsports*
2018	CNC - Communications & Network Consulting *Working Student for Customer Relationship Management & Marketing*
2016	TNG Technology Consulting *Junior Consultant for Technology and Software Consulting*

Research

[1] Large Vision Language Models

Unlocking true machine intelligence hinges on combining language and vision. I find myself particularly drawn to the potential of large-scale vision-language models. These models hold the key to capturing knowledge, fostering reasoning abilities, and enabling machines to spatially grasp the world and reason about relationships therein.

[2]–[5] Deep Learning Approaches for Human-Centric Robotics

Robots are already making a big impact in controlled environments, but the future lies in robots that can work alongside us in our everyday lives. This is why I'm particularly interested in using deep learning to detect and predict human intentions and behaviors - it's a crucial step towards robots that can safely and effectively collaborate with people in our shared world.

[6], [7] Learning for Control

Bridging the gap between deep learning's powerful capabilities and the real world is a key focus of my research. I believe the safest way to achieve this is by integrating them with well-understood and formally verifiable control algorithms. This approach combines the strengths of both fields: deep learning's intelligence and control theory's guaranteed behavior.

[2], [8], [9] Autonomous Driving

Self-driving cars are pushing the boundaries of how autonomous systems navigate complex, shared spaces alongside humans. As the potential benefits are undeniable, I'm excited about researching how deep learning and control theory can work together to achieve this goal.

Education

		Grade
since 2021	PhD Candidate *Technical University of Munich* Supervisor: Markus Ryll (TUM) & Marco Pavone (Stanford)	
2020, 2023	Research Assistant *Stanford University, CA, USA*	
2016 - 2019	M.Sc. - Robotics, Cognition, Intelligence (W) *Technical University of Munich*	1.2 / 4.03
2019	Study Abroad Semester *Chulalongkorn University, Thailand*	
2016	Orientational Semester - Engineering *Technical University of Munich*	
2012 - 2016	B.Sc. - Automotive Information Technology (W) *University of Applied Science, Ingolstadt*	1.2 / 4.03
2014	Study Abroad Semester *Nelson Mandela University, South Africa*	
2012	High School (German Abitur)	1.1 / 4.14

German w. avg. / US w. GPA (W) (W)

Tim SALZMANN

Scholarships

Since 2016	Scholarship by *e-fellows* for outstanding students (E-Fellows-Scholarship)
2019 - 2020	Fellowship by *Stanford University* for Graduate Student Researchers Department for Aeronautics and Astronautics.
2019 - 2020	Scholarship by *DAAD* for international graduate research projects. (IFI-Scholarship)
2014	Scholarship by *DAAD* for study abroad students (PROMOS-Scholarship)
2012	Scholarship by *BMW* for future talent students in engineering (SpeedUp-Program)

Computer Skills

Basic	html, Drupal, CAD-Design, Microsoft Azure/Dynamics
Intermediate	Java, C#, php, sql, Visual Basic, Swift, Wordpress
Advanced	Python, C/C++, Torch, TensorFlow, Keras, ROS, LaTeX, Matlab

What Else?

Having lived on four different continents and being well-traveled I am very culturally-aware, open-minded and I am very keen to acquire new experiences and to generally broaden my horizons. In my free time I am a very active and social person. Outside of work I spend my time in the gym, running, playing tennis, exploring all kinds of new sports and meeting with friends. I enjoy making new connections with people and maintaining previous ones. Further interests include reading, movies with a twist and any new development in technology. I have an interest in following the politics and business news of the day and trying to learn more about past high-level political developments and connections.

Publications

[1] T. Salzmann, M. Ryll, A. Bewley, and M. Minderer, "Scene-graph vit: End-to-end open-vocabulary visual relationship detection," in *Submitted to European Conference on Computer Vision (ECCV)*, 2024.

[2] T. Salzmann, B. Ivanovic, P. Chakravarty, and M. Pavone, "Trajectron++: Dynamically-feasible trajectory forecasting with heterogeneous data," in *European Conference on Computer Vision (ECCV)*, 2020, pp. 683–700.

[3] T. Salzmann, M. Pavone, and M. Ryll, "Motron: Multimodal probabilistic human motion forecasting," in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022, pp. 6447–6456.

[4] T. Salzmann, H.-T. L. Chiang, M. Ryll, D. Sadigh, C. Parada, and A. Bewley, "Robots that can see: Leveraging human pose for trajectory prediction," *IEEE Robotics and Automation Letters*, vol. 8, no. 11, pp. 7090–7097, 2023.

[5] O. Dünkel, T. Salzmann, and F. Pfaff, "Normalizing flows on the product space of so(3) manifolds for probabilistic human pose modeling," in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[6] T. Salzmann, E. Kaufmann, J. Arrizabalaga, M. Pavone, D. Scaramuzza, and M. Ryll, "Real-time neural mpc: Deep learning model predictive control for quadrotors and agile robotic platforms," *IEEE Robotics and Automation Letters*, vol. 8, no. 4, pp. 2397–2404, 2023.

[7] T. Salzmann, J. Arrizabalaga, J. Andersson, M. Pavone, and M. Ryll, "Learning for casadi: Data-driven models in numerical optimization," in *Learning for Dynamics & Control Conference (L4DC)*, 2024.

[8] T. Salzmann, J. Thomas, T. Kühbeck, J.-c. Sung, S. Wagner, and A. Knoll, "Online path generation from sensor data for highly automated driving functions," in *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, IEEE, 2019, pp. 1807–1812.

[9] S. Shafaei, F. Müller, T. Salzmann, M. H. Farzaneh, S. Kugele, and A. Knoll, "Context prediction architectures in next generation of intelligent cars," in *2018 21st International Conference on Intelligent Transportation Systems (ITSC)*, IEEE, 2018, pp. 2923–2930.

Tim SALZMANN

Detailed Experience

MAY 22 - MAY 24 — Alphabet | Google DeepMind — Munich
PhD Researcher

AUG 21 - DEC 21 — Alphabet | X - The Moonshot Factory | Intrinsic — Munich
PhD Resident Artificial Intelligence

MAY 20 - OCT 20 — epap - Start-Up — Hannover
Freelancer Consultant for Development and Data Science
- Development of new product area: Connecting epap to financial data providers for fintech use cases.
- Consulting for Machine Learning and Big Data development.

APR 18 - DEC 18 — BMW of North America, LLC — Silicon Valley
Technology Research Intern for Autonomous Driving
- Creation of a proof-of-concept closed-loop autonomous driving system. This included all relevant steps such as planning, system design, data collection, implementation, simulation, integration, and testing. Implementation included, but was not limited to, machine learning and path/trajectory planning.
- Research in Reinforcement Learning Algorithms for high-level driving strategy.

NOV 17 - MAR 18 — CNC - Communications & Network Consulting — Munich
Working Student for Customer Relationship Management & Marketing
- Project management, organization and implementation of a Digital Marketing Big-Data project involving multiple stakeholders.
- Development and Maintenance of a Microsoft Dynamics system (CRM).

MAY 11 - DEC 17 — Self-Employed — Germany
Motosports Communication & Event Management
- Commentator and editorial support for motorsport.tv (former MotorsTV) for multiple Motorsport series.
- Assistant Track Commentator for for FIA Formula E Events. Commentatory for framework program and on track activities for the German ePrix in Berlin. Communication and organizational work with local organizers and Formula E.
- Editorial support and Social Media communication for Sky during NASCAR live broadcast.

NOV 16 - NOV 17 — BMW Group — Munich
Working Student for Highly Automated and Autonomous Driving
- Planning and implementation of a rapid prototyping framework (based on ROS) for automated driving. In addition, integration of this framework on vehicle prototypes including various sensors.
- Research for machine learning models for trajectory prediction of traffic participants. This included setting up a data processing pipeline to process vehicle traces from the prototypes into machine learning data sets.

JUL 16 - OCT 16 — TNG Technology Consulting — Munich
Junior Consultant for Technology and Software Consulting
- Development of machine learning models and artificial intelligence strategies and algorithms for fraud detection in the telecommunications sector.
- Team lead for a team of three. Representing the project towards client upper and top management.

SEP 15 - MAR 16 — Publishing Future — Munich
Development and Maintenance Engineer
Feature development for Wordpress based websites.

SEP 15 - MAR 16 — BMW Motorsports — Munich
Track Engineering and Simulation Intern
Physical modeling and simulation for lap time evaluation of (hybrid) race cars.

FEB 14 - JUL 14 — BMW Motorsports — Munich
Track Engineering and Simulation Intern
Creating, managing and validating a multi-body simulation for race configuration of vehicle suspensions.
Automatic evaluation of operation strategy for hybrid power systems.

AUG 13 - OCT 13 — BMW Group — Munich
Software Development Automotive Basic Functions Intern
Development of a management tool for HIL (Hardware in the Loop) tests.