









# Johannes Betz

Postdoctoral Researcher in Autonomous Systems  
University of Pennsylvania

 Philadelphia, USA  
 Johannes Betz

 +01-215-433-8094  
 Johannes Betz

 betz.jb@gmail.com  
 JohannesBetz

 Joebetz.science  
 Johannes Betz

## RESEARCH INTEREST

---

- Autonomous systems with focus on autonomous level 5 vehicles
- Path and behavioral planning for autonomous systems
- Advanced machine learning technologies
- Philosophy and ethics in autonomous driving and artificial intelligence

## EDUCATION

---

10/2016 – 05/2020 Munich, Germany	<b>Master of Arts, Technical University of Munich</b> Course of Studies: Philosophy of Science and Technology Master thesis: “What is Mobility? Philosophical Perspectives”
11/2013 – 11/2019 Munich, Germany	<b>Ph.D., Technical University of Munich</b> Department of Mechanical Engineering, Institute of Automotive Technology Ph.D. thesis: “An evaluation of an intelligent fleet disposition for mixed vehicle fleets” Advisor: Prof. Dr.-Ing. Markus Lienkamp
04/2012 – 11/2013 Bayreuth, Germany	<b>Master of Science, University of Bayreuth</b> Courses of Study: Automotive Engineering and Mechatronics Master thesis: “Development of a RFID based service interface”
10/2008 – 04/2012 Coburg, Germany	<b>Bachelor of Engineering, University of Applied Science Coburg</b> Courses of Study: Automotive Technology Bachelor thesis: “Development of a method for optimizing the sequence of a shift quality assessment in automotive transmission systems”

## RESEARCH AND WORK EXPERIENCE

---

10/2020 – present Philadelphia, USA	<b>Postdoctoral researcher, University of Pennsylvania</b> Department of Electrical and Systems Engineering Research group “xLab for Safe Autonomous Systems” Advisor: Prof. Dr. Rahul Mangharam
11/2018 – 09/2020 Munich, Germany	<b>Postdoctoral researcher, Technical University of Munich</b> Department of Mechanical Engineering, Institute of Automotive Technology Head of the research group “Intelligent Vehicle Systems” Founder of the “TUM Autonomous Motorsports” team Advisor: Prof. Dr.-Ing. Markus Lienkamp
02/2017 – 07/2017 Berkeley, USA	<b>Visiting researcher, Lawrence Berkeley National Laboratory</b> Research group “Grid Integration Group”
11/2013 – 11/2018 Munich, Germany	<b>Research associate, Technical University of Munich</b> Department of Mechanical Engineering, Institute of Automotive Technology Research group “Smart Mobility” Advisor: Prof. Dr.-Ing. Markus Lienkamp
06/2012 – 10/2013 Bayreuth, Germany	<b>Research assistant, University of Bayreuth</b> Fraunhofer Institute of Production Technology

10/2011 – 04/2012 Weissach, Germany	<b>Bachelor thesis, Porsche AG</b> Drivetrain development and transmission application
04/2009 – 10/2011 Coburg, Germany	<b>Research assistant, University of Applied Science Coburg</b> Institute of Automotive Technology
09/2010 – 03/2011 Dingolfing, Germany	<b>Internship, BMW AG</b> Quality management in the overall vehicle development

## TEACHING EXPERIENCE

---

02/2021 – present	<b>Lecturer: EAS 203 Engineering Ethics</b> , University of Pennsylvania
10/2020 – present	<b>Lecturer: ESE 615 F1/10 Autonomous Racing Cars</b> , University of Pennsylvania,
10/2018 – 10/2020	<b>Lecturer: Artificial Intelligence in Automotive Technology</b> , Technical University of Munich
10/2018 – 10/2020	<b>Lecturer: Vehicle Dynamics of Passenger Cars</b> , Technical University of Munich
10/2015 – 10/2018	<b>Lecturer: Charging Technologies and Energy Grid for EVs</b> , Technical University of Munich
10/2014 – 10/2020	<b>Lecturer: Race Car Technologies</b> , Technical University of Munich
03/2014 – 10/2018	<b>Lecturer: CAN-Bus Technologies</b> , Technical University of Munich
03/2014 – 10/2017	<b>Lecturer: Power Electronics for Electric Vehicles</b> , Technical University of Munich
11/2013 – present	<b>Thesis supervision:</b> 19 bachelor theses, 25 term papers, 15 master theses, 8 independent project studies

## PUBLICATIONS AND PRESENTATIONS

---

### PEER-REVIEWED JOURNAL PUBLICATIONS

- F. Nobis, E. Shafiei, P. Karle, J. Betz, and M. Lienkamp, "Radar Voxel Fusion for 3D Object Detection," *Applied Sciences*, vol. 11, no. 12, p. 5598, Jun. 2021, doi: 10.3390/app11125598.
- M. Geisslinger, F. Poszler, J. Betz, C. Lütge, M. Lienkamp, "Autonomous Driving Ethics: From Trolley Problem to Ethics of Risk" in *Philosophy & Technology*, <https://doi.org/10.1007/s13347-021-00449-4>
- F. Nobis, F. Fent, J. Betz, M. Lienkamp, „Kernel Point Convolution LSTM Networks for Radar Point Cloud Segmentation" in *Applied Sciences*, vol. 11, no. 6, p. 2599, Mar. 2021, doi: 10.3390/app11062599
- S. Huch, A. Ongel, J. Betz, and M. Lienkamp, "Multi-Task End-to-End Self-Driving Architecture for CAV Platoons," *Sensors*, vol. 21, no. 4, p. 1039, Feb. 2021, doi: 10.3390/s21041039
- T. Herrmann, A. Wischnewski, L. Hermansdorfer, J. Betz, M. Lienkamp, "Real-Time Adaptive Velocity Optimization for Autonomous Electric Race Cars" in *IEEE Transactions on Intelligent Vehicles*, *early access*, doi: 10.1109/TIV.2020.3047858
- A. Heilmeier, A. Thomaser, M. Graf, J. Betz, "Virtual Strategy Engineer: Using Artificial Neural Networks for Making Race Strategy Decisions in Circuit Motorsport," in *Applied Sciences*, vol. 10, no. 21, p. 7805, Nov. 2020, doi: 10.3390/app10217805
- A. Heilmeier, M. Graf, J. Betz, M. Lienkamp, "Application of Monte Carlo Methods to Consider Probabilistic Effects in a Race Simulation for Circuit Motorsport," in *Applied Sciences*, vol. 10, no. 12, p. 4229, Jun. 2020, doi: 10.3390/app10124229
- J. Betz, A. Heilmeier, A. Wischnewski, T. Stahl, M. Lienkamp, "Autonomous Driving – A Crash Explained in Detail" in *Applied Sciences*, vol. 9, no. 23, p. 5126, Nov. 2019, doi: 10.3390/app9235126
- P.R. Palafox, J. Betz, F. Nobis, K. Riedl, M. Lienkamp, "Fusing Semantic Segmentation and Monocular Depth Estimation for Enabling Autonomous Driving in Roads Without Lane Lines" in *Sensors*, vol. 19, no. 14, p. 3224, 2019, doi: 10.3390/s19143224

A. Heilmeier, A. Wischnewski, L. Hermansdorfer, J. Betz, M. Lienkamp, B. Lohmann, "Minimum curvature trajectory planning and control for an autonomous race car" in *Vehicle System Dynamics*, vol. 58, no. 10, p. 1497–1527, Jun. 2019 doi: 10.1080/00423114.2019.1631455

J. Betz, M. Lienkamp, "Approach for the development of a method for the integration of battery electric vehicles in commercial companies, including intelligent management systems" in *Automotive and Engine Technology - The International Journal of WKM*, vol. 1, no.1-4, p. 107-117, 2016, doi: 10.1007/s41104-016-0008-y

T. Tang, D. Soto-Setzke, C. Kohl, T. Köhn, J. Lohrer, and J. Betz, "EE-Architektur für mobile Dienste," *ATZ Extra*, vol. 19, no. 14, pp. 40–45, Oct. 2014, doi: 10.1365/s35778-014-1356-8

## PEER-REVIEWED CONFERENCE PUBLICATIONS

M. Geisslinger, P. Karle, J. Betz, M. Lienkamp, "Watch-and-Learn-Net: Self-supervised Online Learning for Probabilistic Vehicle Trajectory Prediction" in *IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, 2021, in Print

D. Ziegler, J. Betz, M. Lienkamp, "Unified Mobility Estimation Model," in *2021 IEEE International Intelligent Transportation Systems Conference (ITSC)*, Sep. 19, 2021, doi: 10.1109/itsc48978.2021.9564453

J. Bhargav, J. Betz, H. Zheng, and R. Mangharam, "Track based offline policy learning for overtaking maneuvers with autonomous racecars," in *2021 IEEE International Conference on Robotics and Automation (ICRA 2021) - Workshop Opportunities and Challenges With Autonomous Racing*, 2021 preprint: <https://arxiv.org/abs/2107.09782>

L. Hermansdorfer, R. Trauth, J. Betz, M. Lienkamp, "End-to-End Neural Network for Vehicle Dynamics Modeling" presented at the 2020 6th IEEE Congress on Information Science and Technology (CiSt), Jun. 2020, doi: 10.1109/cist49399.2021.9357196

A. Wischnewski, J. Betz, B. Lohmann, "Real-Time Learning of Non-Gaussian Uncertainty Models for Autonomous Racing" presented at the 2020 59th IEEE Conference on Decision and Control (CDC), Dec. 2020, doi: 10.1109/cdc42340.2020.9304230

A. Waclaw, F. Gotzler, J. Betz, "Techno-Economic Analysis of State-of-the-Art Charging Infrastructure Concepts for Typical Commercial Battery Electric Vehicle Fleets" in *23<sup>rd</sup> IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Sep. 2020, doi: 10.1109/itsc45102.2020.9294197

T. Stahl, M. Eicher, J. Betz, F. Diermeyer, "Online Verification Concept for Autonomous Vehicles - Illustrative Study for a Trajectory Planning Module" in *23rd IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Sep. 2020, doi: 10.1109/ITSC45102.2020.9294703

F. Nobis, J. Betz, M. Lienkamp, "Exploring the Capabilities and Limits of 3D Monocular Object Detection - A Study on Simulation and Real World Data" in *23rd IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Sep. 2020, doi: 10.1109/ITSC45102.2020.9294625

T. Herrmann, F. Passigato, J. Betz, M. Lienkamp, "Minimum Race-Time Planning-Strategy for an Autonomous Electric Racecar" in *23rd IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Sep. 2020, doi: 10.1109/ITSC45102.2020.9294681

T. Stahl, J. Betz, "An Open-Source Scenario Architect for Autonomous Vehicles," in *the 2020 Fifteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, Sep. 2020, doi: 10.1109/ever48776.2020.9243029

F. Nobis, O. Papanikolaou, J. Betz, and M. Lienkamp, "Persistent Map Saving for Visual Localization for Autonomous Vehicles: An ORB-SLAM 2 Extension," in *the 2020 Fifteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, 2020, doi: 10.1109/ever48776.2020.9243094

K. Riedl, S. Huber, M. Böhmer, J. Kreibich, J. Betz, "Importance of Contextual Information for the Detection of Road Damages," in *the 2020 Fifteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, 2020, doi: 10.1109/ever48776.2020.9242954

L. Hermansdorfer, J. Betz, M. Lienkamp, "Benchmarking of a software stack for autonomous racing against a professional human race driver," in the *2020 Fifteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, 2020, doi: 10.1109/ever48776.2020.9242926

F. Nobis, M. Geisslinger, M. Weber, J. Betz, M. Lienkamp, "Learning-based Radar and Camera Sensor Fusion Architecture for Object Detection," in *2019 Sensor Data Fusion: Trends, Solutions, Applications (SDF)*, doi: 10.1109/SDF.2019.8916629

J. Betz, A. Wischnewski, A. Heilmeier, F. Nobis, T. Stahl, L. Hermansdorfer, T. Herrmann, M. Lienkamp, "A Software Architecture for the Dynamic Path Planning of an Autonomous Racecar at the Limits of Handling" in *2019 IEEE International Conference on Connected Vehicles and Expo (ICCVE 2019)*, doi: 10.1109/ICCVE45908.2019.8965238

A. Wischnewski, J. Betz, B. Lohmann, "A Model-Free Algorithm to Safely Approach the Handling Limit of an Autonomous Racecar" in *2019 IEEE International Conference on Connected Vehicles and Expo (ICCVE 2019)*, doi: 10.1109/ICCVE45908.2019.8965218

T. Herrmann, F. Christ, J. Betz, M. Lienkamp, "Energy Management Strategy for an Autonomous Electric Racecar using Optimal Control" in *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, 2019, doi: 10.1109/ITSC.2019.8917154

L. Hermansdorfer, J. Betz, M. Lienkamp, "A Concept for Estimation and Prediction of the Tire-Road Friction Potential for an Autonomous Racecar" in *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, 2019, doi: 10.1109/ITSC.2019.8917024

T. Stahl, A. Wischnewski, J. Betz, M. Lienkamp, "Multilayer Graph-Based Trajectory Planning for Race Vehicles in Dynamic Scenarios" in *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, 2019, doi: 10.1109/ITSC.2019.8917032

A. Wischnewski, T. Stahl, J. Betz, B. Lohmann, "Vehicle Dynamics State Estimation and Localization for High Performance Race Cars" in *IFAC-PapersOnLine*, vol. 52, no. 8, p. 154–161, 2019, doi: 10.1016/j.ifacol.2019.08.064

K. Riedl, S. Kurscheid, A. Noll, J. Betz, M. Lienkamp, "Road Network Coverage Models for Cloud-based Automotive Applications: A Case Study in the City of Munich" in *IEEE Intelligent Vehicles Symposium (IV'19)*, 2019, doi: 10.1109/IVS.2019.8814020

A. Waclaw, J. Betz, M. Lienkamp, "Techno-Economical Assessment of Implementing Holistic Electromobility Solutions to Commercial Companies" in *2019 Fourteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, 2019, doi: 10.1109/EVER.2019.8813533

A. Heilmeier, M. Geißlinger, J. Betz, "A Quasi-Steady-State Lap Time Simulation for Electrified Race Cars" in *2019 Fourteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, 2019, doi: 10.1109/EVER.2019.8813646

J. Betz, A. Wischnewski, A. Heilmeier, F. Nobis, T. Stahl, L. Hermansdorfer, M. Lienkamp, "A Software Architecture for an Autonomous Racecar" in *IEEE 89th Vehicular Technology Conference (VTC2019-Spring)*, 2019, doi: 10.1109/VTCspring.2019.8746367

T. Stahl, A. Wischnewski, J. Betz, M. Lienkamp, "ROS-based localization of a race vehicle at high-speed using LIDAR" in *E3S Web of Conferences*, vol. 95, p. 4002, 2019, doi: 10.1051/e3sconf/20199504002

F. Nobis, J. Betz, L. Hermansdorfer, and M. Lienkamp, "Autonomous Racing: A Comparison of SLAM Algorithms for Large Scale Outdoor Environments" in *ICVARS '19: 2019 the 3rd International Conference on Virtual and Augmented Reality Simulations*, Feb. 2019, doi: 10.1145/3332305.3332319

J. Betz, A. Wischnewski, A. Heilmeier, F. Nobis, T. Stahl, L. Hermansdorfer, B. Lohmann M. Lienkamp, "What can we learn from autonomous level 5 Motorsport?" in *Proceedings, Springer Fachmedien Wiesbaden*, 2018, p. 123–146. doi: 10.1007/978-3-658-22050-1\_12

M. Wittmann, L. Lohrer, J. Betz, B. Jäger, M. Ott, M. Klöppel, M. Hann, M. Lienkamp, "A Holistic Framework for Acquisition, Processing and Evaluation of Vehicle Fleet Test Data" in *IEEE International Conference on Intelligent Transportation Systems (ITSC 17)*, 2017, doi: 10.1109/ITSC.2017.8317637

J. Betz, L. Walther, M. Lienkamp, "Analysis of the Charging Infrastructure for Battery Electric Vehicles in Commercial Companies" in *IEEE Intelligent Vehicle Symposium (IV 17)*, 2017, doi: 10.1109/IVS.2017.7995945

J. Betz, M. Hann, B. Jäger, M. Lienkamp, "Evaluation of the Potential of Integrating Battery Electric Vehicles into Commercial Companies on the Basis of Fleet Test Data" *2017 IEEE 85th Vehicular Technology Conference (VTC Spring)*, 2017, doi: 10.1109/VTCSpring.2017.8108289

J. Betz, S. Prottung, and M. Lienkamp, "An evaluation of the car-free city potential for the city of Munich regarding mobility data," *2017 Twelfth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, 2017, doi: 10.1109/ever.2017.7935875.

J. Betz, T. Scholz, and M. Lienkamp, "Evaluation of the potential of integrating battery electric vehicles into the energy structure of a commercial company," presented at the *2016 IEEE Smart Energy Grid Engineering (SEGE)*, 2016, doi: 10.1109/sege.2016.7589541

J. Betz, D. Werner, M. Lienkamp, "Fleet disposition modeling to maximize utilization of battery electric vehicles in companies with on-site energy generation" *Transportation Research Procedia*, vol. 19, pp. 241-257, 2016, doi: 10.1016/j.trpro.2016.12.084

## **OTHER PUBLICATIONS**

B. Jäger, R. Schawohl, W. Christl, F. Bachmann, M. Hann, J. Betz, C. Frank, M. Lienkamp, "VEM-Virtuelle Elektromobilität im Taxi- und Gewerbeverkehr München" Final report for the BMWi-funded project ICT for Electric Mobility II, 2016, doi: 10.2314/GBV:871992922

M. Hann, B. Jäger, J. Betz, C. Frank, and W. Christl, "Elektromobilität im Taxi- und Gewerbeverkehr München-Teilvorhaben der Handwerkskammer für München und Oberbayern (HWK)", Final report of the Subproject Electric vehicles in commercial companies for the BMWi-funded project ICT for Electric Mobility II, 2016, doi: 10.2314/GBV:872639819

## **INVITED TALKS AND PRESENTATIONS**

ICLR 2022, Safe Learning for Autonomous Driving, April 2022

Title: "Approaching the Limit in an Autonomous Racecar"

Arizona State University, November 2021

Title: "Autonomous Racing – Winning the Indy Autonomous Challenge?"

Formula Student Symposium, November 2021

Title: "Autonomous Vehicles on the Edge: Autonomous Racing"

Nokia Bell Labs, November 2021

Title: R. Mangharam, J. Betz, H. Zheng "What can we learn from autonomous racing?"

Embedded Systems Week (ESweek) 2021, Education Track, October 2021

Title: Rahul Mangharam, Johannes Betz "Learn to Drive (and Race) Autonomous Vehicles"

Fall 2021 GRASP Seminar, University of Pennsylvania, October 2021

Title: R. Mangharam, J. Betz, H. Zheng "What can we learn from autonomous racing?"

DiY Robocar Event at Circuit Launch Oakland California, August 2021,

Title: Christian John, Johannes Betz "Autoware.Auto and Autonomous Racing"

Podcast "Die Zukunftsmobilisten", July 2021

Title: "Autonomous Driving"

5<sup>th</sup> Virtual Autonomous Driving Meetup, June 2021

Title: "F1TENTH Autonomous Racing: Vehicle, Research & Community"

Technical University of Munich, Automatic Controls Seminar, June 2021

Title: "Derivative Free Multi Domain Optimization for Autonomous Systems"  
 University of Nebraska-Lincoln, Guest Lecture, April 2021  
 Title: "Multilayer Graph-Based Trajectory Planning for Race Vehicles in Dynamic Scenarios"  
 NVIDIA GTC Conference 2021, April 2021  
 Title: R. Mangharam, J. Betz: "F1/10 Autonomous Racing: Community, Course & Competitions"  
 Clemson University, AUE Lecture Series, March 2021  
 Title: "Multilayer Graph-Based Trajectory Planning for Race Vehicles in Dynamic Scenarios"  
 Technical University of Munich, Lecture Artificial Intelligence in Automotive Technology, February 2021  
 Title: "Foundations of Knowledge Graphs"  
 Traffic21/Mobility21 UTC Deployment Partner Consortium Symposium, November 2020  
 Title: "F1/10 Autonomous Racing: Community, Course & Competitions"  
 University of Pennsylvania, Lecture Autonomous Racing, April 2020  
 Title: "Path and Behavioral Planning for Autonomous Race Vehicles"  
 Technical University Darmstadt, Fahrzeug- und Motortechnisches Seminar, June 2019  
 Title: "Roborace – Autonomous Level 5 Motorsport"  
 Werner-Heisenberg-Gymnasium Garching, May 2019  
 Title: "Autonomes Fahren – Forschung und Lehre"  
 Munich Science Days 2018, November 2018, [video available online](#)  
 Title: „Autonomes Fahren und die neuen Arbeitswelten – das Beispiel Roborace“  
 NVIDIA GTC Conference 2018 in Munich, October 2018, [video available online](#)  
 Title: J. Betz, B. Balcombe: "Roborace: A Case Study in Collaboration"  
 VDI-Dienstagsvortrag Hochschule München, April 2018  
 Title: "Was können wir vom Motorsport mit autonomen Level-5 Fahrzeugen lernen?"  
 7<sup>th</sup> E-Motive Expertenforum München, June 2015, doi: 10.13140/RG.2.2.30235.46887  
 "Visio.M – Leichtfahrzeugkonzept für die urbane Elektromobilität"

## HONORS AND AWARDS

---

10/2021	1 <sup>st</sup> Place, Indy Autonomous Challenge
06/2021	2 <sup>nd</sup> Place, Indy Autonomous Challenge Ansys Simulation Race
10/2020	Best Paper Award, IEEE CiSt 2020, Agadir, Morocco
11/2019	Best Student Paper Finalist, IEEE ICCVE 2019, Graz, Austria
11/2019	PhD graduation with distinction (summa cum laude)
10/2019	1 <sup>st</sup> Place, Roborace Season Alpha Event 5
07/2019	Young Author Award, IFAC IAV 2019, Gdansk, Poland
11/2018	Selected for German-Japan Young Professional Exchange Program 2018
05/2018	1 <sup>st</sup> Place, Roborace "Human + Machine Challenge"
09/2017	Nvidia GPU Grant: Sponsoring of one "Titan Xp" GPU
04/2012	3 <sup>rd</sup> best graduate in Bachelor of Engineering at FH Coburg

## SERVICE TO ACADEMIC COMMUNITY

---

### MEMBERSHIP OF COMMITTEES

01/2022	<b>Program Committee</b> , ITS Workshop at the 14 <sup>th</sup> International Conference on COMMunication Systems & Networks 2022 (COMMSNET)
12/2021	<b>Program Committee</b> , 4 <sup>th</sup> Robot Learning Workshop: Self-Supervised and Lifelong Learning at the 35 <sup>th</sup> Conference on Neural Information Processing Systems (NeurIPS) 2021
09/2021	<b>Organizer</b> (with Michael Sojka, Rahul Mangharam) of the 9 <sup>th</sup> F1TENTH Autonomous Racing Grand Prix, 2021 IEEE International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic

05/2021 **Organizer** (with Madhur Behl, Rahul Mangharam, Venkat Krovi) of the 1<sup>st</sup> Workshop “Opportunities and Challenges with Autonomous Racing”, 2021 IEEE International Conference on Robotics and Automation (ICRA), Xi’an, China

01/2021 – present **Working Group Leader** (together with Christian John), the Autoware Foundation

01/2021 – present **Reviewer Board**, MDPI Machines Journal

01/2021 – present **Outreach Team**, IEEE Open Journal of Intelligent Transportation Systems

2021 **Guest Editor**, SAE Special Issue on Autonomy and Connectivity at the Edge – Autonomous Racing

10/2020 – present **Associate Editor**, SAE International Journal of Connected and Automated Vehicles

10/2020 – present **Program Committee**, IEEE International Conference on Ecological Vehicles and Renewable Energies

## UNIVERSITY SERVICE

02/2021 – present Postdoc Peer Support Program at University of Pennsylvania

12/2020 ESE PhD Committee member at University of Pennsylvania

07/2019 Organization of the “Roadshow: Autonomous Driving” at TUM

04/2019 – 10/2020 Organization of the doctoral seminar “Autonomous Driving” at TUM

04/2018 – 10/2019 Organization of the doctoral seminar “Ai in Mechanical Engineering” at TUM

10/2015 – 10/2020 Faculty Advisor for the TUFast Formula Student Team at TUM

## REVIEW ACTIVITIES

MDPI Sustainability Journal

MDPI Sensors Journal

MDPI Energies Journal

MDPI Applied Sciences Journal

Journal of Field Robotics

International Journal of Vehicle Mechanics and Mobility

Workshop on Dynamics of Road Vehicles: Connected and Automated Vehicles

SAE International Journal of Connected and Automated Vehicles

IEEE Conference on Intelligent Transportation Systems

IEEE International Conference on Robotics and Automation

IEEE Intelligent Vehicles Symposium

IEEE International Conference on Ecological Vehicles and Renewable Energies

IEEE Vehicular Technology Conference

International Scientific Conference on Mobility and Transport

International Munich Chassis Symposium

Forum on Integrated and Sustainable Transportation Systems (FISTS)

## OPEN-SOURCE PROJECTS AND TOOL DEVELOPMENT

F1TENTH Courses: An openEDX course for autonomous driving; [courses.f1tenth.org](https://courses.f1tenth.org)

F1TENTH Autonomous Racing Project, [f1tenth.org](https://f1tenth.org)

A vehicle dynamics simulation for autonomous vehicles; [available on Github](#)

A graph based local trajectory planner for dynamic environments, [available on Github](#)

A library with functions for trajectory planning for autonomous vehicles, [available on Github](#)

A scenario architect for autonomous driving benchmarks, [available on Github](#)

A neural network for object detection with camera and radar, [available on Github](#)

ORB-SLAM2 map saving extension, [available on Github](#)

An optimization algorithm for the creation of a global, optimal raceline, [available on Github](#)

A path and velocity controller for an autonomous racecar, [available on Github](#)

A quasi-static laptime simulation, [available on Github](#)

## COMPETENCES

---

Computer skills      Programming: Python, Matlab/Simulink, C/C++, CUDA, ROS, ROS2  
Development: GitLab, git, SVN, Continuous Integration  
AI-Frameworks: Tensorflow, Keras, TensorRT  
Operating systems: Windows, Linux, MacOS  
Engineering software: Solid Works, Vector CANape, PCB Layout Editors  
Other: Microsoft-Office (Word, Power-Point, Excel), Latex

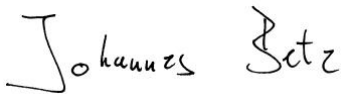
Language              German: Native  
English: Full Professional working proficiency

## EXTRACURRICULAR ACTIVITIES

---

Travel, soccer, triathlon

Philadelphia, 11/3/2021



Johannes Betz