Dejan **Milojevic**

POSTDOCTORAL RESEARCHER AND LECTURER IN ROBOTICS AT ETH ZÜRICH

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Robotics researcher and engineer specializing in **system-level co-design** of mobile robots across **sensing, perception, planning, and control**. Experienced in **optimization-based robot design**, simulation and benchmarking frameworks, and **autonomy-stack integration**, with applications in autonomous driving, delivery, and warehouse robotics. Interested in building **robust, resource-efficient, and scalable** robotic systems.

Experience

ETH Zürich *September 2024 - Present*

Postdoctoral Researcher and Lecturer *Zurich, Switzerland*

- Leading an SNSF-funded research project on automated system-level co-design of mobile robots in the group of Prof. Emilio Frazzoli at the Institute for Dynamic Systems and Control.
- Extending a framework initiated during my doctoral research toward more realistic and scalable robot design, with richer catalogs of hardware, perception, and planning components.
- Developing optimization methods for robot design across interconnected autonomy-stack components, balancing performance with cost, compute, and power for applications such as autonomous driving, delivery and warehouse robotics.
- Established a modular codebase with CI/CD, testing, and static analysis to support scalable research and development.
- Lecturer for the undergraduate course Control Systems II at ETH Zürich, with more than 300 students.

Empa *May 2019 - June 2024*

Doctoral Researcher *Dübendorf, Switzerland*

- Initiated and developed a framework for automated system-level co-design of mobile robots, supporting hardware-software selection to balance task performance with cost, compute, and power.
- Developed optimization methods and algorithms for sensor selection, placement, and holistic robot design, with a focus on the interaction between perception and decision-making.
- Built simulation and optimization frameworks for robot design, integrating full autonomy stacks with perception, planning, and control, alongside benchmarking pipelines and sensor-model development.
- Coordinated project execution across Empa and ETH Zürich and led stakeholder communication and technical presentations for the Automated Driving Sensor Testing Vehicle project with partners including ASTRA, AXA, Embotech, ETH Zürich, Lexus, METAS, Orthotec, and TCS.
- Conducted field tests with an automated vehicle under diverse weather conditions to evaluate lidar-, camera-, and radar-based perception for detection and localization.
- Head Teaching Assistant for Control Systems II, an undergraduate course with over 300 students.

Vay *December 2018 - April 2019*

Software Engineer *Berlin, Germany*

- Led the development of MATSim-based fleet simulations for remotely controlled vehicles to support business-case analysis of mobility-on-demand services.
- Developed algorithms for customer routing and vehicle allocation, including fleet rebalancing, parking, and remote-driver assignment under limited operator availability.
- Integrated audio sensors on the vehicle platform.

ETH Zürich *September 2017 - March 2018*

Research Assistant *Zurich, Switzerland*

- Developed a Java application to manage energy usage for electric buses in the group of Prof. Christopher Onder.

Megasol Energie AG *April 2016 - September 2016*

Industrial Internship *Deitingen, Switzerland*

- Automated part of the solar panel manufacturing process by installing a KUKA robotic arm to perform a tedious and difficult task.

Education

ETH Zürich *May 2019 - June 2024*

Doctor of Science in Mechanical Engineering (Robotics) *Zurich, Switzerland*

- Advised by Prof. Emilio Frazzoli at the Institute for Dynamic Systems and Control (IDSC).

Stanford University *April 2018 - October 2018*
Master's Thesis *Stanford, CA - USA*
- Researched and designed novel control algorithms for large fleets of self-driving vehicles which operate as a shared service, e.g. Uber or Lyft.
- Carried out under the supervision of Prof. Marco Pavone and Prof. Mauro Salazar.

ETH Zürich *September 2016 - October 2018*
Master of Science (MSc) - Mechanical Engineering - Focus: Control Systems *Zurich, Switzerland*
- Conducted a semester project in *Optimal Route Planning* with Prof. Christopher Onder to optimize depot runs of electric buses.

ETH Zürich *September 2012 - May 2017*
Bachelor of Science (BSc) - Mechanical Engineering - Focus: Mechatronics *Zurich, Switzerland*
- Conducted a Bachelor's thesis in creating PEM electrolysis models for hydrogen production with Prof. Christopher Onder.

Skills

Programming	Python, Java, C/C++, Bash, SQL
Developer Tools & CI/CD	Docker, Make/CMake, CircleCI, Codecov, Git, Black, Ruff, Pyright
Robotics/Systems	ROS, MATLAB/Simulink, Blender, CAD (Inventor and Siemens NX), Illustrator
ML/Data	PyTorch, TensorFlow, NumPy, Pandas, Matplotlib, PostgreSQL

Languages

Native German, Serbian **Fluent** English **Novice** French

Awards

Empa PhD Symposium 2021 *January 2021*
Best Scientific Video Award *Switzerland*
The Empa PhD Symposium provides PhD students with a platform to showcase their research and to receive feedback on their ongoing research.

FISITA *May 2018*
FISITA Travel Bursary *Switzerland*
The FISITA Travel Bursary provides financial support to high-caliber students who intern in automotive companies and universities overseas.

Extracurricular Activity

President of the UZH student organization Verein Serbischer Studierender *Jan. 2020 - Dec. 2022*
Coach and Player of Schindler Group's Soccer Club *September 2012 - May 2018*
Mandatory Swiss Military Service *June 2011 - April 2012*

Service

Reviewing	IROS: 2021, 2022.
Workshop Organization	3rd Workshop on Compositional Robotics: Mathematics and Tools, ICRA, London, UK.
Funds	Innovedum Fund, ETH Zürich, Zurich, Switzerland, 2023. Sensor Selection for Autonomous Driving applications (SenSel-AD), Swiss National Science Foundation (SNSF), Bern, Switzerland, 2024.

Invited Talks

The 40th Annual AAAI Conference on Artificial Intelligence *January 2026*
CODEI: Resource-Efficient Task-Driven Co-Design of Perception and Decision Making for Mobile Robots Applied to Autonomous Vehicles *Singapore*

2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *October 2025*
CODEI: Resource-Efficient Task-Driven Co-Design of Perception and Decision Making for Mobile Robots Applied to Autonomous Vehicles *Hangzhou, China*

Massachusetts Institute of Technology (MIT) *October 2024*
Co-design of Mobile Robots - Integrating Perception Systems and Motion Planning for Task Specific Optimization *Cambridge, MA, USA*

Zurich University of Applied Sciences (ZHAW) *January 2024*
Sensorik für automatisiertes Fahren @ Empa *Dübendorf, Switzerland*

RFA Energy, Resources and Emissions Colloquium *September 2023*
Sensor Selection and Perception Validation in Automated Driving *Dübendorf, Switzerland*

Swiss Association for Autonomous Mobility (SAAM) Stream Technology Meeting *May 2023*
Sensor Selection and Perception Validation in Automated Driving *Zurich, Switzerland*

Fachveranstaltung Society of Automotive Engineers (SAE) - Switzerland *October 2022*
Automatisiertes Fahren *Dübendorf, Switzerland*

SCCER Mobility Webinar *March 2020*
Sensor testing and perception guarantees in automated driving *Zurich, Switzerland*

SCCER Mobility Annual Conference *September 2019*
Automated Driving Sensor Testing Vehicle *Zurich, Switzerland*

Publications

International Peer-Reviewed Conference Proceedings

Co-design of Embodied Intelligence: A Structured Approach
Gioele Zardini, Dejan Milojevic, Andrea Censi, Emilio Frazzoli
2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021

Model Predictive Control of Ride-sharing Autonomous Mobility-on-Demand Systems
Matthew Tsao, Dejan Milojevic, Claudio Ruch, Mauro Salazar, Emilio Frazzoli, Marco Pavone
2019 International Conference on Robotics and Automation (ICRA), 2019

Articles in Peer-Reviewed Journals

CODEI: Resource-Efficient Task-Driven Co-Design of Perception and Decision Making for Mobile Robots Applied to Autonomous Vehicles
Dejan Milojevic, Gioele Zardini, Miriam Elser, Andrea Censi, Emilio Frazzoli
Accepted to IEEE Transactions on Robotics. Presentation at IEEE/RSJ IROS 2025. *41 (2025) pp. 2727–2748. 2025*

Sensing and Perception in Automated Driving
C Hohl, D Milojevic, M Elser
Autonomes Fahren Ein Treiber zukünftiger Mobilität *(2022) p. 64. 2022*

Other contributions

Automated Driving Sensor Testing Vehicle
C Hohl, D Milojevic, M Elser, J Zgraggen, N Vulin
Forschungsprojekt ASTRA 2019/004 auf Antrag des Bundesamtes für Strassen (ASTRA), 2021

Theses

Dejan Milojevic. “Co-design of Mobile Robots - Integrating Perception Systems and Motion Planning for Task Specific Optimization”. PhD thesis. ETH Zürich, 2024.
– “Ride-sharing Autonomous Mobility-on-Demand - Model Predictive Control with MATSim Simulation Case Studies”. MA thesis. ETH Zürich, 2018.
Andyn Omanovic, Dejan Milojevic. “Optimal Route Planning - Optimize Depot Runs of Electric Buses in Public Transportation”. ETH Zürich, 2017.
Dejan Milojevic. “Comparison and Evaluation of PEM Electrolysis Models for Hydrogen Production”. ETH Zürich, 2016.

References

Prof. Emilio Frazzoli Full Professor at ETH Zürich, doctoral thesis supervisor — ✉ emilio.frazzoli@idsc.mavt.ethz.ch.
Prof. Gioele Zardini Assistant Professor at MIT, research collaborator — ✉ gzardini@mit.edu.
Dr. Miriam Elser Group leader at Empa, doctoral thesis co-advisor — ✉ miriam.elser@empa.ch.
Dr. Andrea Censi Senior Scientist at ETH Zürich, doctoral thesis co-advisor — ✉ acensi@idsc.mavt.ethz.ch.
Christian Bach Head of laboratory at Empa, PI — ✉ christian.bach@empa.ch.