Felix Dülmer

https://felixduelmer.github.io/ | felix.duelmer@tum.de

EDUCATION

1/2023 – today	**Ph.D. Computer Science** Focus: Robotic Ultrasound and Differentiable Ultrasound Simulation Advisor: Prof. Nassir Navab	*Technical University of Munich, Germany*
10/2018 – 09/2022	**M.Sc. Mechatronics and Robotics** Focus: Robot-Assisted Medical Systems | Grade: 1.5	*Technical University of Munich, Germany*
07/2019 – 12/2019	**Exchange Semester Postgraduate** Focus: Deep Learning and Big Data Analysis	*Universidad de los Andes, Colombia*
04/2019 – 06/2019	**Autonomous Driving Project at Cognitive Systems Lab** Test of a Tactile Steering Wheel in Autonomous Driving | Grade: 1.0	*University of Tsukuba, Japan*
10/2014 – 10/2018	**B.Sc. Mechanical Engineering** Focus*:* Autonomous Driving | Grade: 2.5	*Technical University of Munich, Germany*

EXPERIENCE

01/2023 - today **PhD Candidate in Computer Science** *Technical University of Munich, Germany*

- **Robotic Ultrasound & Automation [2, 7, 9]:** Developed ML methods for quality-aware robotic ultrasound, including Doppler-based quality estimation for robust acquisition **[9]**. Contributed to a field-level perspective on challenges and opportunities in ML in robotic ultrasound, with links to translational robot-assisted vascular surgery **[7, 2]**.
- **Physics-Based & Differentiable Ultrasound Modeling [1, 3–6]:** Built physics-informed, differentiable ultrasound image-formation and simulation methods, spanning ray tracing and learned 3D representations **[3–5]**. Advanced model-based enhancement and novel-view synthesis via deconvolution and Gaussian-based ray casting **[6, 1]**.
- **Leadership & Supervision**: Supervised 10+ students and coordinated research activities across chairs. Contributed to grant writing and proposal development.

04/2021 – 09/2022 **Internship/Working Student as Software Developer** *Workerbase GmbH, Munich, Germany*

- Developed and maintained two cross-platform industrial mobile apps deployed to thousands of factory workers, using Android (Kotlin/Java), iOS (Swift), and Flutter (Dart). Applied clean architecture, design patterns, and test-driven development to ensure scalable, reliable delivery.

09/2017 – 08/2020 **Research Assistant** *Technical University of Munich, Germany*

- Maintained and extended a driving simulator for automated driving research, and onboarded/trained students on its use and related software platforms. Contributed to prototyping components supporting higher levels of vehicle autonomy.

SERVICES AND AWARDS

- Reviewer: IPCAI; MICCAI; ECCV; *IEEE Transactions on Automation Science and Engineering (T-ASE)*
- Scholarship: MCML AI-X Change (2025/2026)
- Reviewer Award: Honorable Mention MICCAI 2025
- Best Paper Runner-Up Award: ASMUS Workshop @ MICCAI 2024
- Hamlyn Winter School: Surgical Imaging and Vision Attendance and Runner-Up Award (2022)

SKILLS

Programming Languages & Frameworks:	Python; PyTorch; Dr.Jit; Mitsuba; C++; Java; Swift; Dart (Flutter); MATLAB
Robotics & Middleware:	ROS (catkin/rosbag/TF); RViz; URDF/Xacro; Gazebo
Systems / IT:	Unix/Linux; Slurm; Git; Web programming

Tools / IDEs: VS Code; GitHub Copilot; Cursor (AI-assisted coding)

Languages: German (native); English (fluent); Spanish (proficient); French(basic)

PUBLICATIONS

1. **Felix Dülmer**; Jakob Klaushofer; Magdalena Wysocki; Nassir Navab; Mohammad Farid Azampour. UltraG-Ray: Physics-Based Gaussian Ray Casting for Novel Ultrasound View Synthesis. 2026, *Under Submission*.

2. **Felix Dülmer**; Mario Reidl; Nikolina-Alexia Fasoula; Nikoletta Katsouli; Dianye Huang; Yuan Bi; Raphael Salz; Rhiannon Lees; Zhongliang Jiang; Christoph Knappich; *et al.* Translational Research and Clinical Trends in Robot-Assisted Vascular Surgery: A Narrative Overview. 2026, *Handbook of Robotic and Image-Guided Surgery* (Elsevier).

3. **Felix Dülmer**; Mohammad Farid Azampour; Nassir Navab. UltraScatter: Ray-Based Simulation of Ultrasound Scattering. 2025, *IEEE International Ultrasonics Symposium (IUS)*.

4. **Felix Dülmer**; Mohammad Farid Azampour; Magdalena Wysocki; Nassir Navab. UltraRay: Introducing Full-Path Ray Tracing in Physics-Based Ultrasound Simulation. 2025, *MICCAI (International Conference on Medical Image Computing and Computer-Assisted Intervention)*.

5. Magdalena Wysocki; **Felix Dülmer**; Ananya Bal; Nassir Navab; Mohammad Farid Azampour. UltrON: Ultrasound Occupancy Networks. 2025, *MICCAI (International Conference on Medical Image Computing and Computer-Assisted Intervention)*.

6. **Felix Dülmer**; Walter Simson; Mohammad Farid Azampour; Magdalena Wysocki; Angelos Karlas; Nassir Navab. Phocus: Physics-based deconvolution for ultrasound resolution enhancement. 2024, *International Workshop on Advances in Simplifying Medical Ultrasound*.

7. Yuan Bi; Zhongliang Jiang; **Felix Dülmer**; Dianye Huang; Nassir Navab. Machine learning in robotic ultrasound imaging: Challenges and perspectives. 2024, *Annual Review of Control, Robotics, and Autonomous Systems*.

8. Angelos Karlas; Nikolina-Alexia Fasoula; Michael Kallmayer; Christoph Schäffer; Georgios Angelis; Nikoletta Katsouli; Mario Reidl; Felix Dülmer; Kenana Al Adem; Leontios Hadjileontiadis; *et al.* **Optoacoustic biomarkers of lipids, hemorrhage and inflammation in carotid atherosclerosis.** 2023, *Frontiers in Cardiovascular Medicine*.

9. Zhongliang Jiang*; **Felix Dülmer***; Nassir Navab. Dopus-net: Quality-aware robotic ultrasound imaging based on doppler signal. 2023, *IEEE Transactions on Automation Science and Engineering*.

* shared first authorship