FREDERIKE DÜMBGEN

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EDUCATION

École polytechnique fédérale de Lausanne, Switzerland (EPFL)
PhD in Computer and Communication Sciences *Sep 2016 – Mar 2021*

Laboratory of Audiovisual Communications, directors: Prof. M. Vetterli, Dr. A. Scholefield.
Conducting research on localization and mapping using radio-frequency, audio and visual signals.

Eidgenössische Technische Hochschule Zürich, Switzerland (ETHZ)
Master's Thesis *Feb 2016 – June 2016*

Autonomous Systems Lab, under Prof. R. Siegwart.
Implemented local spline-based dense stereo reconstruction and pose estimation in *ROS*.

École polytechnique fédérale de Lausanne, Switzerland (EPFL)
Master of Science in Mechanical Engineering *Sep 2014 – June 2016*
Bachelor of Science in Mechanical Engineering *Sep 2010 – June 2014*

Specialization in Control and Mechatronics.
Minor in Computational Science and Engineering.

Heriot Watt University, Edinburgh, UK
Exchange year during Bachelor studies *Sep 2013 – June 2014*

WORK EXPERIENCE

EPFL, Switzerland *Sep 2014 – Present*
Teaching Assistant

Instructed students in *Linear Algebra*, *Probability and Statistics*, *Digital Signal Processing* (Bachelor), and *Mathematical Foundations of Signal Processing*, *Audio and Acoustic Signal Processing* (Master).

Disney Research Los Angeles, California, US *Mar 2018 – Nov 2018*
Lab Associate

Implemented learning-based view synthesis algorithm for motion capture using a linear camera array. Successfully published and presented the accomplished work at conference *ICIP 2019*.

voCHabular, Switzerland *Mar 2017 – Mar 2019*
Leader of Application Development Team

Directed the app development team of non-for-profit organization *voCHabular* for teaching Swiss German to refugees. Active in app development, recruitement, volunteer management, and fundraising.

Bystronic Laser AG, Berne, Switzerland *Mar 2014 – Sep 2014*
Project Intern Total Cost of Ownership

Designed and implemented global sales tool calculating and visualizing the total cost of ownership of laser and waterjet cutting machines. Organized the launching of the tool in global sales offices.

ABB High Voltage Products, Zurich, Switzerland *Sep 2013 – Mar 2014*
Technical Training Intern

Designed online e-Learning courses for supplier admission and high voltage factory safety and conducted hands-on training sessions for mechanical assembly of gas-insulated switch gear systems.

SELECTED PUBLICATIONS

M. Pacholska*, F. Dümbgen*, and A. Scholefield. Relax and Recover: Guaranteed Range-Only Continuous Localization. *Robotics and Automation Letters*, 5(2):2248–2255, 2020. (*equal contrib) link.

G. Baechler*, F. Dümbgen*, G. Elhami*, M. Krekovic*, and M. Vetterli. Coordinate Difference Matrices. *SIAM Journal on Matrix Analaysis and Applications, accepted*, 2020. (*equal contrib).

F. Dümbgen, M. El Helou, and A. Scholefield. Realizability of Planar Point Embeddings from Angle Measurements. In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2020. link.

F. Dümbgen, C. Oeschger, M. Kolundzija, A. Scholefield, E. Girardin, J. Leuenberger, and S. Ayer. Multi-Modal Probabilistic Indoor Localization on a Smartphone. In *International Conference on Indoor Positioning and Indoor Navigation (IPIN)*, pages 1–8, 2019. link.

G. Baechler*, F. Dümbgen*, G. Elhami*, M. Krekovic*, et al. Combining Range and Direction for Improved Localization. In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 3484–3488, 2018. (*equal contrib) link.

F. Dümbgen*, M. El Helou*, N. Gucevska, and S. Süsstrunk. Near-Infrared Fusion for Photorealistic Image Dehazing. *IS&T EI Proceedings*, 2018. (*equal contrib) link.

SELECTED DIRECTED STUDENT PROJECTS

Learning acoustics-based localization of a blind drone (ongoing)
Directing a micro-engineering and a computer science student implementing audio processing on the *Crazyflie* drone for applications in indoor localization and control. Description available online.

Learning-based multi-modal indoor localization
Directed two data science students developing supervised and unsupervised approaches for multimodal indoor localization, using deep neural networks. Description available online.

Modular mobile robot for localization experiments
Co-directed micro-engineering student in building a wheeled robot for conducting indoor localization experiments, including motor control design and data acquisition pipeline. Result available online.

Bring voice user-interfaces to our offices
Co-directed computer science student implementing voice activity detection and neural-network-based keyword classification, running in real-time on an embedded system. Description available online.

TECHNICAL STRENGTHS

Programming	**Proficiency**: C and C++, Python (incl. PyTorch), Matlab, Robot Operating Systems (ROS). **Basics**: Ruby on Rails, Javascript, Java for development of smartphone applications.
Modelling and Simulation	Catia, Solidworks, OnShape, ANSYS Workbench, FLUENT.
Other	**Proficiency**: git, LaTeX, and Unix OS

AWARDS AND HONORS

December 2018: Obtained *EDIC Distinguished Service* award for my work as student representative.

2017: Finalist at multiple hackathons (coding competitions): *StartHack* (top 10 of 100), *HackZurich* (top 25 of 145) and *Lauzhack* (overall 3rd out of 54 teams, competition winner of start-up Gamaya).

September 2016: Awarded *EDIC fellowship* for my first year of PhD (given to $< 7\%$ of PhD applicants).

March 2016: Granted the *NCCR Robotics Scholarship for Women* for Master's Thesis at ETHZ.

September 2011: Accepted into the *Swiss Study Foundation*, supporting excellent students with a sense of responsibility and commitment.