

# Nina Wiedemann | CV

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## Education

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- **ETH Zürich - PhD Candidate** **Switzerland**  
*Chair of Geoinformation Engineering, Prof. Martin Raubal*  
*Research focus: Analyzing drivers of predictability in geospatial data science*  
2021 - 2025
- **ETH Zürich - M.Sc. Data Science** **Switzerland**  
*GPA: 5.7/6, focus on optimization theory (discrete & continuous)*  
*Thesis: An Optimization Framework for Power Infrastructure Planning*  
2018 - 2020
- **University of Osnabrück - B.Sc. Cognitive Science** **Germany**  
*GPA: 1.0 (in top 3 of the year), focus on mathematics and computer vision*  
*Thesis: A Tracking System for Baseball Game Reconstruction*  
2015 - 2018
- **Gymnasium Ottobrunn** **Germany**  
*A-Levels, graduated with 1.0 (best of the year)*  
2006 - 2014

Notable side projects and semester projects.....

- **PennyLocator** Developing an iOS map application for collecting pressed souvenir pennies (3k downloads, 16k active sessions between July 2022 and August 2023)
- **Random facet** Proving an upper bound on the runtime of a randomized simplex algorithm
- **AI4US** Detecting COVID-19 infections on lung ultrasound with medical image analysis
- **Energymanager** Challenge-winner at HackZurich 2022 with our digital energy management tool
- **Greentastic** Developing the iOS app *Greentastic* that informs about the carbon footprint of different means of transport for a requested route (Finalists at HackZurich 2019)

## Research and work experience

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- **Intel Labs** **Munich**  
*Internship* Apr 2024 - Oct 2024  
In a six month internship at the Intel Extended Reality Lab, I contributed to projects on multi-modal 3D generation.
- **Department for Geography and Regional Research** **University of Vienna**  
*Research stay* Sep 2022 - Nov 2022  
I collaborated with Prof. Kounadi and Prof. Janowicz on a geoprivacy project in a six weeks research fellowship. We analyzed the potential of misuse of tracking data with ML.
- **Robotics Perception Group** **University of Zürich**  
*Research assistant* Nov 2020 - May 2021  
I developed a model-based reinforcement learning approach for autonomous control of unmanned aerial vehicles (published at ICRA).

- **Gilytics AG** **Zürich**  
*Software developer* *Mar 2020 - Nov 2020*  
 After collaborating with Gilytics AG in my master thesis on optimizing power infrastructure layout, I was employed to incorporate my algorithms in their software, which is used by international clients from the power grid industry.
- **VIDA (Visualization and Data Analytics) Lab** **New York University (NYU)**  
*Research intern* *Aug 2017 - Jan 2018*  
 In cooperation with Major League Baseball, we aimed to build a novel tracking system for baseball that improves player tracking and operates solely on videos. I implemented and adapted computer vision methods for action recognition and human pose estimation, in order to analyze the motion of players.
- **Department of Neuroeconomics** **University of Zurich**  
*Research assistant* *Feb 2019 - Jul 2020*  
 By means of real-time fMRI studies, we analysed decision making processes in the brain. My tasks involved programming the experiment paradigms and writing software for data acquisition and processing.
- **Max-Planck-Institute for Neurobiology** **Munich**  
*Research intern* *Aug 2016 - Sep 2016*  
 The group of Prof. Borst strives for a better understanding of neural processing of the fly *Drosophila*. I created a computational model of its visual system and compared different theories about the neural encoding of direction selectivity. For further simulations I built a GUI that visualizes the responses to different stimuli.
- **Neuroimaging center** **Technical University of Munich (TUM)**  
*Research intern* *Aug 2015 - Sep 2015, Mar 2016 - Apr 2016*  
 The group researching on (chronic) pain conducted a behavioral study on the effect of reaction times on the perception of pain stimuli. I assisted in the study execution.

## Awards and scholarships

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- **2022** Winners of Sensirion's challenge at the hackathon "HackZurich"
- **2022** Best paper award at the 25th AGILE conference
- **2021** 3rd place in the NeurIPS Traffic4cast 2021 extended challenge (endowed with 2000€)
- **2020** Fritz-Kutter award for Industry Related Thesis in Computer Science (endowed with 3000CHF)
- **2016 - 2020** Scholarship of the "Studienstiftung des Deutschen Volkes" (300€ per month)
- **2014** High school graduation award of the German Physical Society and Siemens AG
- **2012** Siemens award for excellent results in natural sciences

## Journal publications

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- **Wiedemann, N.**, Janowicz, K., Raubal, M. and Kounadi, O. (2024). "Where you go is who you are: a study on machine learning based semantic privacy attacks." *Journal of Big Data*
- Spanniger, T.\*, **Wiedemann, N.\*** and Corman, F. (2024). "Quantifying the dynamic predictability of train delay with uncertainty-aware neural networks." *Transportation Research Part C: Emerging Technologies*
- **Wiedemann, N.**, Xin, Y., Medici, V., Nespoli, L., Suel, E. and Raubal, M. (2024). "Vehicle-to-grid for car sharing-A simulation study for 2030." *Applied Energy*
- **Wiedemann, N.\***, Martin, H.\*, Suel, E., Hong, Y., and Xin, Y. (2023). "Influence of tracking duration

on the privacy of individual mobility graphs” *Journal of Location Based Services*

- Neun, M., Eichenberger, C., Xin, Y., Fu, C., **Wiedemann, N.**, Martin, H., Tomko, M., Ambühl, L., Hermes, L., Kopp, M. (2023) “Metropolitan Segment Traffic Speeds From Massive Floating Car Data in 10 Cities.” *IEEE Transactions on Intelligent Transportation Systems*
- Martin, H.\*, **Wiedemann, N.\***, Reck, D.J. and Raubal, M. (2023). “Graph-based mobility profiling” *Computers, Environment and Urban Systems*
- Martin, H.\*, Hong, Y.\*, **Wiedemann, N.\***, Bucher, D. and Raubal, M. (2023) “Trackintel: An open-source Python library for human mobility analysis.” *Computers, Environment and Urban Systems*
- **Wiedemann, Nina**, and David Adjashvili. (2021) “An Optimization Framework for Power Infrastructure Planning.” *IEEE Transactions on Power Systems*
- Born, J.\*, **Wiedemann, N.\***, Cossio, M., Buhre, C., Brändle, G., Leidermann, K., Aujayeb, A., Rieck, B., Borgwardt, K. (2021) “Accelerating Detection of Lung Pathologies with Explainable Ultrasound Image Analysis.” *Applied Sciences* 11.2
- May, Elisabeth S., Laura Tiemann, Paul Schmidt, Moritz M. Nickel, **Nina Wiedemann**, Christian Dresel, Christian Sorg, and Markus Ploner. (2017) Behavioral responses to noxious stimuli shape the perception of pain. *Scientific reports*

## Selected conference publications

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- Leboutet, Q., **Wiedemann, N.**, Cai, Z., Paulitsch, M., Yuan, K. (2025). MIDGArD: “Modular Interpretable Diffusion over Graphs for Articulated Designs” *Advances in Neural Information Processing Systems, NeurIPS 2024*
- **Wiedemann, N.** and Raubal, M. (2024) “On the potential of Optimal Transport in geospatial data science.” *ICLR 2024 Workshop: Tackling Climate Change with Machine Learning*
- **Wiedemann, N.\***, Wüest, V.\*, Loquercio, A., Müller, M., Floreano, D., and Scaramuzza, D. (2023). “Training Efficient Controllers via Analytic Policy Gradient.” *2023 IEEE International Conference on Robotics and Automation (ICRA)*
- **Wiedemann, N.**, Martin, H., and Westerholt, René. “Benchmarking regression models under spatial heterogeneity” *12th International Conference on Geographic Information Science (GIScience 2023)*
- **Wiedemann, N.**, Martin, H., and Raubal, M. “Unlocking social network analysis methods for studying human mobility.” *AGILE: GIScience Series 3 (2022): 1-12. Best Paper award*
- **Wiedemann, N.**, and Raubal, M. “Traffic Forecasting on Traffic Moving Snippets.” *Presented at NeuRIPS Workshop of Traffic4cast 2021 competition; arXiv preprint arXiv:2110.14383 (2021).*
- **Wiedemann, N.**, Kammler, F., Varwig, A., and Thomas, O. “Towards a Framework for Predictive Maintenance Strategies in Mechanical Engineering – A Method-Oriented Literature Analysis.” *14. Internationale Tagung Wirtschaftsinformatik - RIP paper (2019).*

## Further academic activities

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Organized events.....

- Organizing committee of the **Spatial Data Science Symposium 2023**
- Co-organizing the International Interdisciplinary Computational **Cognitive Science Summer School (IICSSS)** 2021 (1-day online event), 2022, 2023 and 2024 (week-long hybrid events in Tübingen and Osnabrück), with **6500€ funding acquisition** from the Joachim-Herz-Stiftung

Invited talks.....

- 26.05.2023 Talk on “Combinatorics for sustainability - How optimization methods can support spatial planning and operations” in the RAM Colloquium organized by the Spatial Modelling Lab, Department of Spatial Planning, TU Dortmund
- 29.03.2023 Talk on “Vehicle-to-grid for carsharing - Can shared EVs support the power grid

- stability in future cities?” in the global seminar series of the Future Cities Lab, Singapore
- 20.07.2022 Presenting “Challenges in Data-Driven Traffic Analysis” at the Zurich Mobility Workshop organized by IARAI
- 07.05.2020 Presenting “Automatic Detection of COVID-19 From a New Lung Ultrasound Imaging Dataset” at a seminar of the Data Analytics Club at ETH Zürich

#### Teaching.....

- Teaching assistant (lab work and one lecture) in the courses “Geoinformation Technology and Analysis”, “GIS Basics” and “Project GIS and Cartography” (2021 - 2023)
- Supervision of three bachelor theses, two master theses and three semester projects

### Technical skills

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- **Programming languages:** Python, Swift, Matlab, Java, R, SQL (PostGIS), bash
- **Machine learning:** Pytorch, Tensorflow, Keras, Scikit-learn, OpenCV
- **Tools:** Version control (git), HPC (Slurm and LSF), Flask, Google Cloud, geodatabases

### Personal

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- **Languages:** German, English (fluent), Spanish (basic)
- **Hobbies:** Paragliding, skiing, cycling, hiking