VIKTORIA SCHRAM

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Education

Doctor of Philosophy (*ongoing*)   **The University of Melbourne**   **04/2020 - present**
- Artificial Intelligence, Statistical Machine Learning– Scaling Laws, NLP, Matrix Factorisation, Gaussian Processes
- Investigating performance prediction techniques to lower computational resource and data requirements
- Supervised by Prof. Trevor Cohn (The University of Melbourne, Google) and Dr. Daniel Beck (RMIT University)

Master of Science (w/ distinction)   **Friedrich-Alexander University, Germany**   **2015 - 2018**
- Electrical Engineering – Majored in Wireless Communication Systems
- Research Thesis: *Channel coding for THz Communication Systems*

Bachelor of Science   **Friedrich-Alexander University, Germany**   **2010 - 2015**
- Industrial Engineering and Management – Majored in Wireless Communications & Strategic and International Management
- Research Thesis: *Development and implementation of a scalable burst transmission system for the U/VHF region (in German)*

Professional Experience

Graduate Researcher   **The University of Melbourne**   **04/2020 – present**
Conducting research and developing new methods with the goal of "*Predicting the Performance of Machine Learning Methods*" under the supervision of Prof. Trevor Cohn (The University of Melbourne) and Dr. Daniel Beck (RMIT University)
- Ongoing: Research on Scaling Laws of recent deep neural architectures. **2023/2024**
- Developed a new Gaussian Process model for the prediction of learning curves for machine learning models. *2021/2022*
- Developed a new approach based on Bayesian Matrix Factorisation for performance prediction for multilingual tasks in natural language processing, improving upon previous methods. *2020-2022*
- Approaches implemented using Python and PyTorch, GPy, GPflow; Slurm (HPC), (Collaborative) Code management and version control via Git

Research Scientist   **Friedrich-Alexander University, Germany**   **03/2018 - 01/2020**
Postgraduate research scientist at the Institute for Digital Communications
- Developed new methods for linear equalization and decision feedback equalization for point-to-point transmission over the THz channel; extended the current system to OFDM transmission and developed a statistical MIMO communication channel for THz communications. Collaborated with the institute for high frequency to develop software solutions for THz communications for hardware components.
- Developed a seminar series for "Machine Learning for Wireless Communications"; Supervised students working on Master's and Bachelor's theses; Delivered a tutorial on Convex Optimization.
- Organized and planned meetings with the high frequency institute. Organised a study group on machine learning.

Student Research Assistant   **Friedrich-Alexander University, Germany**   **2016 - 2018**
Student research assistant at the Institute for Digital Communications
- Design, development and analysis of a point-to-point single carrier transmission chain for the THz communication channel.

Bachelor Thesis, Student Assistant. & Intern   **Fraunhofer IIS, Germany**   **2014 - 2015**
Internship, followed by a Bachelor's Thesis and a job as a student assistant
- Developed and analysed an OFDM multicarrier system regarding reliable transmission and synchronization.
- Development and implementation of a scalable burst transmission system for the U/VHF region. (Bachelor's Thesis)

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Supervisor & Training Responsibilities

Teaching Associate   **The University of Melbourne**   **2021 - 2023**

- Co-designed and taught tutorials and lab courses on Natural Language Processing, Business and Web Analytics and Statistical Machine Learning. Designed hands-on labs using Python & JupyterLab.

- Providing student feedback and marking for Natural Language Processing, Business and Web Analytics, Statistical Machine Learning and Introduction to Machine Learning.

Supervising & Lecturing as Scientist   **Friedrich-Alexander University, Germany**   **05/2017 - 12/2019**

Supervision and teaching activities during my employment as Research Scientist (after completion of my Master's degree)

- Co-supervised under- and postgraduate students for their final research theses in wireless communications in design, development and analysis of reliable transmission systems using statistical modelling, machine learning and deep learning; supporting 4 students to successfully graduate.

- Co-developed and organised a seminar course for postgraduate students on "Machine Learning for Communications".

- Co-supervised four seminar students working on "Introduction to Machine Learning with Emphasis on Communications", "Optimisation Techniques – Methods and Comparison", "Analysis of Different Frameworks for Deep Neural Networks and their Implementation", "Quantum Computing for Communications".

- Co-supervised a student research assistant working on "Deep Learning on Communications" and "MIMO channel design for THz communication systems."

- Co-developed and taught (as lecturer) a hands-on lab course on "Digital Communications" to postgraduate students.

- Co-developed and taught (as lecturer) a tutorial on "Convex Optimization".

Student Teaching Assistant (PT)   **Friedrich-Alexander University, Germany**   **2014 - 2015**

- Teaching assistant for "Signals and Systems 1" at the Institute for Multimedia Design.

Awards & Recognition

- **Travel-Scholarship** for the attendance of the Research@Sydney event at Google Research (2025)

- **Women in Machine Learning:** Awarded free registration for participating at NeurIPS (2022)

- **Melbourne Research Scholarship:** Full scholarship for PhD research, including full tuition offset (04/2020 – present)

- **Outstanding Teaching Evaluation 2018:** Achieving of a 1.3 out of 5 for the tutorial class on Convex Optimization (2018)

- **AriadneTech:** Mentoring programme for future female researchers (2016 - 2018)

- **German Federal Stipend** ("Deutschlandstipendium"): Awarded for academic excellence (2015 & 2016)

Professional Service & Outreach

- **Reviewing for ML Conferences**, including NeurIPS (since 2024), COLING (since 2024)

- **Reviewing for Communications**: IEEE Transactions on Wireless Communications (since 2018), IEEE Communication Letters (since 2024)
- **Participation in the Buddy-Programme of the University of Melbourne** (since 2024)
- **Volunteering at Conferences:** NeurIPS (2022), WiML (2022), Doctoral Colloquium (University of Melbourne, 2022, 2023)
- **Outreach:** Participated in the programme STEMpal, exchanging letters with school kids answering their questions about STEM professionals (since 2024)
- **Organisation of Study Groups:** Machine Learning for Wireless Communications (2018), Stochastic Optimization (2020)

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Skills & Professional Interests

- THz Communications Systems | OFDM | MIMO | Equalisation | Convex Optimisation | Statistical Channel Modelling | Synchronization |
- Probabilistic Machine Learning | Bayesian Learning | Matrix Factorisation | Gaussian Processes | Deep Learning | Scaling Laws |
- Python | PyTorch | Slurm (HPC) | GPy | GPflow | Matlab |
- Research and Development: published in communications and machine learning venues

Publications

- **V. Schram,** D. Beck, and T. Cohn. Research on Scaling Laws, Paper submitted to ICML, Forty-Second International Conference on Machine Learning. *Currently under review, 2025.*
- **V. Schram,** D. Beck, and T. Cohn. Research on using Gaussian Processes for Performance Prediction for NLP tasks, Journal paper submitted to TACL, Transactions of the Association for Computational Linguistics. *Currently under review, 2024.*
- **V. Schram,** D. Beck, and T. Cohn. "Performance Prediction via Bayesian Matrix Factorisation for Multilingual Natural Language Processing Tasks." Proceedings of the 17th Conference of the European Chapter of the Association for Computational Linguistics. 2023.
- A. Vagollari , **V. Schram,** W. Wicke, M. Hirschbeck, W. Gerstacker. "Joint Detection and Classification of RF Signals Using Deep Learning." 93rd IEEE Vehicular Technology Conference. 2021.
- **V. Schram,** Y. Wu, M. Kolleshi, W. Gerstacker. "Comparison of Transmission Concepts for Indoor THz Communication Systems." Third International Workshop on Mobile Terahertz Systems. 2020.
- **V. Schram,** A. Berehy, J.-N. Zäch, R. Müller and W. Gerstacker. "AMP for THz Channel Estimation." 3rd International Balkan Conference on Communications and Networking. 2019.
- **V. Schram,** and W. Gerstacker. "Analysis of THz Communications in the finite Blocklength Regime." 20th IEEE International Workshop on Signal Processing Advances in Wireless Communications. 2019.
- **V. Schram,** A. Moldovan, and W. Gerstacker. "Compressive Sensing for Indoor THz channel estimation." 52nd IEEE Asilomar Conference on Signals, Systems, and Computers. 2018.

Invited Talks

- MBZUAI: "Matrix Factorization for Performance Prediction" (2023, in-person)
- Manchester University: "A Bayesian Approach to Learning Curve Prediction" (2023, online)
- Macquarie University (NLP group): "A Bayesian Approach to Learning Curve Prediction" (2023, in-person)
- Macquarie University (ML group): "A Bayesian Approach to Learning Curve Prediction" (2023, in-person)