

STEPHAN RABANSER

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EDUCATION

PhD in Computer Science (w/ Prof. Nicolas Papernot) <i>University of Toronto & Vector Institute</i>	September 2020 – Present <i>Toronto, Canada</i>
M.Sc. in Computer Science (w/ Prof. Stephan Günnemann) <i>Technical University of Munich (TUM)</i>	October 2015 – July 2019 <i>Munich, Germany</i>
Visiting Research Scholar (w/ Prof. Zachary C. Lipton) <i>Carnegie Mellon University (CMU)</i>	August 2018 – January 2019 <i>Pittsburgh, PA</i>
Honours Degree in Technology Management <i>Center for Digital Technology and Management (CDTM)</i> <i>Technical University of Munich (TUM)</i> <i>Ludwig Maximilian University of Munich (LMU)</i>	August 2015 – June 2017 <i>Munich, Germany</i>
Visiting Research Student (w/ Prof. Thomas W. Malone) <i>Massachusetts Institute of Technology (MIT)</i> <i>Center for Collective Intelligence (CCI)</i>	February 2016 – June 2016 <i>Cambridge, MA</i>
B.Sc. in Computer Science, Minor in Economic Sciences <i>Technical University of Munich (TUM)</i>	October 2012 – October 2015 <i>Munich, Germany</i>

WORK EXPERIENCE

Machine Learning Researcher <i>Vector Institute for Artificial Intelligence</i>	September 2020 – Present <i>Toronto, Canada</i>
Intern Applied Scientist (Machine Learning) <i>Amazon / AWS AI Labs</i> <ul style="list-style-type: none">Systematically assessed the impact of I/O representations for deep-learning-based time-series forecasting.	September 2019 – July 2020 <i>Munich, Germany</i>
Intern Applied Scientist (Machine Learning) <i>Amazon / AWS AI Labs</i> <ul style="list-style-type: none">Evaluated existing and developed new ML-based algorithms for large-scale lossless data compression.Implemented autoencoder-based probability distribution estimation for arithmetic coding on tabular data.	May 2018 – August 2018 <i>Munich, Germany</i>
Intern Software Development Engineer <i>Amazon – Core Machine Learning</i> <ul style="list-style-type: none">Received an overview of standard time series analysis / forecasting techniques.Implemented Bayes by Backprop (weight uncertainty quantification) for plain MLPs and RNNs in MXNet.	August 2017 – October 2017 <i>Berlin, Germany</i>
Intern Software Development Engineer <i>Amazon Web Services (AWS) – OpsWorks</i> <ul style="list-style-type: none">Developed internal business intelligence tool (business metrics reporting and automated dashboard generation) for new OpsWorks service offering (OpsWorks for Chef Automate).	July 2016 – October 2016 <i>Berlin, Germany</i>

PUBLICATIONS

- Stephan Rabanser, Tim Januschowski, Valentin Flunkert, David Salinas, Jan Gasthaus. **The Effectiveness of Discretization in Forecasting: An Empirical Study on Neural Time Series Models.** Workshop on Mining and Learning from Time Series at KDD 2020. Oral presentation.
- Stephan Rabanser, Stephan Günnemann, Zachary C. Lipton. **Failing Loudly: An Empirical Study of Methods for Detecting Dataset Shift.** *Accepted to Neural Information Processing Systems (NeurIPS) 2019.* Previously presented at the DebugML Workshop at ICLR 2019.
- Stephan Rabanser, Oleksandr Shchur, Stephan Günnemann. **Introduction to Tensor Decompositions and Their Applications in Machine Learning.** *ArXiv e-prints (November 2017).* arXiv:stat.ML/1711.10781.

TECHNICAL STRENGTHS

Programming Languages
ML Frameworks
Tools

Python, Java, Swift, Ruby, C, HTML5/CSS3/JS
TensorFlow, PyTorch, MXNet, sklearn
Git, IDEA Suite, Jupyter, Xcode, Sketch

AWARDS & HONORS

ICLR 2019 Student Volunteer May 2019
NeurIPS 2018 Student Volunteer December 2018
Member of the Elite Network of Bavaria Since April 2016
Apple Worldwide Developers Conference (WWDC) June 2013
Student Scholarship Recipient San Francisco, CA

- Developed résumé iOS app to highlight academic and professional experience as well as hobbies.
- Got awarded a free WWDC ticket.

SELECTED COURSEWORK

Data Shifts and Distribution Change Point Detection August 2018 – July 2019
Master's Thesis Project – CMU & TUM Pittsburgh, PA & Munich, Germany

- Conducted research on dataset shift detection, characterization, and malignancy quantification between training and testing environments.
- Set up a large-scale empirical study to evaluate shift detection potential using statistical two-sample testing on various latent representations.
- Accepted to Neural Information Processing Systems (NeurIPS) 2019.

Denosing Spectral Clustering Through Latent Data Decomposition October 2017 – March 2018
Guided Research – Professorship of Data Mining and Analytics, TUM Munich, Germany

- Developed two new methods to make spectral clustering more robust (reduced sensitivity to noise).
- Modeled problem as latent data decomposition instead of similarity graph decomposition.
- Initial results outperform similar techniques on many datasets, extensive hyper-parameter tuning is needed.

Data Science in Astrophysics and Industry March 2017 – July 2017
Interdisciplinary Project – Max Planck Institute for Astrophysics (MPA) Munich, Germany

- Transformed an existing Gaussian mixture model (GMM) into Google TensorFlow.
- Optimized the algorithmic implementation of the model (e.g. number of mixture components, hyper-parameters).
- Explored different training methods (stochastic vs. deterministic and expectation maximization (EM) vs. gradient descent vs. Newton).
- Determined parallelizable operations and sync-points.
- Researched, implemented, and improved online learning techniques for GMMs and compared them to standard EM and tensor decomposition approaches.

Teaching Assistant August 2014 – November 2014
Swift Introduction Course – Chair for Applied Software Engineering, TUM Munich, Germany

- Held a 2h talk and prepared the corresponding tutorial about RESTful interaction with web services within iOS and OS X apps.
- Developed a course-matching sample API by using Java technologies (Maven, Glassfish, Jersey, JPA).
- Supported course administration by writing and reviewing course assignments.
- Highlighted by Apple as one of the first Swift courses at major universities.

LANGUAGES

German Native
English Fluent, TOEFL iBT 112 (November 2018)
Italian Proficient