

# STEPHAN RABANSER

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## EDUCATION

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

## WORK EXPERIENCE

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

## PUBLICATIONS

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- 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.
- CDTM Class of Fall 2015. **Entrepreneurship in Bavaria.** *Center for Digital Technology and Management (CDTM).* ISBN: 978-3-9815538-9-5. 2015.

## TECHNICAL STRENGTHS

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**Programming Languages**  
**ML Frameworks**  
**Tools**

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

## AWARDS & HONORS

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<b>ICLR 2019 Student Volunteer</b>	May 2019
<b>NeurIPS 2018 Student Volunteer</b>	December 2018
<b>Member of the Elite Network of Bavaria</b>	Since April 2016
<b>Apple Worldwide Developers Conference (WWDC)</b> <i>Student Scholarship Recipient</i>	June 2013 San Francisco, CA
<ul style="list-style-type: none"><li>• Developed résumé iOS app to highlight academic and professional experience as well as hobbies.</li><li>• Got awarded a free WWDC ticket.</li></ul>	

## SELECTED COURSEWORK & PRIOR RESEARCH EXPERIENCE

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<b>Data Shifts and Distribution Change Point Detection</b> <i>Master's Thesis Project – CMU &amp; TUM</i>	August 2018 – July 2019 Pittsburgh, PA & Munich, Germany
<ul style="list-style-type: none"><li>• Conducted research on dataset shift detection, characterization, and malignancy quantification between training and testing environments.</li><li>• Set up a large-scale empirical study to evaluate shift detection potential using statistical two-sample testing on various latent representations.</li><li>• Accepted to Neural Information Processing Systems (NeurIPS) 2019.</li></ul>	

<b>Denoising Spectral Clustering Through Latent Data Decomposition</b> <i>Guided Research – Professorship of Data Mining and Analytics, TUM</i>	October 2017 – March 2018 Munich, Germany
<ul style="list-style-type: none"><li>• Developed two new methods to make spectral clustering more robust (reduced sensitivity to noise).</li><li>• Modeled problem as latent data decomposition instead of similarity graph decomposition.</li><li>• Initial results outperform similar techniques on many datasets, but extensive hyper-parameter tuning is needed.</li></ul>	

<b>Data Science in Astrophysics and Industry</b> <i>Interdisciplinary Project – Max Planck Institute for Astrophysics (MPA)</i>	March 2017 – July 2017 Munich, Germany
<ul style="list-style-type: none"><li>• Transformed an existing Gaussian mixture model (GMM) into Google TensorFlow.</li><li>• Optimized the algorithmic implementation of the model (e.g. number of mixture components, hyper-parameters).</li><li>• Explored different training methods (stochastic vs. deterministic and expectation maximization (EM) vs. gradient descent vs. Newton).</li><li>• Determined parallelizable operations and to which extend sync points are needed.</li><li>• Researched, implemented, and improved online learning techniques for GMMs and compared them to standard EM and tensor decomposition approaches.</li></ul>	

<b>Teaching Assistant</b> <i>Swift Introduction Course – Chair for Applied Software Engineering, TUM</i>	August 2014 – November 2014 Munich, Germany
<ul style="list-style-type: none"><li>• Held a 2h talk and prepared the corresponding tutorial about RESTful interaction with web services within iOS and OS X apps.</li><li>• Developed a course-matching sample API by using Java technologies (Maven, Glassfish, Jersey, JPA).</li><li>• Supported course administration by writing and reviewing course assignments.</li><li>• Highlighted by Apple as one of the first Swift courses at major universities.</li></ul>	

## LANGUAGES

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<b>German</b>	Native
<b>English</b>	Fluent, TOEFL iBT 112 (November 2018)
<b>Italian</b>	Proficient