Julien Siems

LinkedIn Google Scholar Website

Email : juliensiems@gmail.com
Mobile : +49 159 01634106

Education

- **University of Freiburg** — Freiburg, Germany
  Masters in Computer Science; GPA: 4.0 Graduated with Distinction — *Oct 2018 - Mar 2021*
  Courses: Numerical Optimization, Optimal Control, Automated Machine Learning, Game Theory
- **University College London** — London, United Kingdom
  Erasmus Exchange Student — *Sep 2016 - Jun 2017*
  Courses: Probabilistic Graphical Models, Image Processing, Information Retrieval, Computer Vision
- **TU Dresden** — Dresden, Germany
  Bachelors in Computer Science; GPA: 3.5 — *Oct 2014 - Dec 2017*
- **École Polytechnique Fédérale de Lausanne (EPFL)** — Lausanne, Switzerland
  First year courses in Mechanical Engineering — *Sept 2013 - Jul 2014*

Experience

- **University of Freiburg** — Freiburg, Germany
  PhD Student - Machine Learning Group supervised by Prof. Frank Hutter — *Nov 2023 - current*
  - **Focus**: I am primarily focusing on the in-context learning abilities of linear RNNs such as Mamba.
  - **Organizer of the In-Context Learning Workshop at ICML 2024**:
- **Merantix Momentum** — Berlin, Germany
  Machine Learning Researcher — *Jun 2022 - Aug 2023*
  - **NeurIPS 2023 conference paper on mitigating interpretability issues caused by concurvity in generalized additive models**: This project focused on addressing concurvity, the non-linear equivalent of multicollinearity, which arises in the application of Generalized Additive Models, more specifically Neural Additive Models and Neural Prophet.
  - **Interpretable Additive Time-Series Forecasting**: We modified NeuralProphet, an interpretable additive time-series forecasting method, to allow for complex relationships between external time-series. This allowed us to win the Solar Energy Forecasting Challenge hosted by Hessian AI in February 2023
  - **Interpretable Reinforcement Learning**: In this project, I worked on interpretable reinforcement learning in the context of inventory management. The aim was to design an agent which is more flexible than classical static optimization methods, yet is fully interpretable.
- **TU Munich** — Munich, Germany
  Research Assistant - Machine Learning and Inverse Problems Group — *Nov 2021 - Apr 2022*
  - **Adversarial training for inverse problems**: My project focused on optimization of inverse problems when faced with provably maximally adversarial attacks. My contributions were the mathematical and empirical analysis of the problem for a linear model.
- **University of Zurich** — Zurich, Switzerland (Remote from Berlin)
  Research Assistant - Computation and Economics Research Group — *Apr 2021 - Sept 2021*
  - **Iterative Combinatorial Auctions**: As part of my stay at the computational economics group, I co-authored several publications on Machine Learning powered Iterative Combinatorial Auctions. These are auctions which are heavily used in mobile frequency auctions such as 5G or 6G.
- **Amazon Web Services** — Berlin, Germany
  Applied Science Intern — *Sep 2020 - Mar 2021*
  - **Dynamic Neural Network Pruning**: My internship in the AWS Sagemaker Team focused on AutoML and Dynamic Network Pruning. Our proposed neural network weight pruning method can be used to make neural networks more efficient to evaluate and save energy costs.
- **University of Freiburg** — Freiburg, Germany
  Student Research Assistant - Machine Learning Lab — *Apr 2019 - Sep 2020*
  - **Neural Architecture Search**: Throughout my time in the Machine Learning Lab I worked on Neural Architecture Search, a branch of AutoML which deals with finding optimal neural network architectures, which are faster or more accurate than default architectures.
- **BMW Car IT** — Ulm, Germany
  Internship — *Mar 2018 - Sep 2018*
  - **Instance Segmentation**: During my Internship in the department of Modular Software Driver Assistance and Automated Driving at BMW Car IT GmbH, I coauthored a paper on accelerating the training of Mask R-CNN by focusing the training on instance boundaries.
- **Audi AG** — Ingolstadt, Germany
  Bachelor's thesis & Internship — *Jun 2017 - Feb 2018*
  - **Object Detection**: During my bachelors thesis and internship, I mainly worked on object detection using FasterRCNN/YOLO and training them on real-world data.

Publications

* denotes equal contribution

- Riccardo Grazzi*, **Julien Siems***, Jörg Franke, Arber Zela, Frank Hutter, Massimiliano Pontil *"Unlocking State-Tracking in Linear RNNs through Negative Eigenvalues"*. Modern Mathematics of Machine Learning Workshop at NeurIPS 2024 (Oral)
- Sathya Kamesh Bhethanabhotla*, Omar Swelam*, **Julien Siems**, David Salinas, Frank Hutter, *"Mamba4Cast: Efficient Zero-Shot Time Series Forecasting with State Space Models"*. Workshop on Time Series in the Age of Large Models at NeurIPS 2024 (Spotlight)
- Andreas Müller*, **Julien Siems***, Harsha Nori, David Salinas, Arber Zela, Rich Caruana, Frank Hutter, *"GAMformer: In-Context Learning for Generalized Additive Models"*. Tabular Representation Learning Workshop & Interpretable AI Workshop (Oral) at NeurIPS 2024
- Riccardo Grazzi*, **Julien Siems***, Simon Schrodi, Thomas Brox, Frank Hutter. *"Is Mamba Capable of In-Context Learning?"*. ME-FOMO Workshop at ICLR 2024 & AutoML Conference 2024
- **Julien Siems***, Konstantin Ditschuneit*, Winfried Ripken*, Alma Lindborg*, Maximilian Schambach, Johannes S. Otterbach, Martin Genzel. *"Curve Your Enthusiasm: Concurvity Regularization in Differentiable Generalized Additive Models"*. Advances in Neural Information Processing Systems 37 (NeurIPS) 2023.
- **Julien Siems**, Maximilian Schambach, Sebastian Schulze and Johannes Otterbach. *"Interpretable Reinforcement Learning via Neural Additive Models for Inventory Management."* AI4ABM Workshop at International Conference on Learning Representations (ICLR) 2023.
- Jakob Weissteiner*, Jakob Heiss*, **Julien Siems*** and Sven Seuken. *"Bayesian Optimization-based Combinatorial Assignment."* AAAI 2023.
- Jakob Weissteiner*, Jakob Heiss*, **Julien Siems*** and Sven Seuken. *"Monotone-value neural networks: Exploiting preference monotonicity in combinatorial assignment."* International Joint Conference on Artificial Intelligence (IJCAI) 2022.
- Arber Zela*, **Julien Siems***, Lucas Zimmer*, Jovita Lukasik, Margret Keuper and Frank Hutter. *"Surrogate NAS Benchmarks: Going Beyond the Limited Search Spaces of Tabular NAS Benchmarks."* International Conference on Learning Representations (ICLR) 2022.
- **Julien Siems**, Aaron Klein, Cedric Archambeau and Maren Mahsereci. *"Dynamic Pruning of a Neural Network via Gradient Signal-to-Noise Ratio."* 8th ICML Workshop on Automated Machine Learning (AutoML) at International Conference On Machine Learning (ICML) 2021.
- Arber Zela*, **Julien Siems*** and Frank Hutter. *"NAS-Bench-1Shot1: Benchmarking and Dissecting One-shot Neural Architecture Search."* International Conference on Learning Representations (ICLR) 2020.
- Roland Zimmermann* and **Julien Siems***. *"Faster training of Mask R-CNN by focusing on instance boundaries."* Computer Vision and Image Understanding 188 (2019): 102795.

Patents

- Arber Zela, Frank Hutter, **Julien Siems**, Lucas Zimmer, *Method, device and computer program for predicting a suitable configuration of a machine learning system for a training data set*, US Patent No. 16950570
- Arber, Zela, Frank Hutter, **Julien Siems**, Lucas Zimmer, *Verfahren, Vorrichtung und Computerprogramm zum Vorhersagen einer geeigneten Konfiguration eines maschinellen Lernsystems für einen Trainingsdatensatz*, German Patent No. DE: 10 2020 202 392.1
- **Julien Siems**, Arber Zela, Frank Hutter, *Verfahren, Vorrichtung und Computerprogramm zum Erstellen eines maschinellen Lernsystems*, German Patent No. DE: 10 2019 214 500.0

Skills Summary

- **Languages**: Python, C++
- **Tools**: PyTorch, Jax, Scipy, Numpy, Docker, git, Matlab