Phillip Lippe

PhD student focusing on (causal) representation learning and generative pretraining with experience in large-scale training. Looking for Research Scientist positions based in Europe and US with starting dates from October 2024 on.

Nationality German | Languages German (native), English (C1) | Amsterdam, Netherlands | phillip.lippe@gmail.com
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EXPERIENCE

Student Researcher

Google DeepMind

Aug 2023 – Nov 2023 | Amsterdam, Netherlands

- Research in generative multimodal pretraining with positive transfer across modalities; hosted by Mostafa Dehghani
- Parallelized training of models with up to 4 billion parameters
- Results internally used in the Gemini foundation model project

Research Intern

Microsoft Research

Mar 2023 – May 2023 | Amsterdam, Netherlands

- Research in neural PDE solvers for scientific simulations like fluid dynamics; hosted by Johannes Brandstetter
- Results published in *PDE-Refiner: Achieving Accurate Long Rollouts with Neural PDE Solvers* at NeurIPS 2023 (pdf)

Student Research Intern

Daimler AG, Mercedes-Benz

Dec 2016 – Mar 2017
Apr 2018 – Sep 2018 | Stuttgart, Germany

- Research in deep learning for real-time multi-class object detection in complex urban traffic scenes (autonomous driving)
- Bachelor Thesis: *Hierarchical Multi-label Object Detection of Rare Classes for Autonomous Driving* (pdf)

Student Research Intern

Mercedes-Benz Research and Development NA

May 2017 – Aug 2017 | Sunnyvale, United States

- Research in deep generative models for predicting agent behavior in traffic scenarios for autonomous driving (report)
- Performed agile software development with Scrum

PROJECTS

Google Developer Expert, Machine Learning

- Member of the ML GDE program for expertise and public content sharing in JAX+Flax since August 2022
- Presented tutorials on distributed training for scaling deep learning models to billion parameters

Tutorials

- Created and taught a series of implementation tutorials in PyTorch and JAX for various Deep Learning topics (website, ∼40k page visits per month, >1.9k GitHub stars). Part of the DL courses at UvA and official tutorials of PyTorch Lightning

Teaching assistant

- Teaching assistant (TA) for the graduate courses Deep Learning, NLP 1, FAIR, IR 1, Advanced Topics in Computational Semantics, and Foundation Models at the University of Amsterdam (2019-2024)
- Head TA for ASCI PhD Course on Computer Vision 2022 (link)

EDUCATION

PhD, Artificial Intelligence

University of Amsterdam, QUVA lab

Sep 2020 – exp. Sep 2024 | Amsterdam, Netherlands

- Supervisors: dr. Efstratios Gavves and dr. Taco Cohen
- My research focuses on the intersection of causality and deep learning, in particular causal representation learning (abstract)
- ELLIS PhD; collaboration with Qualcomm AI Research

Master of Science, Artificial Intelligence

University of Amsterdam

Sep 2018 – Aug 2020 | Amsterdam, Netherlands

- Courses on AI, including ML, DL, NLP, IR, CV, and RL
- Thesis on "Categorical Normalizing Flows" (publication), applied for permutation-invariant graph/molecule generation
- Final GPA: 9.5, cum laude (Dutch grading system)

Bachelor of Engineering, Computer Science

Baden-Wuerttemberg Cooperative State University

Oct 2015 – Sep 2018 | Stuttgart, Germany

- Cooperative study program with the specialization in IT Automotive and autonomous driving, in cooperation with Daimler AG/Mercedes-Benz R&D
- Final GPA: 1.0 (German grading system)

Pre-Studies, Mathematics/Computer Science

Ruhr University Bochum

Apr 2012 – Sep 2014 | Bochum, Germany

- Completing university courses as high school student, including Introduction to Software Engineering I & II, Linear Optimization, and Programming for Mathematicians

AWARDS

- Won 4th place in the NeurIPS 2020 challenge "Hateful Memes" of Facebook AI (paper)
- Best CS undergraduate student at the Baden-Wuerttemberg Cooperative State University 2018
- Awarded SchülerUni Scholarship 2012/13 for taking university courses on Computer Science/Mathematics during high school

SKILLS

DL Frameworks: PyTorch (2018-present, R&T), JAX/Flax (2021-present, R&T), Tensorflow (2017-2018, R), Caffe (2016-2017, R) (R - Research, T - Teaching)

Programming languages: Python (2016-present), HTML/PHP/SQL (2012-present), Java (2012-2019), MATLAB (2016-2019), C (2015-2017)

Additional skills: SLURM cluster computing (2018-present), git (2015-present), Docker (2017-present)

SELECTED PUBLICATIONS

Conferences

- Samuele Papa, Riccardo Valperga, David M Knigge, Miltiadis Kofinas, Phillip Lippe, Jan-jakob Sonke, Efstratios Gavves: **How to Train Neural Field Representations: A Comprehensive Study and Benchmark**. The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024 (link)
  — *Own contributions:* Core contributor of library development in JAX, proposed and optimized vmap parallelization, advised in model development.
- Davide Talon, Phillip Lippe, Stuart James, Alessio Del Bue, Sara Magliacane: **Towards the Reusability and Compositionality of Causal Representations**. Third Conference on Causal Learning and Reasoning (CLeaR), 2024 (link) **[Oral]**
  — *Own contributions:* Worked on model development, experiment design, and theoretical results.. Contributed to writing.
- Phillip Lippe, Bastiaan S. Veeling, Paris Perdikaris, Richard E. Turner, Johannes Brandstetter: **PDE-Refiner: Achieving Accurate Long Rollouts with Neural PDE Solvers**. Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS), 2023 (link). **[Spotlight]**
- Sindy Löwe, Phillip Lippe, Francesco Locatello, Max Welling: **Rotating Features for Object Discovery**. Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS), 2023 (link). **[Oral]**
  — *Own contributions:* Advised in model development, experiment design and model optimization. Contributed to writing.
- Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, Efstratios Gavves: **BISCUIT: Causal Representation Learning from Binary Interactions**. The 39th Conference on Uncertainty in Artificial Intelligence (UAI), 2023 (link). **[Spotlight]**
- Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, Efstratios Gavves: **Causal Representation Learning for Instantaneous and Temporal Effects in Interactive Systems**. International Conference on Learning Representations (ICLR), 2023 (link).
- Adeel Pervez, Phillip Lippe, Efstratios Gavves: **Differentiable Mathematical Programming for Object-Centric Representation Learning**. International Conference on Learning Representations (ICLR), 2023 (link).
  — *Own contributions:* Proposed application to object-centric learning. Advised in model development and experimental setups. Contributed to writing.
- Adeel Pervez, Phillip Lippe, Efstratios Gavves: **Scalable Subset Sampling with Neural Conditional Poisson Networks**. International Conference on Learning Representations (ICLR), 2023 (link).
  — *Own contributions:* Advised in model development and experimental setups. Contributed to writing.
- Johann Brehmer, Pim de Haan, Phillip Lippe, Taco Cohen: **Weakly supervised causal representation learning**. Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS), 2022 (link).
  — *Own contributions:* Advised in theory and model development, created datasets, implemented causal discovery pipeline, and contributed to writing.
- Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, Efstratios Gavves: **CITRIS: Causal Identifiability from Temporal Intervened Sequences**. International Conference on Machine Learning (ICML), 2022 (link). **[Spotlight]**
- Anna Langedijk, Verna Dankers, Phillip Lippe, Sander Bos, Bryan Cardenas Guevara, Helen Yannakoudakis, and Ekaterina Shutova: **Meta-learning for fast cross-lingual adaptation in dependency parsing**. Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (ACL, Volume 1: Long Papers), 2022 (link). **[Oral]**
  — *Own contributions:* Advised in training and finetuning of large language Transformers, guided as teaching assistant through the project.
- Phillip Lippe, Taco Cohen and Efstratios Gavves: **Efficient Neural Causal Discovery without Acyclicity Constraints**. International Conference on Learning Representations (ICLR), 2022 (link).
- Phillip Lippe and Efstratios Gavves: **Categorical Normalizing Flows via Continuous Transformations**. International Conference on Learning Representations (ICLR), 2021 (link).

Journals

- Sindy Löwe, Phillip Lippe, Maja Rudolph, Max Welling: **Complex-Valued Autoencoders for Object Discovery**. Transactions on Machine Learning Research, Nov 2022 (link).
  — *Own contributions:* Advised in model development, experiment design and model optimization. Contributed to writing
- Douwe Kiela, Hamed Firooz, Aravind Mohan, Vedanuj Goswami, Amanpreet Singh, Casey A. Fitzpatrick, Peter Bull, Greg Lipstein, Tony Nelli, Ron Zhu, Niklas Muennighoff, Rize Velioglu, Jewgeni Rose, Phillip Lippe, Nithin Holla, Shantanu Chandra, Santhosh Rajamanickam, Georgios Antoniou, Ekaterina Shutova, Helen Yannakoudakis, Vlad Sandulescu, Umut Ozertem, Patrick Pantel, Lucia Specia, Devi Parikh (2021). **The Hateful Memes Challenge: Competition Report.** Proceedings of the NeurIPS 2020 Competition and Demonstration Track, PMLR 133:344-360, 2021 (link).
  — *Own contributions:* Added summary of own solution and results to the Hateful Memes Challenge.

SELECTED PUBLIC TALKS

03/2024 Invited Talk at the Deep Thinking Hour (UvA) on "Training Models at Scale"
02/2024 Invited Talk at the CARE Talk Series by Valencelabs on "BISCUIT: Causal Representation Learning from Binary Interactions"
02/2024 Invited Talk at the Bellairs Workshop on Causality on "On Practical Challenges of Scaling Causal Representation Learning"
09/2023 Invited Talk at the AI4Science Talk Series on "Achieving Accurate Long Rollouts with Neural PDE Solvers"
02/2023 Invited Talk at the Rising Stars in AI Symposium at KAUST on "Causal Representation Learning"
12/2022 Invited Talk at the Google Student Developer Club, University of Augsburg on "Machine Learning with JAX and Flax"
08/2022 Invited Talk at the First Workshop on Causal Representation Learning at UAI 2022 on "Learning Causal Variables from Temporal Sequences with Interventions"
07/2022 Spotlight Talk at ICML 2022 on our paper CITRIS: Causal Identifiability from Temporal Intervened Sequences
07/2021 Contributed Talk at the 8th Causal Inference Workshop at UAI 2021
12/2020 Contributed Talk at the NeurIPS 2020 Hateful Memes Competition workshop on our 4th place winning solution

REVIEWING

I have served as reviewer for the following conferences and workshops: ECCV-2020, ICCV-2021, CausalUAI-2021, ICLR-2022, CVPR-2022, CLeaR-2022, NeurIPS-2022, CRL-2022, CML4Impact-2022, CDS-2022, nCSI-2022, ICLR-2023, CLeaR-2023, TSRL4H-2023, Physics4ML-2023, UAI-2023, Frontiers4LCD-2023, NeurIPS-2023, ICML-2024.