Sindy Löwe

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PhD Candidate Machine Learning

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Fascinated by intelligence, its emergence and representation both in biological and technical settings. Experienced in conducting well-reasoned research in neuroscience and machine learning. Skills include critical and analytical thinking, effective planning and creative problem solving.

Education

PhD Candidate in Machine Learning — Oct 2019 – Present
AMLab, University of Amsterdam — Amsterdam, Netherlands
- Supervisor: Max Welling
- Thesis topic: *Structured Representation Learning*

Master of Science in Artificial Intelligence — Sep 2017 – Sep 2019
University of Amsterdam (UvA) — Amsterdam, Netherlands
- Final grade: 9.1/10 (GPA: 4.0/4) – Cum laude
- Thesis title: *Greedy InfoMax for Self-Supervised Representation Learning*
  Received a university-wide award for the best master's thesis (UvA Thesis Award 2020), and a Netherlands-wide award for the best master's thesis in informatics (KNVI/KIVI Thesis Prize for Informatics and Information Science 2020)

Bachelor of Science in Informatics — Oct 2015 – Aug 2016
University of Tübingen — Tübingen, Germany
- Final grade: 1.2 (GPA: 3.9/4) – Graduation with distinction
- Thesis title: *Semantic Segmentation of RGB-Images with Deep Convolutional Neural Networks*

Bachelor of Science in Cognitive Science — Oct 2012 – Sep 2015
University of Tübingen — Tübingen, Germany
- Final grade: 1.3 (GPA: 3.8/4)
- Thesis title: *Neural Modulation by Temporal Predictability in the Mouse Primary Visual Cortex*

Research Experience

Research Intern — Jun 2020 – Oct 2020
Google Brain — Berlin, Germany
- Exploring novel self-supervised object discovery algorithms (publication **(4)** below)

Research Intern — Jun 2018 – Jul 2018
MVTec Software GmbH — Munich, Germany
- Developing new methods for novelty detection using autoencoders (publication **(6)** below)

Research Assistant — Oct 2015 – Jul 2016
University of Tübingen — Tübingen, Germany
Chair for Cognitive Systems
- Implementing and improving deep learning algorithms for visual scene understanding in robots

Research Assistant — Jun 2013 – Aug 2015
Max Planck Institute for Biological Cybernetics — Tübingen, Germany
Department for Physiology of Cognitive Processes
- Investigating how visual percepts are represented by neuronal activity in rats and mice
- Resulting in several extended abstracts, e.g. publication **(7)** below

Selected Publications

(1) **S. Löwe**, P. Lippe, F. Locatello, and M. Welling. Rotating Features for Object Discovery. Oral Presentation *at Neural Information Processing Systems (NeurIPS)*, 2023

(2) **S. Löwe**, P. Lippe, M. Rudolph, and M. Welling. Complex-Valued Autoencoders for Object Discovery. *Transactions on Machine Learning Research (TMLR)*, 2022

(3) **S. Löwe**[1], D. Madras[1], R. Zemel, and M. Welling. Amortized Causal Discovery: Learning to Infer Causal Graphs from Time-Series Data. *Causal Learning and Reasoning (CLeaR)*, 2022

(4) **S. Löwe**, K. Greff, R. Jonschkowski, A. Dosovitskiy, and T. Kipf. Learning Object-Centric Video Models by Contrasting Sets. *NeurIPS 2020 Workshop: Object Representations for Learning and Reasoning*, 2020

(5) **S. Löwe**[1], P. O'Connor, and B. S. Veeling[1]. Putting An End to End-to-End: Gradient-Isolated Learning of Representations. Honorable Mention For The Outstanding New Directions Paper Award *at Neural Information Processing Systems (NeurIPS)*, 2019

(6) P. Bergmann., **S. Löwe**., M. Fauser., D. Sattlegger., and C. Steger. Improving Unsupervised Defect Segmentation by Applying Structural Similarity to Autoencoders. *Conference on Computer Vision Theory and Applications (VISAPP)*, 2019

(7) **S. Löwe**, M. Watanabe, N. Logothetis, L. Busse, and S. Katzner. Temporal Predictability of Visual Target Onset by Audition Leads to Decrease in Evoked Neural Activity in Mouse V1. *Extended abstract at Neuroscience*, 2015

Miscellaneous

Scholarships
- Google PhD Fellowship 2022-2024
- Full scholarship by the German Academic Exchange Service (DAAD) 2017-2019
- ICML D&I Travel Grant 2019; NeurIPS Travel Award 2019; WiML Travel Funding 2019

Skills
- Programming: Python (Pytorch, TensorFlow, Jax, Numpy)
- Languages: German (native), English (full professional proficiency), Dutch (limited working proficiency)
- Soft Skills: public speaking, written communication, teamwork, project and time management, critical thinking, analytical skills, research skills, creativity, strategic thinking

Relevant Coursework
- Machine Learning (I, II), Computer Vision, Natural Language Processing, Deep Learning, Information Theory, Game Theory, Information Retrieval, Reinforcement Learning

Invited Talks
- Causality Discussion Group (07/06/2023)
- Delta Lab 2 Opening Ceremony, Amsterdam (23/09/2022)
- Qualcomm AI Research, Amsterdam (18/08/2022)
- Machine Learning + X Seminars at Brown University (22/04/2022)
- AAAI-21 Workshop: Learning Network Architecture During Training (08/02/2021)
- SoftKR Reading Group at the Vrije Universiteit Amsterdam (26/11/2020)
- Brains@Bay Meetup (18/11/2020)
- 1st International Workshop on Active Inference (14/09/2020)
- Virtual London Machine Learning Meetup (26/08/2020)
- The Great NeurIPS Debate (12/12/2019)
- Google Brain, Amsterdam (25/11/2019)

Organizing
- ICLR 2022 Workshop: Elements of Reasoning: Objects, Structure, and Causality
- NeurIPS 2020 Workshop: Beyond Backpropagation - Novel Ideas for Training Neural Architectures

Reviewing
- NeurIPS 2022 (Top Reviewer), 2023; CLeaR 2022; ICLR 2021 (Outstanding Reviewer), 2022
- Journal of Machine Learning Research (JMLR)
- IEEE Transactions on Pattern Analysis and Machine Intelligence

Teaching
- Teaching Assistant for Deep Learning 2019 & 2020 (Master AI, UvA)
- Teaching Assistant for Machine Learning I 2021 (Master AI, UvA)
- Supervision of three master's projects

[1] equal contribution