

Emile van Krieken

Postdoctoral Researcher – Vrije Universiteit Amsterdam

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I am a Postdoc working jointly at the Vrije Universiteit Amsterdam and the University of Amsterdam. I work on machine learning and artificial intelligence, with a focus on neurosymbolic machine learning. I obtained my PhD in 2024 at the Vrije Universiteit Amsterdam with cum laude distinction, and enjoyed a previous Postdoc at the University of Edinburgh. In my scientific career, I learned how to quickly learn and apply complicated new concepts, honed many new skills and built a strong network.

Education

PhD – Cum Laude (top 5%)

Vrije Universiteit Amsterdam

Amsterdam, NL

Apr 2019 - Jan 2024

Dissertation title: “Optimisation in Neurosymbolic Learning Systems”.

Awarded with **Cum Laude distinction**, corresponding to top 5% of respective research field.

Supervised by prof. Annette ten Teije and dr. Jakub Tomczak.

Doctorate committee: prof. Mark Hoogendoorn, prof. Luc de Raedt, prof. Cassio de Campos, dr. Sebastijan Dumančić, dr. Efthymia Tsamoura.

Work performed in the Computer Science department in the Learning and Reasoning group. The PhD was funded by the Vrije Universiteit Amsterdam.

Awarded with the BNVKI Dissertation Award 2025 (best dissertation on Artificial Intelligence in the Benelux region).

Master in Artificial Intelligence – Cum Laude

University of Amsterdam

Amsterdam, NL

Sep 2016–Feb 2019

Average 9.0/10.0 (4.00 GPA)

Thesis: “Differentiable Fuzzy Logics”. Grade: 9.5/10.0.

Supervisors: prof. Frank van Harmelen, dr. Erman Acar. Assessor: dr. Thomas Kipf.

Bachelor in Computer Science – Cum Laude

Universiteit Utrecht

Utrecht, NL

Sep 2013–Jun 2016

Average 8.7/10.0 (4.00 GPA)

Work Experience

Postdoctoral Researcher

Vrije Universiteit Amsterdam

Amsterdam, the Netherlands

Since July 2025

Position is funded by the “NWO AINed grant” and is under the supervision of dr. Filip Ilievski and prof. dr. Cees G.M. Snoek (jointly with the University of Amsterdam). The project is about common-sense reasoning in multi-modal foundation models.

Research Associate (Postdoc)

University of Edinburgh

Edinburgh, United Kingdom

Sep 2023–June 2025

Position is funded by the “Edinburgh Laboratory for Integrated Artificial Intelligence” (ELIAI) under the supervision of dr. Pasquale Minervini, dr. Antonio Vergari and dr. Edoardo Ponti. The project is on gradient-based learning of discrete structures. The position is situated in the School of Informatics, in particular in the ILCC institute (NLP group) and the Institute for Adaptive and Neural Computation (ANC).

Research Visit*Fondazione Bruno Kessler*

Trento, Italy

Sep 2021–Oct 2021

Project together with dr. Alessandro Daniele and prof. Luciano Serafini on Neurosymbolic AI.

Funded by the HumaneAI EU Horizon project with a micro-project grant.

Research Assistant*Vrije Universiteit Amsterdam*

Amsterdam, NL

Sep 2017–Feb 2018

Supervised by dr. Jacqueline Heinerman, on social learning in robotics.

Treasurer*DWARS, GroenLinkse Jongeren*

Utrecht, NL

*Oct 2016–Jul 2017***Composer and Programmer***Gilded Games*

Breda, NL

Jun 2011–Nov 2015

Worked with an international team on successful modifications for Minecraft like ‘The Aether’.

Publications

A * denotes equal contribution. See my Google Scholar for the most up-to-date list.

- A. Grivas, L. Loconte, **E. van Krieken**, P. Nawrot, Y. Zhao, E. Wielewski, P. Minervini, E. Ponti, A. Vergari. “Fast and Expressive Multi-Token Prediction with Probabilistic Circuits.” Preprint 2025
- E. Marconato*, S. Bortolotti*, **Emile van Krieken***, P. Morettin, E. Umili, A. Vergari, E. Tsamoura, A. Passerini, S. Teso. “Symbol Grounding in Neuro-Symbolic AI: A Gentle Introduction to Reasoning Shortcuts”. Preprint 2025
- T. Younesian, D. Daza, **E. van Krieken**, T. Thanapalasingam, P. Bloem. “GRAPES: Learning to Sample Graphs for Scalable Graph Neural Networks.” Transactions on Machine Learning Research (TMLR 2025)
- **E. van Krieken**, P. Minervini, E.M. Ponti, A. Vergari. “Neurosymbolic Diffusion Models”. (NeurIPS 2025)
- S. Badreddine, **E. van Krieken***, L. Serafini*. “Breaking Rank Bottlenecks in Knowledge Graph Completion”. Preprint 2025
- **E. van Krieken**, P. Minervini, E.M. Ponti, A. Vergari. “Neurosymbolic reasoning shortcuts under the independence assumption”. (NeSy 2025, Oral)
- G. Hong, **E. van Krieken**, E. Ponti, N. Malkin, P. Minervini. “Mixtures of In-Context Learners.” Proceedings of the 63rd Annual Meeting of the Association for Computational Linguistics (ACL 2025, SAC highlight award)
- A. Daniel, **E. van Krieken**. “Noise to the Rescue: Escaping Local Minima in Neurosymbolic Local Search.” Preprint 2025
- A.P. Gema, JOJ Leang, G. Hong, A. Devoto, ACM Mancino, R. Saxena, X. He, Y. Zhao, X. Du, MRG Madani, C. Barale, R. McHardy, J. Harris, J. Kaddour, **E. van Krieken**, P. Minervini. “Are We Done with MMLU?”. Proceedings of the 2025 Conference of the Nations of the Americas Chapter of the Association for Computational Linguistics (NAACL 2025)

- N. Luo, A.P. Gema, **E. van Krieken**, P. Lesci, P. Minervini. “Self-Training Large Language Models for Tool-Use Without Demonstrations”. Findings of the Association for Computational Linguistics: NAACL 2025
- S. Bortolotti, E. Marconato, T. Carraro, P. Morettin, **E. van Krieken**, A. Vergari, S. Teso, A. Passerini. “A Benchmark Suite for Systematically Evaluating Reasoning Shortcuts”. NeurIPS 2024, Datasets and Benchmarks track
- **E. van Krieken***, S. Badreddine, R. Manhaeve, E. Giunchiglia. “ULLER: A Unified Language for Learning and Reasoning”. 18th International conference on Neural-Symbolic Learning and Reasoning (NeSy 2024, *Spotlight*)
- **E. van Krieken**, P. Minervini, E.M. Ponti, A. Vergari. “On the Independence Assumption in Neurosymbolic Learning”. The Forty-First International Conference on Machine Learning (ICML 2024)
- E. Marconato*, S. Bortolotti*, **E. van Krieken***, A. Vergari, A. Passerini, S. Teso. “BEARS Make Neuro-Symbolic Models Aware of their Reasoning Shortcuts”. The 40th Conference on Uncertainty in Artificial Intelligence (UAI 2024, *Spotlight*)
- T. Thanapalasingam, **E. van Krieken**, P. Bloem, P. Groth. “Intelligraphs: Datasets for Benchmarking Knowledge Graph Generation.” Preprint 2024
- **E. van Krieken**, T. Thanapalasingam, J. Tomczak, A. Ten Teije, F. van Harmelen. “A-NeSI: Scalable Approximate Inference for Probabilistic Neurosymbolic Learning.” Advances in Neural Information Processing Systems 36 (NeurIPS 2023)
- A. Daniele*, **E. van Krieken***, L. Serafini, F. van Harmelen. “Refining neural network predictions using background knowledge.” Machine Learning 112 (9), 3293-3331 2023
- **E. van Krieken**, E. Acar, F. van Harmelen. “Analyzing differentiable fuzzy logic operators.” Artificial Intelligence 302 2022
- K. van den Houten, **E. van Krieken**, B. Heidergott. “Analysis of Measure-Valued Derivatives in a Reinforcement Learning Actor-Critic Framework.” Winter Simulation Conference 2022
- D. Alivanistos, S. B. Santamaria, M. Cochez, J.C. Kalo, **E. van Krieken**, T. Thanapalasingam. “Prompting as probing: Using language models for knowledge base construction.” LM-KBC challenge at ISWC 2022, *Track 2 winner*
- **E. van Krieken**, J. Tomczak, A. Ten Teije. “Stochastic: A framework for general stochastic automatic differentiation.” Advances in Neural Information Processing Systems 34 (NeurIPS 2021)
- K. Grouwstra, **E. van Krieken**. “Type-driven Neural Programming by Example.” NeurIPS 2020 Workshop on Computer-Assisted Programming
- **E. van Krieken**, E. Acar, F. van Harmelen. “Analyzing differentiable fuzzy implications.” Proceedings of the International Conference on Principles of Knowledge Representation and Reasoning. Vol. 17. No. 1. 2020
- **E. van Krieken**, E. Acar, F. van Harmelen. “Semi-Supervised Learning using Differentiable Reasoning.” Journal of Applied Logic 6.4 2019
- J. Heinerman, B. Bussmann, R. Groenendijk, **E. Van Krieken**, J. Slik, A. Tezza, A. E. Eiben. “Benefits of social learning in physical robots”. IEEE Symposium Series on Computational Intelligence (SSCI) 2018

Awards

- **BNVKI PhD dissertation award 2025** for the best PhD dissertation in the field of Artificial Intelligence in the Benelux region.
- **LM-KBC challenge at ISWC 2022, Track 2 winner**
- **Best presentation award** at the International Artificial Intelligence in Bergen Research School (June 2022)

Teaching and Supervision

- Machine Learning for Graphs course, Jan 2026 (Master AI Vrije Universiteit Amsterdam).
Acted as co-coordinator and leading instructor. Gave 3 lectures and supervised 2 students' projects.
- ESSLLI 2025 Summer School course “Neurosymbolic learning: an introductory course to theory and applications” with dr. Efthymia Tsamoura. Gave two and a half lectures of 1.5 hours each.
- Deep Learning course (Master AI Vrije Universiteit Amsterdam).
2020, 2021, 2022: Teaching assistant, developed and gave two lectures on Reinforcement Learning.
2025: Gave a lecture on CNNs.
- **Invited lectures:**
 - Foundations of AI course, TU Eindhoven (Jan 2026, MSc. AI, capstone guest lecture on neurosymbolic AI)
 - Symbolic and Neural AI Course, University of Amsterdam (Nov 2025, BSc. AI)
 - Accelerated NLP (on Reasoning in LLMs), University of Edinburgh (Nov 2024)
 - SIKS course: Neuro-Symbolic Systems (June 2024)
 - Machine Learning for Graphs course, Amsterdam (Jan 2024)
 - RL Summer School 2022 in Amsterdam (Jul 2022, lecture on policy gradients)
- **PhD supervision:**
 - Ting-Chih Chen (Co-supervisor, 2025-, Vrije Universiteit Amsterdam)
 - Samy Badreddine (Co-supervisor, 2023-, Fondazione Bruno Kessler, SonyAI)
- **Student supervision:**
 - Ne Luo (2024, MSc UoE)
 - Yinjia Chen (2024, MSc UoE)
 - David Frühbuß (2023, RA VU)
 - Jochem Herrebrugh (2022, BSc VU)
 - Kim van den Houten (2021, MSc VU). Won 2021 Extrie Thesis Award.
 - Kiara Grouwstra (2020, MSc UvA)

Talks

- INDE Lab group meeting (University of Amsterdam, Jan 2026, invited)
- EurIPS 2025 (Dec 2025, three posters among which Neurosymbolic Diffusion Models)

- USPN's Data Science Seminar (Nov 2025, invited)
- NEC Labs (Nov 2025, invited)
- BNAIC 2025 **PhD award plenary talk** (Nov 2025, invited)
- Dagstuhl Seminar on Applications in Neurosymbolic AI (Nov 2025, invited)
- VISLab at University of Amsterdam internal seminar (Oct 2025)
- NeSy 2025 (September 2025, NeSy reasoning shortcuts under independence, **Oral** and poster)
- VU Machine Learning Seminar (Sep 2025, invited)
- Explainable Learning and Reasoning Workshop at Cardiff University (June 2025, invited)
- SMiLe workshop 2025 (June 2025, invited talk)
- Wageningen University and Research (Feb 2025, invited)
- Dagstuhl Seminar on ‘Logic and Neural Networks’ (Feb 2025, invited)
- Turing Neuro-Symbolic Interest group (Oct 2024, invited)
- Tutorial and discussion session on ULLER at NeSy 2024 (September 2024)
- NeSy 2024 (September 2024, Independence Assumption, **Spotlight oral** and poster)
- NeSy 2024 (September 2024, ULLER, **Spotlight oral** and poster)
- Differentiable Almost Everything workshop at ICML 2024 (July 2024, **Invited keynote talk**)
- ICML 2024 (July 2024, poster)
- NeurIPS 2023 (Dec 2023, A-NeSI poster)
- New Frontiers in Graph Learning workshop at NeurIPS 2023 (Dec 2023, GRAPES poster)
- GFlowNet reading club at MILA - Quebec AI Institute (Nov 2023, invited)
- SMiLe workshop 2023 (June 2023, invited talk and poster)
- NeSy-GeMs workshop at ICLR 2023 (May 2023, poster)
- GFlowNet reading club at MILA - Quebec AI Institute (April 2023, invited)
- ILCC/CDT NLP Seminar series at University of Edinburgh (March 2023, invited)
- Algorithms group at TU Delft (Feb 2023, invited)
- AMLAB group at University of Amsterdam (Oct 2022, invited)
- DTAI group at KU Leuven (Sep 2022, invited)
- IJCLR (Sep 2022, **oral**)
- Logic and Learning Seminar, Bergen (Aug 2022, invited)
- HHAI 2022 KR4HI Workshop (Jun 2022, extended abstract)
- International Artificial Intelligence in Bergen Research School (Jun 2022, invited, **best presentation award**)
- BeNeRL 2022 (Jun 2022, Stochastic poster)
- NeurIPS 2021 (Dec 2021, Stochastic poster)
- DKM Unit seminar, Fondazione Bruno Kessler (Sep 2021, invited)
- Pyro Seminar, Broad Institute of MIT and Harvard (Jun 2021, invited, about Stochastic)
- DWS colloquium, Universität Mannheim (Nov 2020, invited)
- KR2020 (Oct 2020, **oral**)

Community Involvement

- **Program Chair** of 19th International Conference on Neurosymbolic Learning and Reasoning (NeSy 2025).
Tasks: Setting up and managing program committee while overseeing reviewing process and final decisions. We started the transition to OpenReview, which was appreciated by the community. We also started with a new editor (Proceedings of Machine Learning Research), which I led. Managed website and social media, day-to-day organisation and schedule, and inviting keynote speakers.
- **Co-lead of organising committee** for Neurosymbolic Generative Models (NeSy-GeMs) workshop at ICLR 2023. Tasks: Proposal writing, website, social media and email maintenance, program chair, setting up the program committee, and moderation during the workshop day.
- Organised a symposium on Probabilistic Learning and Reasoning at the Vrije Universiteit Amsterdam in 2024 before my PhD defence.
- National research evaluation informatics (2015-2020) of the department of computer science, VU Amsterdam (2022). Role: Represent PhD students.
- ELLIS PhD applications evaluator (2023).
- **Active social media accounts:** Twitter @EmilevanKrieken and Bluesky @EmilevanKrieken.com.
- **Reviewing:**
 - Conferences: NeurIPS 2023, 2025 (both years recognised as top reviewer with complementary registration), ICML 2024, ICLR 2024, 2025, 2026, UAI 2025, KR 2023, AISTATS 2022, 2023, 2024, NeSy 2024, 2025 (acting as program chair), 2026, CIKM 2020, AAAI 2020
 - Journals: TMLR (4-6 per year, recognised as a TMLR Expert Reviewer in 2025), JMLR, Operations Research, JBHI, JAIR, Neurosymbolic AI Journal
 - Awards: Amsterdam AI Thesis Awards 2024

Additional personal education

International Artificial Intelligence in Bergen Research School
University of Bergen

Bergen, Norway
Jun 2022

Topic: Knowledge Graphs and Machine Learning.

Explore Entrepreneurship
Vrije Universiteit Amsterdam

Amsterdam, NL
May 2021

Topic: An introduction to entrepreneurship and startups.

Research methods and methodology for IKS
School for Information and Knowledge Systems

Vught, NL
Nov 2019

Topic: Setting up large research projects.

Cambridge Professional English
Stedelijk Gymnasium Breda

Breda, NL
Sep 2006–Jun 2012

Miscellaneous

- Organised a group outing for the Learning and Reasoning group at VU Amsterdam in 2025 to the group of Luc de Raedt in KU Leuven, Belgium. Responsible for planning, transportation and accommodation.

- **Consulting** for Flagship Pioneering (2023). Created an Obsidian plugin.

- **Open Source Software:**

- Stochastic: A PyTorch library for general gradient estimation.
- Juggl: A plugin for the Obsidian note-taking app which adds an advanced and customizable graph view.
- Made significant contributions to other popular Obsidian plugins: Supercharged Links, Breadcrumbs, Graph Analysis (Runner-up Plugin at Obsidian October 2021) and Search on Internet.

- **Technical skills:**

- High proficiency: Python, PyTorch, NumPy, Matplotlib, Latex, Typescript, Git, Obsidian, Markdown, Slurm, LLM inference, VIM, Excel.
- Intermediate proficiency: Pandas, Transformers, Pytest, Tensorflow, Docker, Bash, sh, web development, Java, C#, Haskell, Prolog, R, Matlab.