Emile van Krieken

Research Associate (Postdoc) – University of Edinburgh

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I am a Research Associate (Postdoc) at the University of Edinburgh, working 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. 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%) Amsterdam, NL
Vrije Universiteit Amsterdam *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 Amsterdam, NL
University of Amsterdam *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 Utrecht, NL
Universiteit Utrecht *Sep 2013–Jun 2016*

Average 8.7/10.0 (4.00 GPA)

Work Experience

Research Associate (Postdoc) Edinburgh, United Kingdom
University of Edinburgh *Since Sep 2023*

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 Trento, Italy
Fondazione Bruno Kessler *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 Amsterdam, NL
Vrije Universiteit Amsterdam *Sep 2017–Feb 2018*

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

Treasurer Utrecht, NL
DWARS, GroenLinkse Jongeren *Oct 2016–Jul 2017*

Composer and Programmer Breda, NL
Gilded Games *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.

- 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)
- 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. Younesian, D. Daza, **E. van Krieken**, T. Thanapalasingam, P. Bloem. "GRAPES: Learning to Sample Graphs for Scalable Graph Neural Networks." Preprint 2024
- 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. "Storchastic: 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

- ESSLLI 2025 Summer School course "Neurosymbolic learning: an introductory course to theory and applications" with dr. Efthymia Tsamoura.
- Deep Learning course, 2020, 2021, 2022 (Master AI Vrije Universiteit Amsterdam).

  Teaching assistant, developed and gave two lectures on Reinforcement Learning.
- **Invited lectures:**
  - 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:**
  - 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

- 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, Storchastic poster)
- NeurIPS 2021 (Dec 2021, Storchastic poster)
- DKM Unit seminar, Fondazione Bruno Kessler (Sep 2021, invited)

- Pyro Seminar, Broad Institute of MIT and Harvard (Jun 2021, invited, about Storchastic)
- DWS colloquium, Universität Mannheim (Nov 2020, invited)
- KR2020 (Oct 2020, **oral**)

Community Involvement

- **Program Chair** of 19th International Conference on Neural-Symbolic Learning and Reasoning (NeSy 2025).
- **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 (recognised with complementary registration), 2025, ICML 2024, ICLR 2024, 2025, UAI 2025, KR 2023, AISTATS 2022, 2023, 2024, NeSy 2024, 2025 (program chair), CIKM 2020, AAAI 2020
  - Journals: TMLR (6 per year), JMLR, Operations Research, JBHI, JAIR
  - Awards: Amsterdam AI Thesis Awards 2024

Additional personal education

International Artificial Intelligence in Bergen Research School — Bergen, Norway
University of Bergen — *Jun 2022*
Topic: Knowledge Graphs and Machine Learning.

Explore Entrepreneurship — Amsterdam, NL
Vrije Universiteit Amsterdam — *May 2021*
Topic: An introduction to entrepreneurship and startups.

Research methods and methodology for IKS — Vught, NL
School for Information and Knowledge Systems — *Nov 2019*
Topic: Setting up large research projects.

Cambridge Professional English — Breda, NL
Stedelijk Gymnasium Breda — *Sep 2006–Jun 2012*

Miscellaneous

- We won the **LM-KBC challenge at ISWC 2022**.
- **Consulting** for Flagship Pioneering (2023). Created an Obsidian plugin.

- **Open Source Software:**
  - Storchastic: 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.