



LEON LANG

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<https://langleon.github.io/>

EDUCATION

PhD Student <i>Multivariate Information Theory and Machine Learning</i> University of Amsterdam	09/2020 – 02/2025 Amsterdam, Netherlands
<ul style="list-style-type: none">• Project at the intersection of multivariate information theory and machine learning• Goal: Finding useful Generalizations of Shannon Information Theory	
Master of Science <i>Artificial Intelligence</i> University of Amsterdam	09/2018 – 08/2020 Amsterdam, Netherlands
<ul style="list-style-type: none">• GPA: 9.34/10 (second best GPA among 135 graduates), Cum Laude• Thesis: A Wigner-Eckart Theorem for Steerable Kernels of General Compact Groups (grade: 9.5; only one other among 135 graduates reached this grade)	
Master of Science <i>Mathematics</i> University of Bonn	10/2015 – 10/2017 Bonn, Germany
<ul style="list-style-type: none">• GPA: 1.0, with distinction. German grading scale with 1.0 as the best grade• Thesis: The Asymptotic Behavior of Auslander-Reiten Translations (grade: 1.0)	
Bachelor of Science <i>Mathematics</i> University of Heidelberg	10/2012 – 08/2015 Heidelberg, Germany
<ul style="list-style-type: none">• GPA: 1.1. German grading scale with 1.0 as the best grade• Thesis: The Category Equivalence between Finite Fans and Normal Separated Toric Varieties (grade: 1.0)	
Prestudies <i>Mathematics, Calculus I</i> University of Würzburg	10/2011 – 03/2012 Würzburg, Germany
<ul style="list-style-type: none">• A program that allows talented high school students to already study at university	
High School Balthasar-Neumann-Gymnasium	09/2004 – 06/2012 Marktheidenfeld, Germany
<ul style="list-style-type: none">• GPA: 1.2. German grading scale with 1.0 as the best grade• Final exams: mathematics, German, English, physics, geography	

EXPERIENCE

Supervisor <i>Shutdownability in GPT-4</i> Supervised Program for Alignment Research	02/2023 – 05/2023 Berkeley, USA
Research Intern <i>Combining CIRL and ELK</i> Center for Human-Compatible AI	03/2023 – 06/2023 Berkeley, USA
Research Scholar <i>Machine Learning Alignment Theory Scholars Program</i> Stanford Existential Risk Initiative	11/2022 – 02/2023 Berkeley, USA
Research Intern <i>MSc Thesis Internship</i> Qualcomm-UvA Deep Vision Lab (QUVA Lab)	11/2019 – 07/2020 Amsterdam, Netherlands
Data Analytics Intern <i>CRM Analytics for Telekom AG</i> Detecon International GmbH	03/2018 – 07/2018 Cologne, Germany
Software Assistant <i>Software Development in Java and C# for BMW</i> QAware GmbH	11/2017 – 01/2018 Munich, Germany

PUBLICATIONS

Leon Lang, Rick Quax, Patrick Forré. *Abstract Conditional Mutual Independences and Markov Random Fields*. in Preparation, 2023

Leon Lang, Pierre Baudot, et al. *Information Decomposition Diagrams Applied beyond Shannon Entropy: A Generalization of Hu's Theorem*. Preprint, 2022

Gabriele Cesa, **Leon Lang**, Maurice Weiler. *A Program to Build $E(n)$ -Equivariant Steerable CNNs*. In *International Conference on Learning Representations (ICLR)*, 2022.

- This paper slightly generalizes the 2021 ICLR paper
- Additionally, this contains a demonstration of a practical implementation of the theory

Leon Lang, Maurice Weiler. *A Wigner-Eckart Theorem for Group Equivariant Convolution Kernels*. In *International Conference on Learning Representations (ICLR)*, 2021.

- Top 2% of submitted papers in terms of average initial review score

Benjamin Kolb, **Leon Lang** et al. *Learning to Request Guidance in Emergent Communication*. In *EMNLP Workshop LANTERN*, 2019.

- Shared first author together with Benjamin Kolb

CONFERENCES AND SUMMER SCHOOLS

Effective Altruism Global	02/2023
Attendance	Oakland, USA

Conference on Neural Information Processing Systems (NeurIPS)	11/2022
Attendance	New Orleans, USA

Information Universe Conference	06/2022
Talk on "Generalized Information Diagrams and the Second Law of Thermodynamics"	Groningen, Netherlands

International Conference on Learning Representations (ICLR)	05/2021
Poster presentation on our paper "A Wigner-Eckart Theorem for Group Equivariant Convolution Kernels"	Virtual

LANTERN Workshop at EMNLP	11/2019
Remote oral presentation on our paper "Learning to Request Guidance in Emergent Communication"	Hongkong

Human-aligned AI Summer School	07/2019
A summer school focused on optimization and decision making	Prague, Czech Republic
• Topics: agent incentives, open-source game theory, machine learning	

HONORS AND AWARDS

Distillation Prize by Nate Soares	04/2023
For my contribution to a comprehensive review of the natural abstractions agenda	

Lesswrong Review Prize	01/2023
Given for two reviews of John Wentworth's abstractions work	

Nomination of my MSc Thesis on Steerable Kernels	2021
Nomination for the Dutch Thesis Prize in Computer Science and Information Sciences	

Deutschlandstipendium Germany Scholarship	04/2017 – 09/2017
Scholarship awarded to approximately 0.9% of students at any given time	

Bundeswettbewerb Mathematik German National Mathematics Competition	06/2012
1st prize in the first round of this prestigious mathematics competition	

TEACHING EXPERIENCE

Machine Learning II <i>Teaching Assistant</i> University of Amsterdam	09/2022 – 10/2022 Amsterdam, Netherlands
Causality <i>Teaching Assistant</i> University of Amsterdam	02/2021 – 05/2021 Amsterdam, Netherlands
Machine Learning I <i>Teaching Assistant</i> University of Amsterdam	09/2020 – 10/2020 Amsterdam, Netherlands
FACT-AI <i>Teaching Assistant</i> University of Amsterdam <ul style="list-style-type: none">Supervising seven teams of four students each for a reproducibility research study	01/2020 – 02/2020 Amsterdam, Netherlands
Deep Learning <i>Teaching Assistant</i> University of Amsterdam	11/2019 – 12/2019 Amsterdam, Netherlands
Topology I <i>Teaching Assistant</i> University of Bonn	10/2016 – 03/2017 Bonn, Germany
Calculus for CS students <i>Teaching Assistant</i> University of Bonn	04/2016 – 09/2016 Bonn, Germany
Linear Algebra I <i>Teaching Assistant</i> University of Heidelberg	10/2013 – 03/2014 Heidelberg, Germany

AI SAFETY AND EFFECTIVE ALTRUISM

Writing of Distillations <i>AI Alignment</i> <ul style="list-style-type: none">I co-authored a comprehensive review of the natural abstractions agendaA comprehensive distillation of the core claims of shard theoryAn experiment idea to show that model-based RL agents will try to circumvent learned shutdownabilityAn introduction article for the importance of AI Safety based on the distribution shift problemI distilled my learnings from the Alignment Fundamentals Program into a document containing summaries of more than 60 articles	07/2022 – 04/2023 Online
Main Organizer <i>AI Safety Student Reading Group</i> University of Amsterdam <ul style="list-style-type: none">Monthly discussion meetups with approximately 10 students on papers about technical AI safety research	09/2018 – 07/2020 Amsterdam, Netherlands
Main Organizer and Co-Founder <i>Effective Altruism Student Group</i> University of Bonn <ul style="list-style-type: none">Effective Altruism is a social movement and academic field investigating the most impactful ways to improve the worldIn the student group, we organized discussion meetups, talks by experts, and career workshops	09/2016 – 08/2017 Bonn, Germany

SKILLS

Languages: German (Native), English (Fluent), Dutch (Intermediate)
Programming: Python (NumPy, Matplotlib, PyTorch), Java, C#, Matlab, SQL
Document Creation: LaTeX