Dr. Timo Freiesleben

Curriculum Vitae

Google Scholar
Personal Website

Research Interests

Areas of Specialization	Philosophy of AI, Philosophy of Science, Explainable AI, AI Evaluation
Areas of Competence	Ethics of AI, Decision Theory, Epistemology, Logic, Machine Learning

Positions

10/2025–Now	**Research Fellow**, *Munich Center for Mathematical Philosophy & Munich Center for Machine Learning, LMU München*, "From Bias to Knowledge: The Epistemology of Machine Learning" Emmy Noether Group, Supervisor: Tom Sterkenburg
10/2022–09/2025	**Research Fellow**, *Machine Learning for Science Cluster, Eberhard Karls Universität Tübingen*, "Certification and Foundations of Safe Machine Learning Systems in Healthcare" funded by the Carl Zeiss Foundation, Supervisor: Thomas Grote

Education

10/2019–05/2023	**Ph.D. in Neurophilosophy**, *Graduate School of Systemic Neurosciences and Munich Center for Mathematical Philosophy, LMU München*, Thesis on **What Does Explainable AI Explain?** Thesis advisory committee: Prof. Dr. Stephan Hartmann (main supervisor), Dr. Álvaro Tejero Cantero, Prof. Dr. Agnieszka Wykowska, Prof. Dr. Paul Taylor External reviewer: Prof. Dr. Jan-Willem Romeijn
10/2016–09/2018	**M.A. in Logic and Philosophy of Science**, *Munich Center for Mathematical Philosophy, LMU München*, *Very Good*, Thesis on **Incorporating Intuitions into Decision Making Rationally** Supervised by Dr. Rush Stewart and Prof. Dr. Dr. Hannes Leitgeb
10/2012–09/2016	**B.Sc. in Mathematics**, *Eberhard Karls Universität Tübingen*, *Very Good*, Thesis on **Ramification and Arithmetic Schemes** Supervised by Prof. Dr. Jürgen Hausen
08/2015–07/2016	**Erasmus Exchange Year**, *University of Oslo*, Focus on Mathematical Logic and Computability Theory
09/2010–07/2012	**Abitur**, *in the Wirtschaftsoberschule at the KS-Künzelsau*, *Very Good*

Publications

Books

2024 **Supervised Machine Learning for Science: How to stop worrying and love your black box** , *https://ml-science-book.com/*
Freiesleben*, T. & Molnar*, C.

2023 **What Does Explainable AI Explain?**, *Dissertation LMU Munich*
Freiesleben, T.

Journal Publications

2024 **Foundation Models in Healthcare Require Rethinking Reliability**, *Nature Machine Intelligence*
Grote, T., Freiesleben, T., & Berens, P.

2024 **Scientific Inference With Interpretable Machine Learning: Analyzing Models to Learn About Real-World Phenomena**, *Minds and Machines*
Freiesleben, T., König, G., Molnar, C., & Tejero-Cantero, A.

2023 **Beyond Generalization: A Theory of Robustness in Machine Learning**, *Synthese*
Freiesleben*, T. & Grote*, T.

2022 **The Intriguing Relation Between Counterfactual Explanations and Adversarial Examples**, *Minds and Machines*
Freiesleben, T.

Book Chapters

Forthcoming **Artificial Neural Nets and the Representation of Human Concepts**, *In Philosophy of Science for Machine Learning: Core Issues and New Perspectives*, edited by Juan Durán and Giorgia Pozzi, Synthese Library
Freiesleben, T.

2022 **General pitfalls of model-agnostic interpretation methods for machine learning models**, *xxAI — Beyond explainable AI, In Lecture Notes on Artificial Intelligence*
Molnar, C., König, G., Herbinger, J., Freiesleben, T., Dandl, S., Scholbeck, C., Casalicchio, G., Grosse-Wentrup, M., & Bischl, B.

Conference Publications

2025 **Performative Validity of Recourse Explanations**, *Proceedings of NeurIPS*
König, G., Fokkema, H., Freiesleben, T., Mendler-Dünner, C. & von Luxburg, U.

2024 **CountARFactuals – Generating plausible model-agnostic counterfactual explanations with adversarial random forests**, *Proceedings of World XAI Conference*
Freiesleben*, T., Dandl*, S., Blesch*, K., König*, K., Kapar, J., Bischl, B., & Marvin Wright

2023 **Dear XAI Community, we Need to Talk! Fundamental Misconceptions in Current XAI Research**, *Proceedings of World XAI Conference*
Freiesleben, T., & König, G.

2023 **Relating the Partial Dependence Plot and Permutation Feature Importance to the Data Generating Process**, *Proceedings of World XAI Conference*
Freiesleben*, T., Molnar*, C., König*, G., Herbinger, J., Reisinger, T., Casalicchio, G., Wright, M. N., & Bischl, B.

2023 **Improvement-Focused Causal Recourse (ICR)**, *Proceedings of AAAI Conference on Artificial Intelligence*
König, G., Freiesleben, T., & Grosse-Wentrup, M.

2021 **A causal perspective on meaningful and robust algorithmic recourse**, *ICML 2021 workshop on Algorithmic Recourse*
König, G., Freiesleben, T., & Grosse-Wentrup, M.

Teaching

Main Instructor

Maths for Mathematical Philosophy Students, *MCMP*, Winter Term 25/26

Learning from the impossible: Philosophical and practical implications of Gödel's incompleteness, the No-Free-Lunch, and the Fairness Impossibility Theorems, *University of Tübingen Philosophy and Computer Science Department*, Jointly with Prof. Balthasar Grabmayr and Sebastian Zezulka, Summer Term 25

Maths for Mathematical Philosophy Students, *MCMP*, Winter Term 24/25

Explainable Artificial Intelligence, *MCMP & LMU Statistics Department*, Jointly with Gunnar König, Winter Term 21/22

Causality and Machine Learning, *LMU Statistics Department*, Jointly with Gunnar König and Susanne Dandl, Summer Term 21

Philosophy of Artificial Intelligence, *MCMP*, Jointly with Prof. Stephan Hartmann, Winter Term 20/21

Ethics of Artificial Intelligence, *LMU Statistics Department*, Jointly with Florian Pfisterer, Christoph Molnar, Gunnar König, and Susanne Dandl, Winter Term 20/21

Teaching Assistant

Models and Simulations, *MCMP*, Led by Dr. Rush Stewart, Summer Term 20

Central Topics in Philosophy of Science, *LMU*, Led by Dr. Jürgen Landes, Winter Term 19/20

Linear Algebra 1, *LMU Mathematics Department*, Led by Dr. Peter Philip, Winter Term 18/19

Linear Algebra 2, *LMU Mathematics Department*, Led by Prof. Dr. Fabien Morel, Summer Term 18

Linear Algebra 1, *LMU Mathematics Department*, Led by Prof. Dr. Fabien Morel, Winter Term 17/18

Topology and Multivariable Differential Calculus, *LMU Mathematics Department*, Led by Prof. Dr. Franz Merkl, Summer Term 17

Analysis 1, *LMU Mathematics Department*, Led by Prof. Dr. Franz Merkl, Winter Term 16/17

Academic Service and Organization

Reviewing Philosophy
Synthese, Minds and Machines, Philosophy of Science, British Journal for Philosophy of Science, Erkenntnis, Studies in History and Philosophy of Science, Philosophy & Technology, European Journal for Philosophy of Science, AI & Society

Reviewing Machine Learning
Nature Machine Intelligence, Machine Learning, FAccT, AAAI, ICML workshop, NeurIPS workshop, World XAI Conference, Scientific Reports, Austrian Science Fund (FWF)

Workshop Organizer
Epistemology and Theory of Machine Learning, *LMU Munich*, 30-31 May 2025, Munich
jointly with Tom Sterkenburg & Katia Parshina

Philosophy of Science Meets Machine Learning, *Tübingen University*, 11-13 September 2024, Tübingen
jointly with Konstantin Genin, Thomas Grote, Markus Ahlers, Raysa Benatti, & Sebastian Zezulka

Tübingen, Hannover, and Friends Network Workshop, *Tübingen University*, 04-05 March 2024, Tübingen
jointly with Thomas Grote & Sebastian Zezulka

Philosophy of Science Meets Machine Learning, *Tübingen University*, 12-14 September 2023, Tübingen
jointly with Thomas Grote, Konstantin Genin & Sebastian Zezulka

LMU-Cambridge Workshop, *Topic: "AI in Science: Foundations and Applications"*, 9-10 June 2022, Munich
jointly with Stephan Hartmann & Tom Sterkenburg

Reading Group Organizer
ML Cluster Tübingen, *Topic: "Philosophy of Machine Learning"*, between 2022 and 2025, Tübingen
jointly with Sebastian Zezulka and Benedikt Höltgen

MCMP, *Topic: "Philosophy of Machine Learning"*, since summer term 2022, online
jointly with Tom Sterkenburg

Skills

Languages
German (native speaker), English (fluent), Spanish (good command), Norwegian (good command).

Computer Skills
Python (++), LaTeX(+++), MATLAB/Octave (++), Java (++), R (+), NetLogo (++), JavaScript (++), HTML (++), PHP (+), WebPPL (+), SQL (+).

Awards & Grants

10/2019–09/2022
Graduate School of Systemic Neuroscience, *Ph.D. fellowship*, 52,560€

25/07/2019
Mobility Innovation Competition @ Campus, *3rd prize in Startup competition*, Team: DeepGuardian, 8,000€
Deep-learning-software equipped camera board for violence detection that respects data privacy.

07/2018
Oskar-Karl-Forster-Scholarship, *book stipend*, 500€

06/2012 **School-Prize**, *best Abitur*

Conferences, Talks, Panels, etc.

10/09/2025-12/09/2025 **Keynote: KONVENS** , *Talk on "Dear XAI Community, We Need to Talk! Fundamental Misconceptions in Current XAI Research"*

09/09/2025-12/09/2025 **Conference: Society for Analytic Philosophy (GAP)**, *Contributed talk on "The Benchmarking Epistemology"*

28/07/2025-30/07/2025 **Conference: SAS on Uncertainty**, *Höchstleistungsrechenzentrum Stuttgart (HLRS)*, Contributed talk on "Uncertainty in Machine Learning from a Frequentist Perspective"

10/07/2025-11/07/2025 **Workshop: Epistemology and AI**, *University of Luxembourg*, Contributed talk on "Artificial Neural Nets and the Representation of Human Concepts"

01/07/2025-03/07/2025 **Conference: IACAP**, *University of Twente*, Contributed talk on "The Benchmarking Epistemology"

26/06/2025-27/06/2025 **Workshop: Machine Learning meets Scientific Understanding**, *TU Dortmund University*, Contributed talk on "The Benchmarking Epistemology"

10/06/2025-11/06/2025 **Workshop: Evidence & Uncertainty in Science**, *Tübingen Forum for Science and Humanities* , Invited talk on "Are Performance Gains on Benchmarks a Good Proxy for Progress in Machine Learning?"

30/05/2025-31/05/2025 **Workshop: Epistemology and Theory of Machine Learning**, *MCMP Munich*, Invited talk on "What is bare-bones machine learning still missing for a general scientific methodology?"

07/04/2025-08/04/2025 **Workshop: Learning Under Weakly Structured Information**, *Tübingen*, Invited talk on "What can post-hoc explanation methods tell us about our data?"

24/03/2025-26/03/2025 **Conference: GWP**, *Erlangen*, Contributed talk on "The Benchmarking Epistemology"

21/02/2025 **Talk Series: 10 minutes Talks**, *ML Cluster Tübingen*, Invited talk on "The Benchmarking Epistemology"

20/11/2024-21/11/2024 **Workshop: AI and the Future of Science**, *Lingnan University Hong Kong*, Invited talk on "Supervised Machine Learning for Science"

30/10/2024 **Panel Discussion: Can AI be responsible?**, *Munich School of Philosophy*, Panelist

17/07/2024-19/07/2024 **Conference: World XAI**, *Malta*, Contributed talk on "CountARFactuals – Generating plausible model-agnostic counterfactual explanations with adversarial random forests"

28/05/2024 **Workshop: generalization and overfitting**, *Höchstleistungsrechenzentrum Stuttgart (HLRS)*, Panelist

23/05/2024 **Talk Series: Applied AI**, *online*, Invited talk on "Scientific Inference With Interpretable Machine Learning: Analyzing Models to Learn About Real-World Phenomena"

10/04/2024-12/04/2024 **Workshop: ML, Explain Yourself!**, *Utrecht University*, Contributed talk on "Science as a Kaggle Challenge: How Benchmarking Impacts Scientific Methodology"

02/02/2024 **Seminar Series**, *Höchstleistungsrechenzentrum Stuttgart (HLRS)*, Paper discussion of "Beyond Generalization: A Theory of Robustness in Machine Learning"

08/11/2023-10/11/2023 **Worskhop: AI policy**, *Utrecht University, chaired by Emily Sullivan*, Whitepaper to inspire AI policy

2/11/2023 **Talk Series: UQSay**, *Paris-Saclay University (online)*, Contributed talk on "Supervised Machine Learning in Science"

24/10/2023-26/10/2023 **Conference: Artificial Intelligence, Trustworthyness, Explainability**, *Tübingen*, Contributed talk on "Dear XAI Community, We Need to Talk! Fundamental Misconceptions in Current XAI Research"

19/10/2023 **Panel Discussion: Ethical Engineering**, *Munich*, Bidt: Bavarian Research Institute for Digital Transformation, Panelist

21/08/2023-25/08/2023 **Conference: ECAP**, *Vienna*, Contributed talk on "Beyond Generalization: A Theory of Robustness in Machine Learning"

26/07/2023-28/07/2023 **Conference: World XAI**, *Lisbon*, Contributed talks on "Dear XAI Community, We Need to Talk! Fundamental Misconceptions in Current XAI Research" and "Relating the Partial Dependence Plot and Permutation Feature Importance to the Data Generating Process"

14/06/2023 **Panel Discussion: When do we blindly trust in AI?**, *Helmholtz AI, Hamburg*, Panelist

23/03/2023-24/03/2023 **Workshop: Epistemology and Theory of Machine Learning**, *MCMP*, Invited talk on "Beyond Generalization: A Theory of Robustness in Machine Learning", Munich

07/02/2023-12/02/2023 **Conference: AAAI**, *Washington D.C.*, Contributed talk & poster on "Improvement-Focused Causal Recourse (ICR)"

20/01/2023 **Talk Series: 10 minutes Talks**, *ML Cluster Tübingen*, Invited talk on "What Does Explainable AI Explain?"

27/10/2022-28/10/2022 **Workshop: Responsible Machine Learning in Healthcare**, *University of Copenhagen*, Poster on "What Does Explainable AI Explain?"

19/10/2022-22/10/2022 **Workshop: Philosophy of Science Meets Machine Learning**, *University of Tübingen*, Contributed talk on "Scientific Inference With Interpretable Machine Learning"

30/06/2022-01/07/2022 **Workshop: Philosophy of Science**, *University of Wuppertal*, Invited talk on "Scientific Inference With Interpretable Machine Learning"

21/06/2022-24/06/2022 **Conference: FAccT**, *Online Participation*

13/06/2022 **Panel Discussion: Science Summit of the Joint Research Centre of the European Commission**, *Panelist*

09/06/2022-10/06/2022 **Workshop: AI in Science: Foundations and Applications**, *LMU-Cambridge strategic partnership*, Invited talk on "Scientific Inference With Interpretable Machine Learning"

09/11/2021-12/11/2021 **Workshop: Philosophy of Science Meets Machine Learning**, *University of Tübingen*, Contributed talk on "To Explain and to Predict – Explanatory Machine Learning Models in Science"

24/07/2021 **Workshop: at ICML on Algorithmic Recourse**, *Online Event*, Poster on A Causal Perspective on Meaningful and Robust Algorithmic Recourse

19/05/2021 **Talk Series: MCMP**, *Invited talk on "Embrace the Complexity: The Paradigm Shift in Science From Statistics to Machine Learning"*, München, Germany (Online Event), Jointly with Christoph Molnar

12/04/2021-14/04/2021 **Workshop: Explainable Medical AI**, *NIAS, Leiden, the Netherlands (Online Event)*

17/07/2020 **Workshop: at ICML on Extending Explainable AI Beyond Deep Models and Classifiers**, *Vienna, Austria (Online Event)*, Poster on Pitfalls to Avoid when Interpreting Machine Learning Models

17/02/2020 - 18/02/2020 **Workshop: Prediction Without Explanation?**, *Karlsruhe (KIT)*, Contributed talk on Counterfactual Explanations & Adversarial Examples

14/01/2020 **Guest Lecture**, *MCMP*, Topic: The Wisdom of Crowds, Guest Lecture

27/07/2018 - 28/07/2018 **Workshop: Decision Theory & the Future of Artificial Intelligence**, *München (Jointly organized by the MCMP, the CFI, and the CSER)*

Other information

03/2019–09/2019 **Software Developer (working student)**, *Zentrum Digitalisierung.Bayern*, Garching,
Project: Working on the national research project MEMAP which contributes to the German energy transition strategy. MEMAP (Multi-Energy Management and Aggregation-Platform) optimally matches the local electricity- and heat demand/production for districts
Tasks: My work focused mainly on the software development of the platform in the programming language Java. In particular, I had the following tasks:
- programming the OPC-UA interfaces for handling live-data
- developing a Jetty-websocket and a website for online access to the platform (HTML, Javascript,etc.)
- configuration of server data for providing optimization results

10/2018–09/2019 **M.Sc. in Computer Science**, *Ludwig-Maximilians-Universität München (LMU)*, Taken courses on Deep Learning & AI
Without Graduation

09/2008–08/2010 **Advanced Technical College Entrance Qualification and apprenticeship as Business Informatics Assistant**, *GvSS Heilbronn*, Very Good

02/2008–09/2008 **EQJ-Internship as Salesman**, *Intersport Heilbronn*

09/2007–12/2007 **Apprenticeship for logistic manager**, *GFT Logistic GmbH Möckmühl*, Not completed

References

Prof. Dr. Stephan Hartmann
Chair and Head of the Munich Center for Mathematical Philosophy
Department of Philosophy, Philosophy of Science and the Study of Religion
Ludwig-Maximilians-Universität München
Contact no: + 49 (0) 89 / 2180 - 3320
Email: S.Hartmann@lmu.de

Dr. Thomas Grote
Research Fellow – Ethics and Philosophy Lab
Cluster of Excellence – Machine Learning for Science
Eberhard Karls Universität Tübingen
Email: thomas.grote@uni-tuebingen.de

Prof. Dr. Jan-Willem Romeijn
Professor of Philosophy of science
Faculty of Philosophy
University of Groningen
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Book Author
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Prof. Dr. Rush Stewart
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Department of Philosophy
University of Rochester
Email: rush.stewart@rochester.edu