

Emanuel Tewolde

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SELECTED EDUCATION

Carnegie Mellon University

PhD in Computer Science

Aug. 2022 – ca. Aug. 2027

Pittsburgh, USA

- Foundations of Cooperative AI Lab (FOCAL), Advisor: Vincent Conitzer
- Research Focus: Algorithmic Game Theory for AI systems
- Course Focus: Algorithmic Game Theory, Reinforcement Learning

Imperial College London

MSc in Pure Mathematics

Oct. 2020 – Oct. 2021

London, United Kingdom

- GPA (UK): 83.8%, Distinction → Ranked 1st out of 28 Graduates
- Focus: Geometry & Topology, Game Theory, Machine Learning

Technical University (TU) of Darmstadt

BSc in Mathematics with a minor in Economics

Oct. 2016 – Oct. 2019

Darmstadt, Germany

- GPA (Germany): 1,27
- Focus: Mathematical Optimization

INDUSTRY AND RESEARCH EXPERIENCES

Meta (contracting via Magnit)

Research Engineer at FAIR within Meta Superintelligence Labs

Sep. 2025 – ongoing

London, United Kingdom

- Working on LLM Coding Agents for AI Research (AIRA)

Carnegie Mellon University

Graduate Research Assistance, Working on Cooperative AI Research

Aug. 2022 – ca. Aug. 2027

Oxford, United Kingdom

University of Oxford

Extended Research Visits, Working on Cooperative AI Research

Summers of 2022–2025

Oxford, United Kingdom

Fraunhofer Institute for Energy Economics and Energy System Technology

Research Internship

Apr. 2020 – Jul. 2020

Kassel, Germany

- Working on Deep Learning on Graphs representing Energy Distribution Networks

Fraunhofer Institute for Energy Economics and Energy System Technology

Undergraduate Research Assistance

May 2019 – Oct. 2019 resp.

Kassel, Germany

- Working on Machine Learning Methods for Time Series Data representing Wind Turbine Maintenance Data

PUBLICATIONS

($\alpha\beta$) : alphabetical ordering, = : equal contribution

In Submission

- Emanuel Tewolde, Brian Hu Zhang, Ioannis Anagnostides, Tuomas Sandholm, Vincent Conitzer. Decision Making under Imperfect Recall: Algorithms and Benchmarks.
- Ratip Emin Berker⁼, Emanuel Tewolde⁼, Vincent Conitzer, Mingyu Guo, Marijn Heule, Lirong Xia. On the Edge of Core (Non-)Emptiness: An Automated Reasoning Approach to Approval-Based Multi-Winner Voting.
- Steffen Backmann, David Guzman Piedrahita, Emanuel Tewolde, Rada Mihalcea, Bernhard Schölkopf, Zhijing Jin. When Ethics and Payoffs Diverge: LLM Agents in Morally Charged Social Dilemmas.

Highly Refereed Conference Papers

- Chandler Smith, Marwa Abdulhai, ... (15 more authors) ..., Emanuel Tewolde, ... (66 more authors) ..., Jose Hernandez-Orallo, Joel Z Leibo. Evaluating Generalization Capabilities of LLM-Based Agents in Mixed-Motive Scenarios Using Concordia. In *Neural Information Processing Systems (NeurIPS)*, 2025.
- Brian Hu Zhang⁼, Ioannis Anagnostides⁼, Emanuel Tewolde, Ratip Emin Berker, Gabriele Farina, Vincent Conitzer, and Tuomas Sandholm. Learning and Computation of Φ -Equilibria at the Frontier of Tractability. In *ACM Conference on Economics and Computation (EC)*, 2025.
- Brian Hu Zhang⁼, Ioannis Anagnostides⁼, Emanuel Tewolde, Ratip Emin Berker, Gabriele Farina, Vincent Conitzer, and Tuomas Sandholm. Expected Variational Inequalities. In *International Conference on Machine Learning (ICML)*, **Oral** (Top 1.0% of submissions), 2025.
- Emanuel Tewolde, Brian Hu Zhang, Caspar Oesterheld, Tuomas Sandholm, and Vincent Conitzer. Computing Game Symmetries and Equilibria That Respect Them. In *Association for the Advancement of Artificial Intelligence (AAAI)*, **Oral** (Top 4.6% of submissions), 2025. **Best Poster Award** (out of 674 posters).
- Ratip Emin Berker, Emanuel Tewolde, Ioannis Anagnostides, Tuomas Sandholm, Vincent Conitzer. The Value of Recall in Extensive-Form Games. In *Association for the Advancement of Artificial Intelligence (AAAI)*, **Oral**, 2025.
- Emanuel Tewolde, Brian Hu Zhang, Caspar Oesterheld, Manolis Zampetakis, Tuomas Sandholm, Paul W. Goldberg, and Vincent Conitzer. Imperfect-Recall Games: Equilibrium Concepts and Their Complexity. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2024.
- Emanuel Tewolde and Vincent Conitzer. Game Transformations That Preserve Nash Equilibria or Best-Response Sets. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2024.
- ($\alpha\beta$) Vincent Conitzer, Rachel Freedman, Jobst Heitzig, Wesley H. Holliday, Bob M. Jacobs, Nathan Lambert, Milan Mossé, Eric Pacuit, Stuart Russell, Hailey Schoelkopf, Emanuel Tewolde, and William S. Zwicker. Social Choice Should Guide AI Alignment in Dealing with Diverse Human Feedback. In *International Conference on Machine Learning (ICML) – Position Paper Track*, 2024.
- Emanuel Tewolde, Caspar Oesterheld, Vincent Conitzer, and Paul Goldberg. The Computational Complexity of Single-Player Imperfect-Recall Games. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2023.

SELECTED SCHOLARSHIPS, GRANTS, AND AWARDS

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| • AAAI Best Poster Award (out of 674 posters) | 2025 |
| • PhD Fellowship, Cooperative AI Foundation | 2025 – present |
| • Research Grant, Cooperative AI Foundation, \$6750 | 2022 |
| • Scholarship, German Scholarship Foundation (Studienstift. des Deutschen Volkes), ~22,000€ | 2020 – 2022 |
| • Scholarship, Hessen-Wisconsin Exchange Program, ~\$10,000 | 2018 |

TEACHING EXPERIENCE

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| • Leading a Reading Group for the Cooperative AI Summer School | 2025 |
| • Graduate Teaching Assistant, Carnegie Mellon University | 2024 – 2025 |
| Sole TA for 15-784 Cooperative AI and 17-759 Advanced Topics in Machine Learning and Game Theory | |
| • Instructor for new Teaching Assistants, TU of Darmstadt | 2019 – 2020 |
| Taught and supervised 5 – 10 new TAs per semester for the mathematics department | |
| • Undergraduate Teaching Assistant, TU of Darmstadt | 2017 – 2019 |
| Introduction to Algebra, Analysis 2, Analysis 1 | |

INVITED TALKS

- Autonomous Reasoning & Learning Group, Imperial College London Jul. 2025
- Optimization Seminar, Technical University of Darmstadt Jun. 2025
- EconCS Seminar, Carnegie Mellon University Feb. 2025
- FAR.AI Nov. 2024
- Guest Lecture for 17-759 Adv. Top. in Machine Learning and Game Theory, Carnegie Mellon University Nov. 2024
- Foundation and Language Model (FLAME) Center, Carnegie Mellon University Sep. 2024
- Algorithmic Game Theory Seminar, University of Oxford Jun. 2024
- Google DeepMind London May 2024
- Fei Fang's AI and Social Good Lab, Carnegie Mellon University Apr. 2024

RELEVANT SKILLS

Software: Python ★★★★★, High-Performance & Distributed Computing ★★★★★, PyTorch ★★★★★, TensorFlow ★★★★★, Gym ★★★★★, Matlab ★★★★★, SQL ★★★★★, Microsoft Office ★★★★★
Languages: German ★★★★★, English ★★★★★, Amharic ★★★★★

FURTHER HIGHER EDUCATION

- Multiple Courses of the MSc in International Economics & Economic Policy at Goethe University Frankfurt 2019 – 2020
- MSc Specialization in Mathematical Optimization at the Technical University of Darmstadt 2019 – 2020
- Exchange Semester at the University of Wisconsin-Milwaukee 2018
- Taking a Mathematics Course at Goethe University Frankfurt as a High School Student 2015

SELECTED VOLUNTEERING

- Mentoring of more junior PhD students at Carnegie Mellon University 2023 – present
- Co-organizing the visiting days and introductory course for admitted and first-year PhD students resp. 2023 – present
- Academic Representative for Pure Mathematics at Imperial College London 2020 – 2021
- Coordinating Outreach Events for the International Office at the TU of Darmstadt 2019 – 2020
- Hessen-Student-Ambassador in Milwaukee 2018