

# Tom Zehle

PhD Researcher, Machine Learning

University of Freiburg / ELLIS Institute Tübingen · Research group of Frank Hutter

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PhD researcher working on prompt optimization and multi-agent system optimization. Research vision: automated design and optimization of multi-agent systems ("AutoML for Agents"). Task lead in the EU ELLIOT project (WP3). Previously data scientist at Airbus; M.Sc. in Statistics and Data Science from LMU Munich. First author of four public papers (one sole-authored); maintainer of the open-source framework promptolution.

## EXPERIENCE

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**PhD Researcher · University of Freiburg / ELLIS Institute Tübingen** Oct 2025 – present · Freiburg, Germany

- Research on prompt optimization and multi-agent system optimization.
- Task lead in the EU ELLIOT project (WP3, Task 3.3: fine-tuning of MGFMs).
- Author of five publications to date (four first-author, one sole-authored); see Publications below.
- Supervising B.Sc./M.Sc. students and a student assistant; see Supervision below.
- Reviewer for NeurIPS 2026 and Nature (2025).

**Data Scientist · Airbus** 2023 – 2025 · Munich, Germany

- Engineered a similarity-search model for the Eurofighter support center; now in production, used by system engineers to accelerate incident handling.
- Built fine-tuning scripts, a comprehensive evaluation framework, and production backend services and APIs for model deployment.
- Developed a prompt-optimization proof of concept and an AI-powered export-classification pipeline for sensitive documents.

**Dual Student, Data Science · Airbus** 2020 – 2023 · Munich / Ingolstadt / Getafe

- Practical phases across computer vision, traditional ML, and NLP.
- Built a transformer-tabular hybrid model to predict flight arrival times.
- Developed a computer-vision algorithm for the ExoMars rover project and a scene-change-detection system for production safety.

## EDUCATION

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**M.Sc. Statistics and Data Science · LMU Munich** 2023 – 2025

Machine Learning track. Grade: 1.1.

Thesis (1.0): "Understanding Temporal Structure in Text – A Study of Positional Encodings in LLMs"; published as the positional-encodings calibration paper at Findings of EACL 2026.

**B.Sc. Business Informatics (Data Science Specialization) · DHBW Ravensburg** 2020 – 2023

Dual study with Airbus. Grade: 1.4.

Thesis (1.0): fine-tuning transformers for similarity search across aircraft documentation and incident reports.

PUBLICATIONS

CANTANTE: Optimizing Agentic Systems via Contrastive Credit Attribution

Tom Zehle [arXiv preprint \(2026\)](#) [\[PDF\]](#) [\[code\]](#)

MO-CAPO: Multi-Objective Cost-Aware Prompt Optimization

Jan Büssing, Moritz Schlager, Timo Heiß, Tom Zehle, Matthias Feurer [arXiv preprint \(2026\)](#) [\[PDF\]](#)

Can Calibration of Positional Encodings Enhance Long Context Utilization?

Tom Zehle, Matthias Aßenmacher [Findings of EACL 2026](#) [\[PDF\]](#) [\[code\]](#)

promptolution: A Unified, Modular Framework for Prompt Optimization

Tom Zehle, Timo Heiß, Moritz Schlager, Matthias Aßenmacher, Matthias Feurer  
[EACL 2026 \(System Demonstrations\)](#) [\[PDF\]](#) [\[code\]](#)

CAPO: Cost-Aware Prompt Optimization

Tom Zehle, Moritz Schlager, Timo Heiß, Matthias Feurer [AutoML 2025](#) [\[PDF\]](#) [\[code\]](#)

SUPERVISION

- B.Sc./M.Sc. student research projects on multi-agent system optimization (two students).
- A student assistant supporting the research group.

AWARDS & MEDIA

|         |                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------|
| Award   | Airbus “Fly Your Ideas” Competition 2024, with L. Backhaus and N. Lethaus <a href="#">[link]</a>               |
| Podcast | “How does an Airbus data scientist keep up to date?”, Industrial AI Podcast, May 2025 <a href="#">[listen]</a> |
| Videos  | Paper walkthroughs and demos, e.g. the promptolution EACL 2026 demonstration <a href="#">[channel]</a>         |

SKILLS

|             |                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------|
| ML research | Prompt optimization, multi-agent systems, AutoML, LLM evaluation                              |
| Engineering | Python, PyTorch, open-source development (promptolution maintainer), agentic coding workflows |
| Statistics  | Experimental design, multi-objective optimization                                             |
| Languages   | German (native), English (fluent), Russian (intermediate), Spanish (basic)                    |