Dr. Philip Heltweg

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Education

Doctorate (Ph.D.), Computer Science — Erlangen, Germany
Friedrich-Alexander-University Erlangen-Nürnberg — *Dec 2021 — Sep 2025*

- Passed with distinction, achieving the best possible grade of 1.0
- Thesis: Open Collaborative Data Engineering With Subject-Matter Experts Using Domain-Specific Languages

Master of Science, Data Science — Hagen, Germany
University of Hagen — *Oct 2022 — Apr 2025*

- Completed alongside full-time employment and doctoral research
- Coursework included data engineering, knowledge-based systems, and symbolic AI

Master of Science, Practical Computer Science — Hagen, Germany
University of Hagen — *Apr 2020 — Oct 2021*

- Passed with distinction, achieving the best possible grade of 1.0
- Student assistant at the Chair of Knowledge-Based Systems (Prof. Dr. Beierle)
- Coursework included software engineering, software architecture, and theoretical computer science

Bachelor of Science, Information Systems — Münster, Germany
University of Münster — *2009 — 2012*

- Student assistant at the Databases and Information Systems Group (Prof. Dr. Vossen)

Work Experience

Isselthal Industries UG

Founder — Apr 2019 — Present
Raesfeld, Germany

Deliver custom software and applied AI projects, working directly with client leadership from requirements and technical evaluation through implementation and handover.

- **AI-assisted parking monitoring:** Built a prototype using an open-source camera platform and computer vision models. Evaluated detection methods against labelled video datasets and delivered event review and Slack alerts on the client's infrastructure within the original budget.
- **Coaching chatbot:** Built an AI evaluation pipeline and improved a chatbot intended to support people returning to work after burnout, enabling systematic assessment of response quality and safety.
- **Laboratory data extraction:** Built software to extract laboratory results from PDF documents.
- **Internal AI tooling:** Built an AI-agent environment on OpenCode, with custom skills and persistent memory, to support software engineering, research, and internal operations.

Friedrich-Alexander-University Erlangen-Nürnberg

Researcher — Dec 2021 — Nov 2025
Erlangen, Germany

- Developed Jayvee, an open-source domain-specific language for defining and executing data pipelines, designed to support collaboration with subject-matter experts.
- As part of a EUR 100,000 Software Campus grant with Springer Nature, hired and managed a team of software engineers and students to deliver a 19-month collaborative data-engineering research project.
- Conducted qualitative and quantitative research into collaborative data engineering, including controlled experiments, with results published in peer-reviewed journals.

ESL FACEIT GROUP

Senior Technical Product Manager Feb 2018 — Apr 2019
Cologne, Germany

Managed competitive gaming products and event platforms from initial pitch to market entry.

- Coordinated engineering and design priorities with C-level management and external partners including AT&T, Intel, and Valve Corporation.
- ESL Play App, competitive gaming, iOS/Android (2M+ installs, 100k+ MAU, 4+ avg rating)
- ESL Event App, esports stadium events, iOS/Android (30+ events, 4+ avg rating)
- DotA game integration, automated tournament management for 1k+ concurrent teams
- Hearthstone game integration, technical feasibility evaluation and prototype development with external partners

Technical Product Manager & Lead Developer ESL Mobile Mar 2015 — Feb 2018
Cologne, Germany

Led mobile product development using TypeScript, Java, HTML5/CSS, Ionic, Angular, Cordova, and Play Framework.

- Established and led the mobile development team, hiring software engineers and designers
- Published three apps on iOS and Android: ESL Play App, ESL Event App, and ESL Katowice App
- Created and maintained backend infrastructure for mobile apps
- Planned software architecture and infrastructure spending

Full Stack Software Developer Jan 2013 — Mar 2015
Cologne, Germany

Developed matchmaking and tournament services for ESL Play with 9+ million registered users.

- Transitioned a legacy PHP4 monolith to microservice architecture in Java
- Delivered multiple releases daily as part of a Scrum team

Grants & Awards

Software Campus, 2022

Awarded EUR 100,000 in research funding through a competitive development program for future IT leaders, funded by Germany's Federal Ministry of Education and Research, with Springer Nature as industry partner.

- Completed six management training courses with industry partners such as Volkswagen, Merck, Software AG, TRUMPF, DATEV, and Holtzbrinck Publishing Group

Other Experience

Teaching:

- Advisor for 14 M.Sc./B.Sc. theses and projects, Friedrich-Alexander-University Erlangen-Nürnberg, 2022 - 2025
- Developed and taught a course on advanced methods of data engineering to 450+ students, Friedrich-Alexander-University Erlangen-Nürnberg, 2023 - 2025
- Guest lecturer on microservices for the course "Advanced Software Engineering" at TH Nürnberg Georg Simon Ohm, 2026

Languages:

- German (native)
- English (fluent)
- French (A2)
- Portuguese (basic)

Academic Service

Peer reviewing, 2022 - present:

- Journal of Computer Languages (COLA)
- Communications of the Association for Information Systems (CAIS)
- Empirical Software Engineering (EMSE)
- Hawaii International Conference on System Sciences (HICSS)
- International Conference on Software Business (ICSOB)

Scientific Publications

[1] J. Jablonski, G.-D. Schwarz, P. Heltweg, and D. Riehle, "Optimization Opportunities for Cloud-Based Data Pipeline Infrastructures," *arXiv [cs.DC]*, Apr. 2026, [Online]. Available: https://arxiv.org/abs/2604.01954

[2] P. Heltweg, G.-D. Schwarz, and D. Riehle, "Can a domain-specific language improve program structure comprehension of data pipelines? A mixed-methods study," *Empirical Software Engineering*, vol. 31, no. 1, p. 38, Feb. 2026, doi: 10.1007/s10664-025-10746-7.

[3] P. Heltweg, "Open Collaborative Data Engineering With Subject-Matter Experts Using Domain-Specific Languages," Doctoral dissertation, Erlangen, Germany, 2025.

[4] G.-D. Schwarz, P. Heltweg, and D. Riehle, "Balancing technology heterogeneity in microservice architectures," *Empirical Software Engineering*, vol. 30, no. 5, pp. 1–46, Oct. 2025, doi: 10.1007/s10664-025-10684-4.

[5] P. Heltweg, G.-D. Schwarz, R. Dirk, and Q. Felix, "An Empirical Study on the Effects of Jayvee, a Domain-Specific Language for Data Engineering, on Understanding Data Pipeline Architectures," *Software: Practice & Experience*, 2025, doi: 10.1002/SPE.3409.

[6] P. Heltweg, D. Riehle, and G.-D. Schwarz, "Is spreadsheet syntax better than numeric indexing for cell selection?," *arXiv [cs.PL]*, May 2025, [Online]. Available: https://arxiv.org/abs/2505.23296

[7] P. Heltweg and D. Riehle, "A Systematic Analysis of Problems in Open Collaborative Data Engineering," *Trans. Soc. Comput.*, vol. 6, no. 3–4, pp. 1–30, Dec. 2023, doi: 10.1145/3629040.

[8] P. Heltweg and D. Riehle, "Challenges to Open Collaborative Data Engineering," in *Proceedings of the 56th Hawaii International Conference on System Sciences*, T. X. Bui, Ed., Hyatt Regency Maui, Jan. 2023, pp. 679–688. doi: https://hdl.handle.net/10125/102714.

[9] K. Sauerwald, P. Heltweg, and C. Beierle, "Certification of Iterated Belief Changes via Model Checking and its Implementation," in *19th International Workshop on Non-Monotonic Reasoning (NMR 2021), Hanoi, Vietnam, November 2-5, 2021, Proceedings*, L. Amgoud and R. Booth, Eds., 2021, pp. 250–254. [Online]. Available: https://nmr.cs.tu-dortmund.de/proceedings/NMR2021Proceedings.pdf#page=257

[10] K. Sauerwald and P. Heltweg, "On Using Model Checking for the Certification of Iterated Belief Changes," in *Proceedings of the 7th Workshop on Formal and Cognitive Reasoning co-located with the 44th German Conference on Artificial Intelligence (KI 2021), Berlin, Germany, September 28, 2021*, C. Beierle, M. Ragni, F. Stolzenburg, and M. Thimm, Eds., in CEUR Workshop Proceedings, vol. 2961. CEUR-WS.org, 2021, pp. 23–33. [Online]. Available: http://ceur-ws.org/Vol-2961/paper_3.pdf

[11] P. Heltweg, "Implementing a Structured Approach to Belief Revision by Deterministic Switching Between Total Preorders," Master's thesis, 2021.