Philipp Stark

Doctor Rer. Nat. Computer Science

Department of Human Geography, Lund University
Sölvegatan 10, 223 62 Lund, Sweden

+49 157 8600 6832 |philipp.stark@keg.lu.se | https://portal.research.lu.se/en/persons/philipp-stark

Academic Positions

Lund University, Sweden

Postdoctoral Fellow — *Since Sep '24*
Department of Human Geography. Focus: (Causal) Machine Learning, Representation Learning, Computational Social Science and Statistics

Leading the Hägerstrand Lab — *Since March '26*
Responsible for the development, coordination, and ongoing management of this computational lab within the Department, including personnel, resources, and research infrastructure. My role includes providing consultancy for computationally intensive projects, offering guidance on high-performance computing (HPC) solutions, and ensuring effective team structure and operations.

University of Tübingen, Germany

Researcher — *Nov '20 - June '24*
Researcher during doctoral studies at the Hector Research Institute of Education Sciences and Psychology.

Research Project Coordination & Technical Lead
Coordinated multi-study VR research projects, overseeing experimental planning, scheduling, and execution, while leading the full technical setup, maintenance, and in-situ support of VR hardware, software, and data pipelines during experimental sessions http://vre-tuebingen.de/.

Education

University of Tübingen, Germany

Dr. rer. nat. (Computer Science) — *July '24*
Towards Effective Virtual Reality Learning Environments: Assessment of Information Processing and Learning through Eye Tracking http://dx.doi.org/10.15496/publikation-96637

M.Sc. Cognitive Science — *Oct '20*

B.Sc. Mathematics — *Dec '18*

B.A. Media Science & Political Science — *March '16*

Publications

2026

Stark, P., Sopasakis, A., Hall, O., & Grillitsch, M. (2026). Using text-based life trajectories from swedish register data to predict residential mobility with pretrained transformers. *Advances in Knowledge Discovery and Data Mining, Lecture Notes in Artificial Intelligence (LNAI)*, *16600*. https://doi.org/10.1007/978-981-92-1468-6_34

Lau, K. H. C., **Stark, P**., Bozkir, E., & Kasneci, E. (2026). Skin-deep bias: How avatar appearances shape perceptions of AI hiring. *Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems, Chi '26*. https://doi.org/10.1145/3772318.3790379

Daltoè, T., Appel, T., **Stark, P**., Brucker, B., Dreher, A., Fauth, B., Friesen, M., Gerjets, P., Hansen, L., Trautwein, U., & Göllner, R. (2026). How is preservice teachers' gaze during classroom observation connected to their assessments of teaching quality? A controlled study in screen-based and immersive video environments. *Learning and Instruction*, *101*, Article 102260. https://doi.org/10.1016/j.learninstruc.2025.102260

Bueno, I., Bühler, B., **Stark, P**., Fütterer, T., Trautwein, U., Demszky, D., Hill, H., & Kasneci, E. *From scoring to explanations: Evaluating SHAP and LLM rationales for rubric-based teaching quality assessment* (accepted at ACL 2026).

2025

Göllner, R., Lazarides, R., & **Stark, P.** (2025). Revealing teaching quality through lesson semantics: A GPT -assisted analysis of transcripts. *British Journal of Educational Psychology*, bjep.70001. https://doi.org/10.1111/bjep.70001

Lau, K. H. C., Sen, S., **Stark, P**., Bozkir, E., & Kasneci, E. (2025). Adaptive Gen-AI Guidance in Virtual Reality: A Multimodal Exploration of Engagement in Neapolitan Pizza-Making. *ICMI 2025.* https://doi.org/10.48550/ARXIV.2411.18438

2024

Stark, P., Jung, A. J., Hahn, J.-U., Kasneci, E., & Göllner, R. (2024). Using Gaze Transition Entropy to Detect Classroom Discourse in a Virtual Reality Classroom. *Proceedings of the 2024 Symposium on Eye Tracking Research and Applications*, 1–11. https://doi.org/10.1145/3649902.3653335

Stark, P., Bozkir, E., Sójka, W., Huff, M., Kasneci, E., & Göllner, R. (2024). The impact of presentation modes on mental rotation processing: A comparative analysis of eye movements and performance. *Scientific Reports*, *14*(1), 12329. https://doi.org/10.1038/s41598-024-60370-6

Stark, P., Hasenbein, L., Kasneci, E., & Göllner, R. (2024). Gaze-based attention network analysis in a virtual reality classroom. *MethodsX*, *12*, 102662. https://doi.org/10.1016/j.mex.2024.102662

Ferdinand, J., Gao, H., **Stark, P.**, Bozkir, E., Hahn, J.-U., Kasneci, E., & Göllner, R. (2024). The impact of a usefulness intervention on students' learning achievement in a virtual biology lesson: An eye-tracking-based approach. *Learning and Instruction*, 90, 101867. https://doi.org/10.1016/j.learninstruc.2023.101867

Stark, P. (2024). Towards Effective Virtual Reality Learning Environments: Assessment of Information Processing and Learning through Eye Tracking http://dx.doi.org/10.15496/publikation-96637

2023

Gao, H., Bozkir, E., **Stark, P.,** Goldberg, P., Meixner, G., Kasneci, E., & Göllner, R. (2023). Detecting Teacher Expertise in an Immersive VR Classroom: Leveraging Fused Sensor Data with Explainable Machine Learning Models. *2023 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, 683–692. https://doi.org/10.1109/ISMAR59233.2023.00083

Hasenbein, L., **Stark, P.,** Trautwein, U., Gao, H., Kasneci, E., & Göllner, R. (2023). Investigating social comparison behaviour in an immersive virtual reality classroom based on eye-movement data. *Scientific Reports*, 13, 14672. https://doi.org/10.1038/s41598-023-41704-2

Stark, P., Appel, T., Olbrich, M., & Kasneci, E. (2023) Pupil Diameter during Counting Tasks as Potential Baseline for Virtual Reality Experiments. *In Proceedings of the 2023 Symposium on Eye Tracking Research and Applications (ETRA '23)*. Association for Computing Machinery, New York, USA, 17, 1–7. https://doi.org/10.1145/3588015.3588414

2021-22

Hasenbein, L., **Stark, P.,** Trautwein, U., Queiroz, A. C. M., Bailenson, J., Hahn, J.-U., & Göllner, R. (2022). Learning with simulated virtual classmates: Effects of social-related configurations on students' visual attention and learning experiences in an immersive virtual reality classroom. *Computers in Human Behavior*, 133, 107282. https://doi.org/10.1016/j.chb.2022.107282

Bozkir*, E., **Stark*, P.,** Gao, H., Hasenbein, L., Hahn, J.-U., Kasneci, E., & Göllner, R. (2021). Exploiting Object-of-Interest Information to Understand Attention in VR Classrooms. *2021 IEEE Virtual Reality and 3D User Interfaces*, 597–605. https://doi.org/10.1109/VR50410.2021.00085 (***both authors contributed equally**)

In Preparation

Stark, P., van Borris, A., Grillitsch, M., Hall, O., & Sopasakis, A., Empirical Evaluation of Temporal Harmonization of Industry Classifications with Swedish Microdata *(in preparation for submission to Economics Letters)*

Stark P., & Grillitsch, M, Machine Learning - A Realist Perspective *(in preparation for submission to the* Journal of Economic Geography *special issue "Advancing Economic GeoAI")*

Stark, P., & Grillitsch, M. When Do Related Industries Become Unrelated? Latent Industry Representations and the Dynamics of Related Variety

Stark, P., Sopasakis, A., Hall, O., & Grillitsch, M. Latent Career Representations Reveal Human Capital Flows, Career Trajectories, and Knowledge Spillovers

Projects

Stark, P., Hall, O., Sopasakis, A., & Grillitsch, M., *NEXUS – Machine Learning on Register Data*

Stark, P., Erlström, A., Grillitsch, M., Hall, O., & Sopasakis, A., *Temporal Harmonization of Industry Classifications with Swedish Register Data* https://portal.research.lu.se/en/projects/temporal-harmonization-of-industry-classifications-with-swedish-r

Stark, P., Hall, O., Ekström, E. C., Jirström, M. *AI-Powered Store Insights: Analyzing Advertising in Ethiopian Souk Shops using Vision Language Models*

Friedrich, J., **Stark, P**., Cardona, M. & Stihl, L., *Evaluating Adaptation and Policy Failure in EU Textile Waste Governance Using AI-Supported Newspaper Analysis*

Yuan, L., **Stark, P,** & Grillitsch, M. *Detect Inter-Firm Knowledge Connectivity Combining Mobile Phone and Register Data*

Melgaco, L., Coelho, L. X. P., Schreiber, F., & **Stark, P.** *Racial Spatial Inequality and Urban Transformation in Brazil: A Three-Decade Grid-Based Census Analysis of Racial Concentration, Mega-Projects, and Socioeconomic Change*

Stark, P., *Causal Machine Learning and Latent Representations in Social Science*

Funding and Grants

Awarded

Principal Investigator (PI)
Stark, P., Erlström, A., Grillitsch, M., Hall, O., Sopasakis, A.
Temporal Harmonization of Industry Classifications with Swedish Register Data
AI Lund Initiative, Lund University — **SEK 62,391**
Project portal: https://portal.research.lu.se/en/projects/temporal-harmonization-of-industry-classifications-with-swedish-r

Applications and Participation (Ongoing / Submitted)

Co-Applicant
Hall, O., Stark, P., Toger, M., & Sopasakis, A.
Calibrated Earth Observation for Climate–Health Attribution: Quantifying Temperature–Mortality and Temperature–Morbidity Relationships in Sweden, 1990–2020
Swedish National Space Agency — Utlysning 2026-R

Participating Researcher
Östh, J., Dahlberg, M., Stark, P., Hall, O.
Migration and Resilience in a Changing World: A Global Spatial Analysis Using Demographic and Remote Sensing Data

Co-Principal Investigator (Co-PI)
Friedrich, J., Jessen, S., Stark, P.
Leveraging Large-Scale Newspaper Data to Uncover Regional Negotiations of the Green Transition in the EU
Crafoord Foundation

Project Partner
HORIZON-CL2-2026-01-TRANSFO-02: Open topic: Strengthening Europe's social model and sustainable competitiveness through productivity
Consortium including: Lund University, University of Bologna, Austrian Institute of Technology, Nicolaus Copernicus University, University of Pécs, Charles University

Rejected

Principal Investigator (PI)
Stark, P., Martynovich, M.,
Social Data Analysis in a Data-Saturated World
X-course Initiative, Education Committee, Lund University (Development of interdisciplinary course proposal)

Co-Principal Investigator
Mattsson, P., Stark, P., Hall, O., Grillitsch, M.
Life Trajectories and Rural Renewal: Explaining Entrepreneurial Pathways of Urban-to-Rural Movers
Kamprad Family Foundation for Entrepreneurship, Research & Charity

Project Partner
HORIZON-CL2-2025-01-DEMOCRACY-04
Consortium including: Joanneum Research; Deutsches Zentrum für Luft- und Raumfahrt (DLR); Fondation pour la Recherche Stratégique; Școala Națională de Studii Politice și Administrative; University of Warsaw

Project Partner
HORIZON-CL2-2025-01-TRANSFO-02

Consortium including: University of Bologna, Lund University, Austrian Institute of Technology, Nicolaus Copernicus University, University of Pécs, Charles University

Presentations

**presenting author*

Organized Workshops

Stark, P.* & Forsyth, R.*, Workshop on *Generative AI Tools in University Education*, 2025, Lund University

Recent Invited Talks

Stark, P., Learning from Registers - *GeoAI and Mechanism of Machine Learning* in the Context of Large-Scale Register Data. Nobel-X 2025 // PhD X 2025. Oslo Metropolitan University.

Stark, P., Machine Learning for Modeling Dynamics in the Swedish Labor Market, 2025 Mixed Methods Research Conference, Halmstad University

Stark, P., Eye Tracking in Education Research, Guest Lecturer: 2023 Block Course on Eye Tracking, Chair for Human-Centered Technologies for Learning, Technical University of Munich, Germany

Recent Talks

Stark, P., & Göllner, R**.** *Linking Teachers' Self-Efficacy with Effective Learning: Testing the Mediational Path Through Classroom Semantics.* Symposium contribution at the 13th Congress of the Society for Empirical Educational Research (GEBF 2026), Potsdam, Germany.

Bueno, I., Bühler, B., **Stark, P.,** Fütterer, T., Trautwein, U., Demszky, D., Hill, H., & Kasneci, E**.** *From Scoring to Teacher Feedback: NLP-based Teaching Quality Score Interpretability with SHAP Values.* Symposium contribution at the 13th Congress of the Society for Empirical Educational Research (GEBF 2026), Potsdam, Germany.

Stark, P.*, Predicting Household and Workplace Mobility in Sweden from Individual Life Trajectories with Transformers, 2025 CIRCLE Research Symposium, Lund University (upcoming)

Stark, P.* Machine Learning for Modeling Dynamics in the Swedish Labor Market – Opportunities and Challenges, 2025, Centre for Innovation Research CIRCLE, Lund University

Göllner, R.*, **Stark, P.**, Hasenbein, L., Stürmer, K., Goldberg, P., Recognizing Student Disruptions in a VR Classroom: An Expertise Comparison Using Behavioral Process Data. 2023 Working Group for Empirical Pedagogical Research (AEPF), Potsdam, Germany

Stark, P.*, Gao, H., Goldberg, P., Bozkir, E., Kasneci, E., Göllner, R., Machine Learning for Analyzing Professional Vision in the Virtual Classroom. Symposium on Classroom Experience in Virtual Reality as an Opportunity for Teacher Education. 2023 GEPF conference (Society for Empirical Educational Research), Essen, Germany

Stark, P.*, Hasenbein, L., Bozkir, E., Gao, H., Kasneci, E., The Use of Eye Tracking in Virtual Reality in Educational Research. Symposium on Virtual Realities in Empirical Teaching-Learning Research. 2022 GEPF conference (Society for Empirical Educational Research), Bamberg, Germany

Goldberg, P.*, Göllner, R., Hasenbein, L., **Stark, P.**, Stürmer, K. Recognizing Classroom Disruptions as Relevant: An Expertise Comparison in the Virtual Classroom. Symposium on Keeping an eye on the classroom: New insights into situation-specific skills of inexperienced teachers in the context of effective classroom management. 2022 GEPF conference (Society for Empirical Educational Research), Bamberg, Germany

Bozkir, E., **Stark, P.***, Gao, H., Hasenbein, L., Hahn, J.-U., Kasneci, E., & Göllner, R. Exploiting Object-of-Interest Information to Understand Attention in VR Classrooms. 2021 IEEE Virtual Reality and 3D User Interfaces Conference, Virtual

Posters

Stark, P., Bozkir, E., Huff, M., Sójka W.*, Kasneci, E., & Göllner, R., The Impact of Presentation Modes on Mental Rotation Processing. NeNa 2023 (Neuroscience Young Investigators Conference), Frankfurt, Germany

Stark, P.*, Appel, T., Olbrich, M., Kasneci, E. Pupil Diameter during Counting Tasks as Potential Baseline for Virtual Reality Experiments. 2023 ACM Symposium of Eye Tracking Research & Applications (ETRA)

Teaching Experience

I have accumulated 723.5 registered (~850 currently) hours in total. My teaching spans quantitative methods, statistics, computer-based data analysis, and research methodology.

• **2026 Course development (assigned)** activity for the 30 ECTS course in Spatial Data Analysis within the free-standing modules of the bachelor's program in Human Geography.

• ***2026*** *– Research Design and Methods in Development Studies (Master of Science Programme in International Development and Management (LUMID))***,** *Introduction to Quantitative Research (SGEA23, Human Geography, 30 ECTS; UTVC24, Development Studies, 15 ECTS), Bachelor Thesis Preparation Course (SGEK03 Research Methods).*

• ***2025*** *– Bachelor Thesis Preparation Course (SGEK03 Research Methods) [47h]. Introduction to Quantitative Approaches (SGEA23, Human Geography, 30 ECTS; UTVC24, Development Studies, 15 ECTS) [99h].*

• ***2023**** *– Seminar: Quantitative Data Analysis (Evaluation: 1.8).*

• ***2022**** *– Seminar: Computer-based Data Analysis (Evaluation: 1.3). Seminar: Quantitative Data Analysis (Evaluation: 1.1).*

• ***2021**** *– Seminar: Computer-based Data Analysis (Evaluation: 1.6). Seminar: Quantitative Data Analysis (Evaluation: 1.4).*

In addition, I have supervised bachelor's theses in both education science and computer science, combining methodological guidance with academic writing support. Furthermore, I am engaging in non-official PhD supervision in different projects.

**Responsible for the complete seminar (see attachment for hours). German universities grading scheme: 1.0 - 1.5 (very good); 1.51 - 2.5 (good); 2.51 - 3.5 (satisfactory); 3.51 - 4.0 (sufficient); >4 (not sufficient)*

Pedagogical Training

2026	**[admitted] Course Development in Higher Education** at the Division for Higher Education Development, Lund University (2 weeks)
2025	**Teaching and Learning in Higher Education** at the Division for Higher Education Development, Lund University (2 weeks)
2025	**Teaching and Learning Research Methods in Social Sciences** at the Social Science Faculty, Lund University (2 weeks) (to be completed)
2019	Mathematik Lehren Lernen (**Learn to teach mathematics**, 2 ETCS)

Mentoring

2022 Bennet Blum, **Bachelor thesis in computer science**, University of Tübingen

2022 Katja Schnitzer, **Bachelor thesis in education science**, University of Tübingen

2021-2022 **Weronika Sójka** was student assistant in my VR project, is now a PhD candidate with the International Max Planck Research School (IMPRS) in Tübingen. I supervised her work on the project.

Reviewing

2026 *CVPR 2026 Workshop GAZE, Member of ICMI 2026 Program Committee, ISMAR26*

2026 *Acta Psychologica*

2025 *Acta Psychologica, PLOS Computational Biology, Journal of Human-Computer Interaction, Cerebral Cortex*

2025 Computer Science Conferences: *ISMAR 2025 (2 papers), ETRA 2025 (2 short papers), ETRA 2025 GenEAI*

2024 *International Journal of Human-Computer Interaction*

2024 Computer Science Conferences: *ETRA 2024 ETVIS, AMCIS 2024 Papers, ISMAR 2024 Journal Papers*

Professional Development

Service and Outreach

2026 **Co-Organizer**, EU-SPRI Autumn School (Early Career Research Training) *Responsible AI for Science, Technology, Innovation, and Policy* CIRCLE, Lund University, Lund, Sweden (Autumn 2026)

2025 **Interview Committee Member** - Assistant Professor in Human Geography with a Focus on (Geo)AI, Regional Development, and Spatial Planning *Department of Human Geography, Lund University*

2024 Workshop on **Writing a Grand Proposal**

2024 Workshop on **Negotiation Skills and Moderation**

2023-2024 **Student volunteer chair**, 2024 Eye Tracking Research and Applications (ETRA) conference in Glasgow, England

2023 **Cooperation for science communication in practice**, Seminar for Training and Further Education of Teachers Stuttgart (for vocational schools), Stuttgart, Germany

2022-2023 **Student volunteer chair and technical support**, 2023 Eye Tracking Research and Applications (ETRA) conference in Tübingen, Germany

2021-2022 **PhD representative**, LEAD Graduate School and Research Network

2016-2017 **Erasmus** at the University of Manchester in Mathematics

2016 **BA thesis presentation**, Summer School Risky Understanding at the University of North Carolina

Since 2019 **Election worker**, Regional and national elections of the Federal Republic of Germany

Professional Experience

2019-2020 **Academic Tutor**, Mathematics in Computer Science, Department of Computer Science, University of Tübingen

2017-2019 **Research Assistant**, Knowledge Construction Department, Leibniz-Institut für Wissensmedien, Tübingen

2014-2015 **Research Assistant**, Empirical Media Research Department, Institute of Media Studies, University of Tübingen

2014-2015 **Academic Tutor**, Introduction to Media Science, Institute of Media Studies, University of Tübingen

Membership & Affiliations

Affiliated with the **Swedish Competence Centre for Satellite Enabled Social Science Analytics** https://sesac.se

Affiliated with **AI Lund -** An open network for research, education and innovation in the area of Artificial Intelligence at Lund University https://www.ai.lu.se/philipp-stark (Sweden)

Associated Member of the **Centre for Innovation Research CIRCLE**, Lund University (Sweden)

Affiliated with the **Social Science Methods Center – Division: Computational Social Science** https://www.sam.lu.se/en/research/lund-social-science-methods-centre/computational-social-science (Sweden)

Affiliated with **Climate AI Nordics** https://climateainordics.com/ (RISE Research Institutes of Sweden AB, Sweden)

PhD Candidate in the **LEAD Graduate School and Research Network**. https://uni-tuebingen.de/en/research/core-research/lead-graduate-school-research-network/

Associate Member of the **Society for Empirical Educational Research** (GEPF, Germany)