

# Conrad Borchers

✉ cborcher@cs.cmu.edu | 🌐 www.cborchers.com

## Education

### Carnegie Mellon University

HUMAN-COMPUTER INTERACTION, PhD

Pittsburgh, PA

08/2022 - present

### University of Oxford

SOCIAL DATA SCIENCE, MSc

Oxford, United Kingdom

10/2021 - 08/2022

### University of Tübingen

PSYCHOLOGY, BSc

Tübingen, Germany

10/2018 - 07/2021

## Professional Experience

- 08/2022 - **Graduate Research Assistant**, Human-Computer Interaction Institute, Carnegie Mellon University
- 02/2020 - **Research Affiliate**, Lab of Christian Fischer, University of Tübingen
- 11/2021 - 07/2022 **Student Researcher and Team Lead**, Oxford Artificial Intelligence Society
- 11/2021 - 07/2022 **Graduate Research Assistant**, Saïd Business School, University of Oxford
- 05/2021 - 09/2021 **Research Intern**, CAHL Lab (Zach Pardos), University of California, Berkeley
- 08/2020 - 01/2021 **Undergraduate Research Assistant**, Tübingen School of Education
- 02/2019 - 07/2020 **Undergraduate Research Assistant**, Leibniz Knowledge Media Research Center (IWM)

## Publications

### JOURNAL ARTICLES

- J8 – Karumbaiah, S., **Borchers, C.**, Falhs, A.-C., Holstein, K., Rummel, N., & Aleven, V. (revise and resubmit). Seeing the Unseen: A Multimodal Conceptualization and Measurement of AI-Augmented Teacher Noticing in Human-AI-Partnered Classrooms. Manuscript submitted to the *Journal of Educational Psychology*.
- J7 – **Borchers, C.**, Rosenberg, J., & Swartzentruber, R. M. (2023). Facebook Post Data: A Primer for Educational Research. *Educational Technology Research and Development*. <https://doi.org/10.1007/s11423-023-10269-2>
- J6 – **Borchers, C.**, Eder, T. F., Richter, J., Keutel, C., Huettig, F., & Scheiter, K. (2023). A Time Slice Analysis of Dentistry Students' Visual Search Strategies and Pupil Dilation during Diagnosing Radiographs. *PloS one*. <https://doi.org/10.1371/journal.pone.0283376>
- J5 – Pardos, Z. A., **Borchers, C.**, & Yu, R. (2023). Credit hours is not enough: Explaining undergraduate perceptions of course workload using LMS records. *The Internet and Higher Education*, 56, 100882. <https://doi.org/10.1016/j.iheduc.2022.100882>
- J4 – Rosenberg, J., **Borchers, C.**, Burchfield, M., Anderson, D., Stegenga, S., & Fischer, C. (2022). How educational institutions reveal students' personally identifiable information on Facebook. *Learning, Media and Technology*. Advanced Online Publication. <https://doi.org/10.1080/17439884.2022.2140672>
- J3 – Rosenberg, J., **Borchers, C.**, Burchfield, M., Anderson, D., Stegenga, S., & Fischer, C. (2022). Posts About Students on Facebook: A Data Ethics Perspective. *Educational Researcher*. Advanced Online Publication. <https://doi.org/10.3102/0013189X221120538>
- J2 – Rosenberg, J., Burchfield, M., **Borchers, C.**, Gibbons, B., Anderson, D., & Fischer, C. (2021). Social media and students' privacy: What schools and districts should know. *Phi Delta Kappan*, 103(2), 49-53. <https://doi.org/10.1177/00317217211051145>
- J1 – Rosenberg, J., **Borchers, C.**, Dyer, E., Anderson, D. & Fischer, C. (2021). Understanding Public Sentiment About Educational Reforms: The Next Generation Science Standards on Twitter. *AERA Open*, 7(1), 1-17. <https://doi.org/10.1177/23328584211024261>

## CONFERENCE PROCEEDINGS [PEER-REVIEWED]

- C10 – **Borchers, C.**, Wang, Y., Karumbaiah, S., Ashiq, M., Shaffer, D. W., & Aleven, V. (in-press). Revealing Networks: Understanding Effective Teacher Practices in AI-Supported Classrooms using Transmodal Ordered Network Analysis. *Proceedings of the 14th International Learning Analytics and Knowledge Conference (LAK)*. Kyoto, Japan. ACM. <https://doi.org/10.1145/3636555.3636892>
- C9 – **Borchers, C.**, Zhang, J., Baker, R. S., & Aleven, V. (in-press). Using Think-Aloud Data to Understand Relations between Self-Regulation Cycle Characteristics and Student Performance in Intelligent Tutoring Systems. *Proceedings of the 14th International Learning Analytics and Knowledge Conference (LAK)*. Kyoto, Japan. ACM. <https://doi.org/10.1145/3636555.3636911>
- C8 – **Borchers, C.**, Carvalho, P. F., Xia, M., Liu, P., Koedinger, K. R., & Aleven, V. (2023). What Makes Problem-Solving Practice Effective? Comparing Paper and AI Tutoring. *Proceedings of the 18th European Conference on Technology Enhanced Learning (EC-TEL)*. Aveiro, Portugal.
- C7 – Karumbaiah, S., **Borchers, C.**, Shou, T., Falhs, A.-C., Liu, C., Nagashima, T., Rummel, N., & Aleven, V. (2023). A Spatiotemporal Analysis of Teacher Practices in Supporting Student Learning and Engagement in an AI-enabled Classroom. *Proceedings of the 24th International Conference on Artificial Intelligence in Education (AIED)*. Tokyo, Japan.
- C6 – Shou, T., **Borchers, C.**, Karumbaiah, S., & Aleven, V. (2023). Optimizing Parameters for Accurate Position Data Mining in Diverse Classrooms Layouts. *Proceedings of the 16th International Conference on Educational Data Mining (EDM)*. Bengaluru, India.
- C5 – **Borchers, C.**, Klein, L., Johnson, H., & Fischer, C. (2023). Timing Matters: Inferring Educational Twitter Community Switching from Membership Characteristics. *Proceedings of the 16th International Conference on Educational Data Mining (EDM)*. Bengaluru, India.
- C4 – Karumbaiah, S., **Borchers, C.**, Falhs, A.-C., Holstein, K., Rummel, N., & Aleven, V. (2023). Teacher Noticing and Student Learning in Human-AI Partnered Classrooms: A Multimodal Analysis. *Proceedings of the 2023 Annual Meeting of the International Society of the Learning Sciences (ISLS)*. Montréal, Canada.
- C3 – **Borchers, C.** & Pardos, Z. A. (2023). Insights into undergraduate pathways using course load analytics. *Proceedings of the 13th International Learning Analytics and Knowledge Conference (LAK)*. Arlington, TX. ACM. <https://doi.org/10.1145/3576050.3576081>
- C2 – **Borchers, C.**, Rosenberg, J., Gibbons, B., Burchfield, M., & Fischer, C. (2021). To Scale or Not to Scale: Comparing Popular Sentiment Analysis Dictionaries on Educational Twitter Data. *Proceedings of the 14th International Conference on Educational Data Mining (EDM)*. Paris, France.
- C1 – Burchfield, M., Rosenberg, J., **Borchers, C.**, Thomas, T., Gibbons, B., & Fischer, C. (2021). Are Violations of Student Privacy “Quick and Easy”? Investigating the Privacy of Students’ Images and Names in the Context of K-12 Educational Institution’s Posts on Facebook. *Proceedings of the 14th International Conference on Educational Data Mining (EDM)*. Paris, France.

## WORKSHOP PUBLICATIONS [PEER-REVIEWED]

- W1 – **Borchers, C.**, Gala, D. S., Gilbert, B., Oravkin, E., Bounsi, W., Asano, Y. M., & Kirk, H. R. (2022). Looking for a Handsome Carpenter! Debiasing GPT-3 Job Advertisements. *Proceedings of the 4th Workshop on Gender Bias in Natural Language Processing (NAACL)*.

## STUDENT-LED CONFERENCES, WHITE PAPERS, AND BLOG POSTS

- M3 – **Borchers, C.** (2020). Die Replikationskrise in der Psychologie - Reflexionen und Implikationen für die Erziehungswissenschaft. [The Replication Crisis in Psychology - Reflections and Implications for Pedagogy]. *Dynamiken des Pädagogischen Perspektiven auf Studium, Theorie und Praxis*. Budrich.
- M2 – **Borchers, C.**, Rosenberg, J., & Fischer, C. (2020). An Examination of the #NGSSchat Storify Database. <https://doi.org/10.31219/osf.io/4tafx>
- M1 – **Borchers, C.**, Ferdinand, J., & Fischer, C. (2020). Inquiry-based Learning: Forschendes Lernen im Unterricht. [Inquiry-based learning in classroom instruction]. <https://lead.schule/blog/forschendes-lernen-im-unterricht/>

## Presentations & Invited Talks

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### CONFERENCE PRESENTATIONS

- P6 – Fischer, C., Morina, F., **Borchers, C.**, & Klein, L. (2023, August). Online Communities of Practice on Twitter: A Case Study of the German Educational Twittersphere. Paper presented at the 20th Biennial EARLI Conference, Thessaloniki, Greece.
- P5 – **Borchers, C.**, & Braesemann, F.. Correlation networks predict success of digital technologies (2022, November). Paper presented at the the 11th International Conference on Complex Networks and their Applications, Palermo, Italy.
- P4 – Fischer, C., Morina, F., **Borchers, C.**, Klein, L., & Eich, M. (2022, April). Informal Professional Development in Online Communities of Practice at Scale: Mapping Nationwide Educational Twitterspheres. Paper presented at the 2022 Annual Meeting of the American Educational Research Association, San Diego, CA.
- P3 – **Borchers, C.**, Eder, T., & Scheiter, K. (2021, September). How Effective is Reflective search? A Time Slice Analysis of Dentistry Students' Visual Search Strategies and Pupil Dilation during Diagnosing Radiographs. Paper presented at the 2nd Workshop on Mental Effort, Virtual Conference.
- P2 – Rosenberg, J., **Borchers, C.**, Gibbons, B., Dyer, E., Anderson, D., & Fischer, C. (2021, April). Don't worry, be happy? A sentiment analysis of the #NGSSchat Twitter community. Paper presented at the 2021 Annual Meeting of the American Educational Research Association, Virtual Conference.
- P1 – Fischer, C., Morina, F., **Borchers, C.**, & Klein, L. (2021, March). Using Big Data to Support Educational Change: Twitter as a Platform for Informal Professional Development. Paper presented at the 2021 Annual Meeting of the Leibniz Education Research Network, Hannover, Germany.

### INVITED TALKS

- T2 – **Borchers, C.** (2022, October). Debiasing GPT-3 Job Ads. The Data Skeptic Podcast hosted by Kyle Polich.
- T1 – **Borchers, C.** (2022, September). Leveraging data science to improve educational processes: From K-12 student privacy on social media to higher education student workload. Invited talk at the Department of Theory & Practice in Teacher Education, University of Tennessee, Knoxville.

## Awards, Fellowships, & Grants

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- 2024 **GSA Conference Funding (LAK '24) - \$750**, Carnegie Mellon University
- 2024 **Ethical AI in Education Fellow**, Learnest
- 2023 **EDM2023 Travel Scholarship - \$1,250**, International Educational Data Mining Conference
- 2023 **Prof. Ramkumar Memorial Foundation Scholarship - \$100**, International Educational Data Mining Conference
- 2023 **Best Full Paper Honorable Mention**, 13th International Learning Analytics and Knowledge Conference
- 2023 **GSA Conference Funding (LAK '23) - \$750**, Carnegie Mellon University
- 2023 **GuSH Graduate Research Grant (Scaffolding Effects on Problem-Solving in Intelligent Tutoring Systems) - \$750**, Carnegie Mellon University
- 2022 **OII Thesis Prize for Best MSc Dissertation**, Oxford Internet Institute
- 2022 **LearnLab Summer School Participant (ITS Track)**, Carnegie Mellon University
- 2022 **Merck Innovation Cup '22 Participant**, Merck KGaA (Merck Group)
- 2021 **Best Poster Award**, 14th International Conference on Educational Data Mining
- 2021 **Learning Engineering Fellow**, EPIC@Berkeley - UC Berkeley GSE & Schmidt Futures
- 2019-2020 **Research Fellow**, European Federation of Psychology Students Associations (EFPSA)
- 2018 **BSc and MSc Scholarship**, German Academic Scholarship Foundation (Studienstiftung)

## Teaching Experience ---

### TEACHING ASSISTANT

- Fall 2023 **User-Centered Research and Evaluation**, School of Computer Science, Carnegie Mellon University
- Spring 2023 **Tools for Online Learning**, School of Computer Science, Carnegie Mellon University
- Spring 2021 **Cognitive Modeling**, Department of Computer Science, University of Tübingen, Germany

### WORKSHOPS

- Fall 2022 **Sentence Embeddings for Twitter Research**, Introduction to Data Science Methods in Education, University of Tennessee, Knoxville; GitHub: <https://tinyurl.com/sembutk>

## Mentoring ---

- Fall 2023 **Snigdha Tiwari**, Research Assistant, Carnegie Mellon University
- Fall 2023 **Dhruvisha Mondhe**, METALS Independent Study, Carnegie Mellon University
- SU 2023 **Kennion Gubler**, NSF REU, Carnegie Mellon University
- SU 2023 **Ha Tien Nguyen**, NSF REU, Carnegie Mellon University
- SU 2023 **Cindy Peng**, NSF REU, Carnegie Mellon University
- Spring 2023 **Jialin Ye**, MHCI Independent Study, Carnegie Mellon University
- Spring 2023 **Avani Guduri**, Undergraduate Independent Study, Carnegie Mellon University
- Fall 2022 **Tianze Shou (with Shamya Karumbaiah)**, Extending NSF REU Summer Intern Work into a Short Paper at EDM '23, Carnegie Mellon University

## Service to the Academic Community ---

### PEER REVIEW

- 2024 **Teaching and Teacher Education**, Ad-hoc Reviewer
- 2024 **American Journal of Education**, Ad-hoc Reviewer
- 2024 **CHI**, Conference Proceedings
- 2024 **LAK**, Conference Proceedings
- 2023-2024 **ISLS**, Conference Proceedings
- 2022-2024 **AERA**, Annual Meeting Proceedings
- 2023 **NeurIPS**, Workshop Track

### COMMITTEE WORK

- 2023-2024 **Graduate Student Assembly Representative**, Carnegie Mellon University
- 2023 **NSF REU Summer Intern Admissions Committee**, Carnegie Mellon University

### VOLUNTEERING

- 2023 **EDM**, Student Volunteer
- 2023 **ISLS**, Student Volunteer