

# Conrad Borchers

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

## Publications

*Italicized author names indicate mentored students. An asterisk (\*) indicates equal contribution.*

### JOURNAL ARTICLES

- 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]

- C12 – Peng, C., **Borchers, C.**, & Aleven, V. (2024). Designing Homework Support Tools for Middle School Mathematics Using Intelligent Tutoring Systems. *Proceedings of the 2024 Annual Meeting of the International Society of the Learning Sciences (ISLS)*. Buffalo, NY, USA.
- C11 – Nguyen, H. T., **Borchers, C.**, Xia, M., & Aleven, V. (2024). Designing Tools for Caregiver Involvement in Intelligent Tutoring Systems for Middle School Mathematics. *Proceedings of the 2024 Annual Meeting of the International Society of the Learning Sciences (ISLS)*. Buffalo, NY, USA.
- C10 – **Borchers, C.**, Wang, Y., Karumbaiah, S., Ashiq, M., Shaffer, D. W., & Aleven, V. (2024). 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. (2024). 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

- P7 – Gold, G., **Borchers, C.**, & Carvalho P. F. (2024, March). Students' Academic Performance and Goal Orientation Relate to Initial Knowledge but Not Learning Rate. Poster presented at the 14th International Learning Analytics and Knowledge Conference (LAK), Kyoto, Japan.
- 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

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### 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

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- Spring 2024 **Katherine Zhao**, Programming Mentorship, Carnegie Mellon University
- Spring 2024 **Devika Venikopalan**, Research Mentorship, Carnegie Mellon University
- 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)**, Extension of NSF REU Research, Carnegie Mellon University

## Service to the Academic Community

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### PEER REVIEW

- 2024 **Journal of Learning Analytics**, Ad-hoc Reviewer
- 2024 **Journal of Infrastructure, Policy and Development**, Ad-hoc Reviewer
- 2024 **Teaching and Teacher Education**, Ad-hoc Reviewer
- 2024 **American Journal of Education**, Ad-hoc Reviewer
- 2024 **CSCW**, Conference Proceedings
- 2024 **EDM**, Conference Proceedings
- 2024 **AIED**, Conference Proceedings
- 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
- 2023-2024 **NSF REU Summer Intern Admissions Committee**, Carnegie Mellon University

### VOLUNTEERING

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