Nigel Bosch

Curriculum Vitae
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School of Information Sciences and Department of Educational Psychology
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Appointments

2025–present	Associate Professor, School of Information Sciences (75%) Associate Professor, Department of Educational Psychology (25%) University of Illinois Urbana–Champaign
2019–2025	Assistant Professor, School of Information Sciences (75%) Assistant Professor, Department of Educational Psychology (25%) University of Illinois Urbana–Champaign
2020–present	Discovery Partners Institute (DPI) Affiliate
2019–present	Faculty Affiliate, National Center for Supercomputing Applications Faculty Affiliate, Illinois Informatics University of Illinois Urbana–Champaign
2017–2019	Postdoctoral Researcher, National Center for Supercomputing Applications University of Illinois Urbana–Champaign

Education

2017	PhD, Computer Science University of Notre Dame, Notre Dame, IN 46556

Awards

Publication Awards

- EDM 2025 Best Paper Award (International Conference on Educational Data Mining)
- APA Editor's Choice selection (Journal of Psychopathology and Clinical Science, 2025)
- CHI 2025 Honorable Mention (ACM CHI Conference on Human Factors in Computing Systems, 2025)
- LAK 2022 Finalist for Best Short Paper Award (International Conference on Learning Analytics & Knowledge)
- EDM 2020 Finalist for Best Paper Award (International Conference on Educational Data Mining)
- AIED 2018 Best Student Paper Award (International Conference on Artificial Intelligence in Education)

- UMAP 2017 Best Student Paper Award (Conference on User Modeling, Adaptation, and Personalization)
- EDM 2017 Best Student Paper Award (International Conference on Educational Data Mining)
- AIED 2015 Best Paper Award (International Conference on Artificial Intelligence in Education)
- EDM 2015 Best Student Paper Award (International Conference on Educational Data Mining)
- IUI 2015 Finalist for Best Paper Award (International Conference on Intelligent User Interfaces)
- ICSE 2014 ACM Distinguished Paper Award (International Conference on Software Engineering)

Other Awards

- Jeanneret Award for Excellence in the Study of Individual or Group Assessment (Society for Industrial and Organizational Psychology), 2024
- College of Education Distinguished Scholar, 2023
- Outstanding SPIN (Students Pushing INnovation) mentor, summer 2018, academic year 2019–2020
- Outstanding reviewer, IEEE Face & Gesture (FG) conference, 2019
- Teachers Ranked as Excellent (University of Illinois teaching award) – fall 2018, fall 2019, spring 2020, fall 2020, fall 2021, spring 2023, spring 2024, spring 2025
- Facilitating Learning Excellence Award (revamped University of Illinois teaching award) – fall 2025

Grants

Grants as Principal Investigator (PI)

2025–2027 EASE: Educational AI Stakeholder Ethics ($19,944). University of Illinois Campus Research Board (RB26029). PI.

2020–2025 Collaborative Research: Exploring Algorithmic Fairness and Potential Bias in K-12 Mathematics Adaptive Learning ($987,015; collaborative total: $1,500,000). National Science Foundation (NSF DUE #2000638). PI.

2020–2021 Supporting Self-regulated Learning in Online Education via Automatically Personalized Interventions ($14,997). Technology Innovation in Educational Research and Design (TIER-ED, a University of Illinois initiative). PI.

Grants as Co-PI

2023–2026 Collaborative Research: Examining Elementary Mathematics Teachers' Behaviors and Learning with an Online Professional Development Platform ($1,499,999). National Science Foundation (NSF ECR #2301272). Co-PI.

2022–2026 FairFL-MC: A Metacognitive Calibration Intervention Powered by Fair and Private Machine Learning ($850,000). National Science Foundation (NSF IIS #2202481). Co-PI.

2021–2026 Towards a Wearable Alcohol Biosensor: Examining the Accuracy of BAC Estimates from New-Generation Transdermal Technology using Large-Scale Human Testing and Machine Learning Algorithms ($2,222,481). National Institutes of Health (NIH #R01AA028488). Co-I.

2020–2022 Assessing Eye Movement Scanpaths in Source Code Comprehension ($151,998). Sandia National Laboratories. Co-PI.

2019–2024 Advancing Computational Grounded Theory for Audiovisual Data from STEM Classrooms ($1,313,855). National Science Foundation (NSF DRL #1920796). Co-PI.

2018–2022 Underrepresented Student Learning in Online Introductory STEM College Courses ($1,399,194). Institute of Education Sciences (IES #R305A180211). Co-PI.

Other Grants

2018–2019 National Study of Learning Mindsets Early Career Fellowship ($8000 + travel). Mindset Scholars Network and University of Texas at Austin Population Research Center.

2016 National Science Foundation Travel Award ($1449). 24th ACM Conference on User Modeling, Adaptation and Personalization (UMAP).

2015 National Science Foundation Travel Award ($2398). 17th ACM International Conference on Multimodal Interaction (ICMI).

2015 National Science Foundation Travel Award ($1250). 20th ACM Conference on Intelligent User Interfaces (IUI 2015).

2015 National Science Foundation Travel Award ($1000). 8th International Conference on Educational Data Mining (EDM 2015) and 17th International Conference on Artificial Intelligence in Education (AIED 2015).

2015 University of Notre Dame Professional Development and Graduate Student Union Conference Presentation Grant ($2600). 8th International Conference on Educational Data Mining (EDM 2015) and 17th International Conference on Artificial Intelligence in Education (AIED 2015).

2013 National Science Foundation Travel Award ($1300). Doctoral Consortium at 16th International Conference on Artificial Intelligence in Education (AIED 2013).

Publications

Peer-reviewed Journal Publications

Kang, D., Fairbairn, C. E., Jiang, L., & **Bosch, N.** (in press). Predicting substance use behaviors: A multi-dataset, mega-analysis. *Journal of Psychopathology and Clinical Science*. DOI: 10.1037/abn0001167

Lu, Y., Fairbairn, C. E., Han, J., & **Bosch, N.** (in press). A cross-lagged analysis of measured and self-estimated intoxication: Mobile health data from a large U.S. sample examined 2016-2022. *Addiction*. DOI: 10.1111/add.70681

Fairbairn, C. E. & **Bosch, N.** (2026). Applying artificial intelligence to expand the measurement toolkit in clinical psychological science: Moving beyond self-reports. *Clinical Psychological Science, 14*(4), 497-513. DOI: 10.1177/21677026251379441

Fairbairn, C. E., Kang, D., Han, J., & **Bosch, N.** (2026). Objective assessment in clinical psychological

science: Progress in wearable alcohol biosensors. *Annual Review of Clinical Psychology, 22*, 427-453. DOI: 10.1146/annurev-clinpsy-061724-080804

Hur, P., Palaguachi, C., Machaka, N., Krist, C., Dyer, E., D'Angelo, C., & **Bosch, N.** (2026). A framework for considering exploration, interpretation, and confirmation during data analysis: Computationally assisted analysis of teacher-group interactions. *Journal of Educational Data Mining, 18*(1), 180-207. DOI: 10.5281/zenodo.18851065

Lu, Y., Fairbairn, C. E., Han, J., & **Bosch, N.** (2026). Mobile health for alcohol use assessment: Longitudinal effects of breathalyzer self-monitoring in everyday contexts. *American Journal of Psychiatry, 183*(4), 251-259. DOI: 10.1176/appi.ajp.20241170

Murgia, S., Fairbairn, C. E., Barnett, N. P., Flanagan, J., & **Bosch, N.** (2026). Acceptability and feasibility of a new-generation alcohol biosensor: A mixed-methods evaluation in a large community sample. *Experimental and Clinical Psychopharmacology, 34*(1), 18–30. DOI: 10.1037/pha0000799

Stinar, F., Lee, H., Belitz, C., Nasiar, N., Fancsali, S. E., Ritter, S., Almoubayyed, H., Baker, R. S., Ocumpaugh, J., & **Bosch, N.** (2026). Fairness implications of unmodeled reading skills in adaptive learning systems. *Journal of Educational Data Mining, 18*(2), 242-268. DOI: 10.5281/zenodo.23837239

Ariss, T., Caumiant, E. P., Fairbairn, C. E., Kang, D., **Bosch, N.**, & Morris, J. K. (2025). Exploring associations between drinking contexts and alcohol consumption: An analysis of photographs. *Journal of Psychopathology and Clinical Science, 134*(3), 284-297. DOI: 10.1037/abn0000977

Dempsey, J., Tsiola, A., **Bosch, N.**, Christianson, K., & Stites, M. (2025). Eye-movement indices of reading while debugging Python source code. *Journal of Cognitive Psychology, 37*(2), 89-107. DOI: 10.1080/20445911.2024.2447117

Fairbairn, C. E., Han, J., Caumiant, E. P., Benjamin, A. S., & **Bosch, N.** (2025). A wearable alcohol biosensor: Exploring the accuracy of transdermal drinking detection. *Drug and Alcohol Dependence, 266*, 112519:1-10. DOI: 10.1016/j.drugalcdep.2024.112519

Lee, H. & **Bosch, N.** (2025). Calibration discrepancy predicts students' subsequent metacognitive strategy use in computer-based learning environments. *International Journal of Artificial Intelligence in Education, 35*, 3746–3779. DOI: 10.1007/s40593-025-00514-5

Salvi, R. & **Bosch, N.** (2025). Investigating perception of gender stereotypes in large language models: A computational grounded theory approach. *ACM Journal on Responsible Computing, 2*(2), 1-29. DOI: 10.1145/3737882

Zhang, Y., Paquette, L., & **Bosch, N.** (2025). Conditional and marginal strengths of affect transitions during computer-based learning. *International Journal of Artificial Intelligence in Education, 35*, 1317–1345. DOI: 10.1007/s40593-024-00430-0

Hickman, L., Saef, R., Ng, V., Woo, S. E., Tay, L., & **Bosch, N.** (2024). Developing and evaluating language-based machine learning algorithms for inferring applicant personality in video interviews. *Human Resource Management Journal, 34*(2), 255-274. DOI: 10.1111/1748-8583.12356

Jeng, A., **Bosch, N.**, & Perry, M. (2024). Phatic expressions influence perceived helpfulness in online peer help-giving: A mixed methods study. *Learning and Instruction, 91*, 101893:1-11. DOI: 10.1016/j.learninstruc.2024.101893

Lawrence, L., Mercier, E., Tucker Parks, T., **Bosch, N.**, & Paquette, L. (2024). Accuracy and effectiveness of an orchestration tool on instructors' interventions and groups' collaboration. *Computers and Education Open, 7*, 14 pages. DOI: 10.1016/j.caeo.2024.100203

Lee, H. & **Bosch, N.** (2024). Subtopic-specific heterogeneity in computer-based learning behaviors. *International Journal of STEM Education, 11*(61), 1-31. DOI: 10.1186/s40594-024-00519-x

Loui, M. C., **Bosch, N.**, Chan, A. S., Davis, J. L., Gutiérrez, R., He, J., Karahalios, K., Koyejo, S., Mendenhall, R., Sanfilippo, M. R., Tong, H., Varshney, L. R., & Wang, Y. (2024). Artificial intelligence, social responsibility, and the roles of the university. *Communications of the ACM, 67*(8), 22-25. DOI: 10.1145/3640541

Stinar, F., Xiong, Z., & **Bosch, N.** (2024). An approach to improve k-anonymization practices in educational data mining. *Journal of Educational Data Mining, 16*(1), 61-83. DOI: 10.5281/zenodo.11056083

Valdiviejas, H., Azevedo, R. F. L., **Bosch, N.**, & Perry, M. (2024). Automatic detection of metacognitive language and student achievement in an online STEM college course. *Online Learning, 28*(3), 524-563. DOI: 10.24059/olj.v28i3.4127

Zhang, Y., Paquette, L., & **Bosch, N.** (2024). Using permutation tests to identify statistically sound and nonredundant sequential patterns in educational event sequences. *Journal of Educational and Behavioral Statistics*, 33 pages. DOI: 10.3102/10769986241248772

Ariss, T., Fairbairn, C. E., & **Bosch, N.** (2023). Examining new-generation transdermal alcohol biosensor performance across laboratory and field contexts. *Alcoholism: Clinical & Experimental Research, 47*(1), 50-59. DOI: 10.1111/acer.14977

Baker, R. S., Hutt, S., **Bosch, N.**, Ocumpaugh, J., Biswas, G., Paquette, L., Andres, J. M. A., Nasiar, N., & Munshi, A. (2023). Detector-driven classroom interviewing: Focusing qualitative researcher time by selecting cases in situ. *Educational Technology Research and Development*, 23 pages. DOI: 10.1007/s11423-023-10324-y

Belitz, C., Ocumpaugh, J., Ritter, S., Baker, R. S., Fancsali, S. E., & **Bosch, N.** (2023). Constructing categories: Moving beyond protected classes in algorithmic fairness. *Journal of the Association for Information Science and Technology, 74*(6), 663-668. DOI: 10.1002/asi.24643

Booth, B. M., **Bosch, N.**, & D'Mello, S. K. (2023). Engagement detection and its applications in learning: A tutorial & selective review. *Proceedings of the IEEE, 111*(10), 1398-1422. DOI: 10.1109/JPROC.2023.3309560

Jeng, A., Williams-Dobosz, D., **Bosch, N.**, & Perry, M. (2023). Direct and indirect ways of being helpful in online peer help-giving interactions. *Computers & Education, 205*, 104894:1-15. DOI: 10.1016/j.compedu.2023.104894

Jeng, A., **Bosch, N.**, & Perry, M. (2023). Sense of belonging predicts perceived helpfulness in online peer help-giving interactions. *The Internet and Higher Education, 57*, 100901:1-14. DOI: 10.1016/j.iheduc.2022.100901

Zhang, Y., Paquette, L., Baker, R. S., **Bosch, N.**, Ocumpaugh, J., & Biswas, G. (2023). How are feelings of difficulty and familiarity linked to learning behaviors and gains in a complex science learning task? *European Journal of Psychology of Education, 38*, 777-800. DOI: 10.1007/s10212-022-00616-x

Bosch, N. & D'Mello, S. K. (2022). Can computers outperform humans in detecting user zone-outs? Implications for intelligent interfaces. *ACM Transactions on Computer-Human Interaction (TOCHI), 29*(2), 1-33. DOI: 10.1145/3481889

Hickman, L., **Bosch, N.**, Ng, V., Saef, R., Tay, L., & Woo, S. E. (2022). Automated video interview personality assessments: Reliability, validity, and generalizability investigations. *Journal of Applied Psychology, 107*(8), 1323-1351. DOI: 10.1037/apl0000695

Zhang, Y., Paquette, L., **Bosch, N.**, Ocumpaugh, J., Biswas, G., Hutt, S., & Baker, R. S. (2022). The evolution of metacognitive strategy use in an open-ended learning environment: Do prior domain knowledge and motivation play a role? *Contemporary Educational Psychology, 69*, 102064:1-14. DOI: 10.1016/j.cedpsych.2022.102064

Bosch, N. & Paquette, L. (2021). What's next? Sequence length and impossible loops in state transition measurement. *Journal of Educational Data Mining, 13*(1), 1-23. DOI: 10.5281/zenodo.5048423

Bosch, N. & D'Mello, S. K. (2021). Automatic detection of mind wandering from video in the lab and in the classroom. *IEEE Transactions on Affective Computing, 12*(4), 974-988. DOI: 10.1109/TAFFC.2019.2908837

Bosch, N. (2021). Identifying supportive student factors for mindset interventions: A two-model machine learning approach. *Computers & Education, 167*, 104190:1-15. DOI: 10.1016/j.compedu.2021.104190

Bosch, N. (2021). AutoML feature engineering for student modeling yields high accuracy, but limited interpretability. *Journal of Educational Data Mining, 13*(2), 55-79. DOI: 10.5281/zenodo.5275314

Fairbairn, C. E. & **Bosch, N.** (2021). A new generation of transdermal alcohol biosensing technology: Practical applications, machine learning analytics, and questions for future research. *Addiction, 116*(10), 2912-2920. DOI: 10.1111/add.15523

Gurrieri, L., Fairbairn, C. E., Sayette, M. A., & **Bosch, N.** (2021). Alcohol narrows physical distance between strangers. *Proceedings of the National Academy of Sciences, 118*(20), e2101937118:1-3. DOI: 10.1073/pnas.2101937118

Williams-Dobosz, D., Jeng, A., Azevedo, R. F. L., **Bosch, N.**, Ray, C., & Perry, M. (2021). Ask for help: Online help-seeking and help-giving as indicators of cognitive and social presence for students underrepresented in chemistry. *Journal of Chemical Education, 98*(12), 3693-3703. DOI: 10.1021/acs.jchemed.1c00839

Zhang, Y., Paquette, L., Baker, R. S., Ocumpaugh, J., **Bosch, N.**, Biswas, G., & Munshi, A. (2021). Can strategic behavior facilitate confusion resolution? The interplay between confusion and metacognitive strategies in Betty's Brain. *Journal of Learning Analytics, 8*(3), 28-44. DOI: 10.18608/jla.2021.7161

Fairbairn, C. E., Kang, D., & **Bosch, N.** (2020). Using machine learning for real-time BAC estimation from a new-generation transdermal biosensor in the laboratory. *Drug and Alcohol Dependence, 216*, 108205:1-108205:8. DOI: 10.1016/j.drugalcdep.2020.108205

Hutt, S., Krasich, K., Mills, C., **Bosch, N.**, White, S., Brockmole, J. R., & D'Mello, S. K. (2019). Automated gaze-based mind wandering detection during computerized learning in classrooms. *User Modeling and User-Adapted Interaction, 29*(4), 821-867. DOI: 10.1007/s11257-019-09228-5

Wammes, J. D., Ralph, B. C. W., Mills, C., **Bosch, N.**, Duncan, T. L., & Smilek, D. (2019). Disengagement during lectures: Media multitasking and mind wandering in university classrooms. *Computers & Education, 132*, 76-89. DOI: 10.1016/j.compedu.2018.12.007

Bosch, N. & Paquette, L. (2018). Metrics for discrete student models: Chance levels, comparisons, and use cases. *Journal of Learning Analytics, 5*(2), 86-104. DOI: 10.18608/jla.2018.52.6

Bosch, N. & D'Mello, S. K. (2017). The affective experience of novice computer programmers. *International Journal of Artificial Intelligence in Education, 27*(1), 181-206. DOI: 10.1007/s40593-015-0069-5

Monkaresi, H., **Bosch, N.**, Calvo, R. A., & D'Mello, S. K. (2017). Automated detection of engagement using video-based estimation of facial expressions and heart rate. *IEEE Transactions on Affective Computing, 8*(1), 15-28. DOI: 10.1109/TAFFC.2016.2515084

Bosch, N., D'Mello, S. K., Ocumpaugh, J., Baker, R. S., & Shute, V. (2016). Using video to automatically detect learner affect in computer-enabled classrooms. *ACM Transactions on Interactive Intelligent Systems (TiiS), 6*(2), 17:1-17:26. DOI: 10.1145/2946837

Shute, V. J., D'Mello, S. K., Baker, R., Cho, K., **Bosch, N.**, Ocumpaugh, J., Ventura, M., & Almeda, V. (2015). Modeling how incoming knowledge, persistence, affective states, and in-game progress influence student learning from an educational game. *Computers & Education, 86*, 224-235. DOI: 10.1016/j.compedu.2015.08.001

Peer-reviewed Published Conference Proceedings

Lee, H., Jeng, A., Burns, S., Bates, M., Moran, C., Kearfott, H., Reyes-Denis, T., Cimpian, J. R., Vythoulkas, G., **Bosch, N.**, & Perry, M. (2026). Teacher characteristics shape engagement and outcomes in online professional learning environments. *Proceedings of the 16th Learning Analytics and Knowledge Conference (LAK '26)*, pp. 315-324. DOI: 10.1145/3785022.3785069

Miller, S. R. & **Bosch, N.** (2026). Learning by teaching an LLM: A new approach to writing instruction. In B. K. Litts, D. DeLiema, C. Lee, S. Krist, A. Mawasi, L. Martin, & K. Kumpulainen (Eds.), *Proceedings of the 20th International Conference of the Learning Sciences - ICLS 2026*, pp. 2776-2778. DOI: 10.22318/icls2026.408370

Miller, S. & **Bosch, N.** (2026). Writing instructors' pedagogical decisions about generative AI. In E. G. Blanchard, G. Chen, M. Chi, & S. Isotani (Eds.), *Proceedings of the 27th International Conference on Artificial Intelligence in Education (AIED 2026)*, pp. 535-543. DOI: 10.1007/978-3-032-29770-9_58

Miller, S., Jiang, L., & **Bosch, N.** (2026). Fairness depends on assessment: Learning by teaching with large language models. In E. G. Blanchard, G. Chen, M. Chi, & S. Isotani (Eds.), *Proceedings of the 27th International Conference on Artificial Intelligence in Education (AIED 2026)*, pp. 469-477. DOI: 10.1007/978-3-032-29773-0_39

Miller, S. R. & **Bosch, N.** (2026). Prompting for teachability: Designing novice personas in LLMs for learning by teaching contexts. *Proceedings of the 16th Learning Analytics and Knowledge Conference (LAK '26)*, pp. 822-828. DOI: 10.1145/3785022.3785067

Stinar, F., Zong, R., Wang, D., & **Bosch, N.** (2026). EdataWeave: Collecting learning behaviors across multiple platforms. *Proceedings of the Thirteenth ACM Conference on Learning @ Scale (L@S '26)*, pp. 535-539. DOI: 10.1145/3774398.3811562

Belitz, C., Lee, H., Nasiar, N., Fancsali, S. E., Stinar, F., Almoubayyed, H., Ritter, S., Baker, R., Ocumpaugh, J., & **Bosch, N.** (2025). Exploring student identity in adaptive learning systems through qualitative data. In A. I. Cristea, E. Walker, Y. Lu, O. C. Santos, & S. Isotani (Eds.), *Proceedings of the 26th International Conference on Artificial Intelligence in Education (AIED 2025)*, 356-363. DOI: 10.1007/978-3-031-98462-4_45

Hur, P., Twidale, M., & **Bosch, N.** (2025). "Like driving in a storm at night": How students use metaphors to describe confusion during learning. In A. Rajala, A. Cortez, R. Hofmann, A. Jornet, H. Lotz-Sisitka, & L. Markauskaite (Eds.), *Proceedings of the 19th International Conference of the Learning Sciences - ICLS 2025*, pp. 2973-2975. DOI: 10.22318/icls2025.443156

Lee, H., Stinar, F., Zong, R., Valdiviejas, H., Wang, D., & **Bosch, N.** (2025). Learning behaviors mediate the effect of AI-powered support for metacognitive calibration on learning outcomes. *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, pp. 17:1-18. DOI: 10.1145/3706598.3713960

Lee, H., Belitz, C., Nasiar, N., & **Bosch, N.** (2025). XAI reveals the causes of attention deficit hyperactivity disorder (ADHD) bias in student performance prediction. *Proceedings of the 15th Learning Analytics and Knowledge Conference (LAK '25)*, pp. 418-428. DOI: 10.1145/3706468.3706521

Stinar, F., Lee, H., Belitz, C., Nasiar, N., Fancsali, S. E., Ritter, S., Almoubayyed, H., Baker, R. S., Ocumpaugh, J., & **Bosch, N.** (2025). Fairness of Bayesian knowledge tracing for math learners of different reading ability. In C. Mills, G. Alexandron, D. Taibi, G. Lo Bosco, & L. Paquette (Eds.), *Proceedings of the 18th International Conference on Educational Data Mining (EDM 2025)*, pp. 170-181. DOI: 10.5281/zenodo.15870165

Stinar, F. & **Bosch, N.** (2025). Surveying contextualized student data sharing preferences for educational AI. In A. I. Cristea, E. Walker, Y. Lu, O. C. Santos, & S. Isotani (Eds.), *Proceedings of the 26th International Conference on Artificial Intelligence in Education (AIED 2025)*, 349-363. DOI: 10.1007/978-3-031-98462-4_45

Tang, L. & **Bosch, N.** (2025). Human-crafted features in machine learning increase trust but risk over-reliance. In C. Mills, G. Alexandron, D. Taibi, G. Lo Bosco, & L. Paquette (Eds.), *Proceedings of the 18th International Conference on Educational Data Mining (EDM 2025)*, pp. 192-204. DOI: 10.5281/zenodo.15870199

Zong, R., Zhang, Y., Shang, L., Stinar, F., **Bosch, N.**, & Wang, D. (2025). Bidirectional human–AI collaboration for equitable student performance prediction via deep uncertainty learning. *Proceedings of the 34th International Joint Conference on Artificial Intelligence (IJCAI 2025)*, pp. 10026-10034. DOI: 10.24963/ijcai.2025/1114

Belitz, C., Lee, H., Nasiar, N., Fancsali, S. E., Ritter, S., Almoubayyed, H., Baker, R. S., Ocumpaugh, J., & **Bosch, N.** (2024). Hierarchical dependencies in classroom settings influence algorithmic bias metrics. *Proceedings of the 14th International Conference on Learning Analytics & Knowledge (LAK '24)*, pp. 210-218. DOI: 10.1145/3636555.3636869

Bosch, N., Williams-Dobosz, D., & Perry, M. (2024). Measuring help-seeking in online course discussion forums with privacy-preserving large language models. In J. Clarke-Midura, I. Kollar, X. Gu, & C. D'Angelo (Eds.), *Proceedings of the 16th International Conference of the Learning Sciences - CSCL 2024*, pp. 189-192. DOI: 10.22318/cscl2024.507823

Bosch, N., Reyes Denis, T., & Perry, M. (2024). Teacher learning online: Detecting patterns of

engagement. In R. Lindgren, T. Asino, E. A. Kyza, C. K. Looi, D. T. Keifert, & E. Suárez (Eds.), *Proceedings of the 18th International Conference of the Learning Sciences - ICLS 2024*, pp. 1047-1050. DOI: 10.22318/icls2024.106829

Jiang, X., **Bosch, N.**, & Torvik, V. I. (2024). Training a geographic entity recognizer on biomedical abstracts with the aid of embeddings, metadata, and linked data. *Proceedings of the 2024 IEEE/ACM Joint Conference on Digital Libraries (JCDL)*, pp. 12:1-5. DOI: 10.1145/3677389.3702515

Jiang, L. & **Bosch, N.** (2024). Short answer scoring with GPT-4. *Proceedings of the 11th ACM Conference on Learning@Scale (L@S '24)*, pp. 438-442. DOI: 10.1145/3657604.3664685

Jiang, L., Belitz, C., & **Bosch, N.** (2024). Synthetic dataset generation for fairer unfairness research. *Proceedings of the 14th International Conference on Learning Analytics & Knowledge (LAK '24)*, pp. 200-209. DOI: 10.1145/3636555.3636868

Tang, L. & **Bosch, N.** (2024). Can students understand AI decisions based on variables extracted via AutoML? *Proceedings of the 2024 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, pp. 3342-3349. DOI: 10.1109/SMC54092.2024.10831034

Hur, P., Machaka, N., Krist, C., & **Bosch, N.** (2023). Informing expert feature engineering through automated approaches: Implications for coding qualitative classroom video data. *Proceedings of the 13th International Conference on Learning Analytics & Knowledge (LAK '23)*, pp. 630-636. DOI: 10.1145/3576050.3576090

Jeng, A., **Bosch, N.**, & Perry, M. (2023). Perceived helpfulness of phatic expressions in online help-giving interactions. *Proceedings of the 17th International Conference of the Learning Sciences - ICLS 2023*, pp. 1780-1781. DOI: 10.22318/icls2023.314349

Pinto, J., Paquette, L., & **Bosch, N.** (2023). Interpretable neural networks vs. expert-defined models for learner behavior detection. *Companion Proceedings 13th International Conference on Learning Analytics & Knowledge (LAK23)*, pp. 105-107.

Zong, R., Zhang, Y., Stinar, F., Shang, L., Zeng, H., **Bosch, N.**, & Wang, D. (2023). A crowd–AI collaborative approach to address demographic bias for student performance prediction in online education. *Proceedings of the 11th AAAI Conference on Human Computation and Crowdsourcing (HCOMP 2023)*, pp. 198-210. DOI: 10.1609/hcomp.v11i1.27560

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Hur, P., Lee, H., Bhat, S., & **Bosch, N.** (2022). Using machine learning explainability methods to personalize interventions for students. In A. Mitrovic & **N. Bosch** (Eds.), *Proceedings of the 15th International Conference on Educational Data Mining (EDM 2022)*, pp. 438-445. DOI: 10.5281/zenodo.6853181

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Book Chapters

Hutt, S., Baker, R. S., Ocumpaugh, J., Munshi, A., Andres, J. M. A. L., Karumbaiah, S., Slater, S., Biswas, G., Paquette, L., **Bosch, N.**, & van Velsen, M. (2022). Quick Red Fox: An app supporting a new paradigm in qualitative research on AIED for STEM. *Artificial Intelligence in STEM Education*, pp. 319-332.

Paquette, L. & **Bosch, N.** (2020). The invisible breadcrumbs of digital learning: How learner actions inform us of their experience. *Handbook of Research on Digital Learning*, pp. 302-316. DOI: 10.4018/978-1-5225-9304-1.ch019

D'Mello, S. K., **Bosch, N.**, & Chen, H. (2018). Multimodal-multisensor affect detection. *The Handbook of Multimodal-Multisensor Interfaces, Volume 2: Signal Processing, Architectures, and Detection of Emotion and Cognition*, pp. 167-202. DOI: 10.1145/3107990.3107998

Peer-reviewed Workshop Papers

Belitz, C., **Bosch, N.**, Jiang, L., Jivet, I., Kirouchenassamy, B., Lee, H., Leporini, B., Malloci, F. M., Marras, M., Rotelli, D., & Stinar, F. (2025). Fair4AIED 2025: First international workshop on fairness in algorithmic decision-making for education. In A. I. Cristea, E. Walker, Y. Lu, O. C. Santos, & S. Isotani (Eds.), *Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium, Blue Sky, and WideAIED*, pp. 308-314. DOI: 10.1007/978-3-031-99267-4_40

Lee, H., Hur, P., Bhat, S., & **Bosch, N.** (2021). Promoting self-regulated learning in online learning by triggering tailored interventions. In R. S. Baker, C. Mills, & U. Boser (Eds.), *CEUR Workshop Proceedings: Joint Workshops at the International Conference on Educational Data Mining*, 1-8.

Bosch, N. & Paquette, L. (2017). Unsupervised deep autoencoders for feature extraction with educational data. *Deep Learning with Educational Data Workshop at the 10th International Conference on Educational Data Mining*.

Bosch, N. & D'Mello, S. K. (2014). Co-occurring affective states in automated computer programming education. In E. Walker & C. K. Looi (Eds.), *Proceedings of the Workshop on AI-supported Education for Computer Science (AIEDCS) at the 12th International Conference on Intelligent Tutoring Systems*, pp. 21-30.

Bosch, N. & D'Mello, S. K. (2013). Sequential patterns of affective states of novice programmers. In E. Walker & C. K. Looi (Eds.), *Proceedings of the First Workshop on AI-supported Education for Computer Science (AIEDCS 2013)*, pp. 1-10.

Invited Talks/Seminars

- *New Directions for Measurement with Machine Learning in Education and Psychology*. Invited talk at the 2026 Midwestern Psychological Association annual meeting. April 17, 2026.
- *AI-powered Measurement and Assessment for Short Student-written Texts*. Speaker Series for the Targeted Infusion Project "Innovating Writing-To-Learning Pedagogy", Jackson State University. July 11, 2024.
- *Privacy and Big Data in Postsecondary Education*. Building a Multidimensional Future: A Conversation on Big Data and Educational Measurement, National Council on Measurement in Education Annual Meeting. June 1, 2021.

- *Learning about Learning from Unstructured Classroom Data*. AAAI Spring Symposium on Artificial Intelligence for K–12 Education. March 22, 2021.
- *Hyperparameter Tuning in Machine Learning for Student Models*. Learning Analytics Learning Network. October 20, 2020.

Teaching and Mentorship

Teaching Activities

- Instructor, *Causal Inference with Machine Learning* (EPSY 590ML) – fall 2023, spring 2025, spring 2026
  - **Newly developed course**
- Instructor, *Concepts of Machine Learning* (IS 390CML/327) – spring 2022, fall 2022, spring 2023, fall 2024
  - **Newly developed course**
- Instructor, *Data, Statistical Models, and Information* (IS 542/507) – fall 2019, spring 2020, fall 2020, fall 2021
- Instructor, *Applied Machine Learning: Team Projects* (IS 590ML/557) – spring 2019, fall 2019, spring 2021, spring 2024, fall 2025
  - **Newly developed course**
- Instructor, *Foundations of Information Processing* (IS 452) – spring 2019
- Instructor, *Data Mining* (IS 590DT2/577) – fall 2018, fall 2020
- Co-instructor, *Machine Learning Team Projects* (IS 590ML) – fall 2018
- Information Sciences independent study advisor (IS 592/589) – fall 2019 (1), spring 2020 (3), fall 2020 (1), spring 2021 (2), summer 2021 (1), spring 2022 (2), summer 2022 (4)
- Information Sciences undergraduate independent study advisor (IS 389) – spring 2022 (1)
- Educational Psychology independent study advisor (EPSY 595) – fall 2020 (1), summer 2021 (1), spring 2022 (1), fall 2022 (1)
- Informatics independent study advisor (INFO 597) – fall 2020 (1)
- Informatics individual undergraduate research (INFO 199/399) – fall 2020 (1), spring 2021 (1), spring 2022 (1)
- Guest Lecturer, *AI Applications in Education* (CS 498)
- Guest Lecturer, *Research Design for Information Sciences* (IS 204)
- Guest Lecturer, *Advanced Topics: Machine Learning & Social Computing* (IS 590MSC)
- Guest Lecturer, *Introduction to Educational Data Mining* (CI 507EDM)
- Guest Lecturer, *Qualitative Analysis of Video Data* (CI 507AVD)

Doctoral Advising

- Sydney Miller – Information Sciences
- Frank Stinar – Information Sciences
- Clara Belitz – Information Sciences
- Lan Jiang – Information Sciences
- HaeJin Lee – Information Sciences
- Liang Tang – Information Sciences (secondary co-advisor with Masooda Bashir)

- Destiny Williams-Dobosz – Educational Psychology (secondary co-advisor with Michelle Perry)
  - Graduated 2025 → Postdoc at Boston College
- Paul Hur – Information Sciences (secondary co-advisor with Michael Twidale)
  - Graduated 2024 → Postdoc at Freie Universität Berlin
- Hannah Valdiviejas – Educational Psychology (secondary co-advisor with Michelle Perry)
  - Graduated 2023 → SRCD Federal Executive Branch Policy Fellow

Master's Students Mentored

- Shuyi Guo (2024–2025), MS in Information Management
  - Graduated 2025 → Machine learning engineer at TikTok San Jose
- Sree Balasubramanian (2022–2023), MS in Information Management → Analytics Rotation Program Manager at Genentech
- Rohan Salvi (2022–2023), MS in Information Management → PhD student at University of Illinois Chicago
- Vel Wu (2020), MS in Information Management → Data engineer at Groundhog Technologies
- Aditya Kadrekar (2020), MS in Information Management → Data scientist at Cargill, Inc.
- Lan Jiang (2019–2020), MS in Information Management → PhD student at UIUC
- Tre Tomaszewski (2019–2020), MS in Bioinformatics → PhD student at UIUC
- Jinlin Zeng (2018–2019), MS in Information Management

Undergraduate Students Mentored

- Molly Babczak (2025)
- Raphael Chen (2025–2026)
- Hanning Lin (2024–2025) → Grad student at UC Berkeley
- Stefan Chu (2023–2024) → Grad student at Harvard University
- Ziwei Wang (2023–2024) → Grad student at University of Pennsylvania
- Ved Shah (2021, SPIN—*Students Pushing INnovation* intern) → Grad student at Northwestern University
- HaeJin Lee (2021) → Grad student at UIUC
- Alistair Nunn (2020–2021)
- Zihan (Crescent) Xiong (2020–2022) → Grad student at University of Pennsylvania
- Debopam Sanyal (2019–2020, SPIN—*Students Pushing INnovation* intern) → Grad student at UIUC
- Lauren Gregory (2019)
- Dean Lin (2018–2019, SPIN—*Students Pushing INnovation* intern)
- Eddie Huang (2018–2019) → Grad student at UIUC
- Zhuoyue Wang (2018–2019) → Grad student at UC Berkeley
- Yuxuan Chen (Notre Dame; 2013–2016) → Grad student at Columbia University
- Huili Chen (Notre Dame; 2015–2016) → Grad student at Massachusetts Institute of Technology)
- Jianan Wang (Notre Dame; 2016)
- Jacob Beiter (Notre Dame; 2016)
- Timothy Pusateri (Notre Dame; 2015)

Professional Activities

Journal and Proceedings Editing

- Accessibility Production Editor, *Journal of Educational Data Mining* (2023–present)
- Co-editor, special issue of the APA *Technology, Mind, and Behavior* journal on "Understanding Involuntary Thought and Affect through Big Data and AI" (2023–2024)
- Co-editor, special issue of the *Journal of Educational Data Mining* on extended follow-ups to the best papers from EDM 2022 (December 2022)
- Co-editor, *Proceedings of the 15th International Conference on Educational Data Mining (EDM 2022)*

Journal Reviews

- ACM Transactions on Computer–Human Interaction (TOCHI)
- ACM Transactions on Human–Robot Interaction (THRI)
- ACM Transactions on Knowledge Discovery from Data (TKDD)
- Addiction
- American Educational Research Association Open (AERA Open)
- American Educational Research Journal (AERJ)
- Behavior Research Methods (BRM)
- British Journal of Educational Technology (BJET)
- Computers & Education
- Contemporary Educational Psychology
- IEEE Transactions on Affective Computing (TAFFC)
- IEEE Transactions on Learning Technologies (TLT)
- Image and Vision Computing (IMAVIS)
- International Journal of Artificial Intelligence in Education (IJAIED)
- International Journal of Human–Computer Interaction (IJHCI)
- International Journal of STEM Education
- Journal of Educational Data Mining (JEDM)
- Journal of Educational Psychology
- Journal of Learning Analytics (JLA)
- Learning and Individual Differences
- Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)
- Psychometrika
- Technology, Mind, and Behavior
- The Internet and Higher Education

Conference Reviews (Program Committee)

- AAAI Conference on Artificial Intelligence
- ACM CHI Conference on Human Factors in Computing Systems
- ACM Conference on Computer-Supported Cooperative Work and Social Computing
- ACM Conference on Fairness, Accountability, and Transparency (FAccT)
- ACM/IEEE Joint Conference on Digital Libraries (JCDL)

- Conference on Neural Information Processing Systems (NeurIPS)
- IEEE Conference on Automatic Face and Gesture Recognition (FG)
- IEEE Winter Conference on Applications of Computer Vision (WACV)
- International Conference on Affective Computing and Intelligent Interaction (ACII)
- International Learning Analytics and Knowledge (LAK) Conference
- International Society of the Learning Sciences (ISLS; ICLS/CSCL conferences)

Conference Associate Chair/Senior Program Committee

- ACM CHI Conference on Human Factors in Computing Systems
- ACM International Conference on Multimodal Interaction (ICMI)
- International Conference on Artificial Intelligence in Education (AIED)
- International Conference on Educational Data Mining (EDM)

Conference Chairing

- Late-breaking Results (LBR) and Demos track Co-chair, User Modeling, Adaptation, and Personalization (UMAP) Conference, 2025
- Equity, Diversity, Inclusion, and Accessibility Co-chair, Educational Data Mining (EDM) Conference, 2025
- Accessibility Chair, Educational Data Mining (EDM) Conference, 2024
- Program Committee Co-chair, Educational Data Mining (EDM) Conference, 2022
- Industry Track Co-chair, Educational Data Mining (EDM) Conference, 2020

Workshop Organization

- Co-chair/organizer, *Fair4AIED 2026: Second International Workshop on Fairness in AI-Assisted Decision-Making for Education* held at the Artificial Intelligence in Education (AIED) 2026 conference (https://fair4aied.github.io/2026/)
- Co-chair/organizer, *Fair4AIED 2025: First International Workshop on Fairness in Algorithmic Decision-Making for Education* held at the Artificial Intelligence in Education (AIED) 2025 conference (https://fair4aied.github.io/2025/)
- Co-chair/organizer, *Analyzing Learning with Speech Analytics and Computer Vision Methods: Technologies, Principles, and Ethics* workshop held at the International Conference on Learning Sciences (ICLS) 2020 conference
- Co-chair/organizer, *Fairness, Accountability, and Transparency in Educational Data* workshop held at the Educational Data Mining (EDM) 2020 conference (https://fatedm.inria.fr/)

Workshop and Symposium Reviews

- AAAI Workshop on AI Education
- APA Technology, Mind, and Society (TMS)
- EDMGAMES Workshop at the Educational Data Mining Conference
- EuroCSS Workshop on Biases in Social Computing Data and Technology
- HEXED (Human-Centric eXplainable AI in Education) Workshop
- IJCAI Workshop on Artificial Intelligence in Affective Computing
- International Workshop on Empathetic Computing

- NeurIPS Workshop on Generative AI for Education (GAIED)
- Society of Research on Educational Effectiveness Spring Conference (SREE)

Grant/Fellowship Proposals Reviews and Panels

- Computer Science Evaluation Group Member, Natural Sciences and Engineering Research Council of Canada (NSERC), 2025–2028
- Panelist, National Science Foundation (NSF) Directorate for Social, Behavioral and Economic Sciences (SBE), 2025
- Ad-hoc reviewer, UIUC Andrew T. Yang Research and Entrepreneurship Award, 2024
- Ad-hoc reviewer, UIUC Chancellor's Call to Action Research Projects, 2024
- Ad-hoc reviewer, UIUC / University Academic Alliance of Taiwan seed grant proposals, 2024
- Ad-hoc reviewer, Tools Competition (The Learning Agency), 2023–2024
- Panel chair, Institute of Education Sciences (IES), 2024
- Panelist, Institute of Education Sciences (IES), 2021, 2023, 2026
- Ad-hoc reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC), 2021–2022, 2024
- Ad-hoc reviewer, National Institutes of Health (NIH), 2021
- Panelist, National Science Foundation (NSF) Directorate for STEM Education, 2021–2023
- Ad-hoc reviewer, UIUC Technology Innovation in Educational Research and Design (TIER-ED) Pilot Projects, 2021
- Ad-hoc reviewer, UIUC Technology Innovation in Educational Research and Design (TIER-ED) Student Fellows, 2020
- Panelist, National Science Foundation (NSF) Directorate for Computer and Information Science and Engineering (CISE), 2020
- Ad-hoc reviewer, UIUC Campus Research Board, 2020–2022, 2025
- Ad-hoc reviewer, National Center for Supercomputing Applications (NCSA) Faculty Fellows, 2017

Professional Memberships (Past and Current)

- American Educational Research Association (AERA) Division C
- Association for the Advancement of Affective Computing (AAAC)
- Association for Computing Machinery (ACM)
- International Artificial Intelligence in Education Society
- International Educational Data Mining Society
- International Society of the Learning Sciences (ISLS)

Campus Committees

- Technology Governance Teaching and Learning Subcommittee (campus-level), UIUC, 2026–2029
- Executive Committee, School of Information Sciences, UIUC, 2025–2026
- Specialized Faculty Promotion Committee, College of Education, UIUC, 2025–2026
- Third-year Review Committee, School of Information Sciences, UIUC, 2025
- Space Policy Taskforce, College of Education, UIUC, 2023–2024
- AI Curriculum Committee, School of Information Sciences, UIUC, 2023–2024
- Doctoral Studies Committee, School of Information Sciences, UIUC, 2022–2025

- MS/IM Program Committee, School of Information Sciences, UIUC, 2019–2022
- Research Advisory Committee, School of Information Sciences, UIUC, 2019–2023
- Admissions Committee, School of Information Sciences, UIUC, 2019
- University of Notre Dame Computer Science Graduate Student Board, 2014–2015, 2015–2016

Search Committees

- Specialized Faculty, School of Information Sciences, UIUC, 2019–2020, Spring 2021, 2021–2022
- Tenure-track Faculty, School of Information Sciences, UIUC, 2023–2024, 2024–2025
- Tenure-track Faculty, Department of Curriculum and Instruction, UIUC, 2025–2026

Other Service and Outreach

- International Educational Data Mining Society Board of Directors, 2024–2030
- Illinois Online Higher Education Symposium Presenter, 2024
- HackIllinois Mentor, 2023
- STEM For All Video Showcase Presenter (TERC), 2020, 2021, 2022
- Illinois Science Olympiad State Tournament Judge, 2017–2019
- Northern Indiana Regional Science and Engineering Fair Judge, 2015, 2016
- Notre Dame National Robotics Week Presenter, 2013