

Nigel Bosch

Curriculum Vitae

Last Updated: October 2, 2026

School of Information Sciences and Department of Educational Psychology
501 E Daniel St, University of Illinois Urbana–Champaign, Champaign, IL 61820
pnb@illinois.edu – <https://pnigel.com>

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

- Fairbairn, C. E. & **Bosch, N.** (in press). Applying artificial intelligence to expand the measurement toolkit in clinical psychological science: Moving beyond self-reports. *Clinical Psychological Science*. DOI: [10.1177/21677026251379441](https://doi.org/10.1177/21677026251379441)
- 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](https://doi.org/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](https://doi.org/10.1111/add.70681)
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1037/pha0000799)
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1111/acer.14977)
- Baker, R. S., Hutt, S., **Bosch, N.**, Ocumpaugh, J., Biswas, G., Paquette, L., Andres, J. M. A., Nasir, 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1016/j.compedu.2015.08.001)

Peer-reviewed Published Conference Proceedings

- Miller, S. R. & **Bosch, N.** (in press). Learning by teaching an LLM: A new approach to writing instruction. *Proceedings of the 20th International Conference of the Learning Sciences - ICLS 2026*, pp. 2776-2778.
- Lee, H., Jeng, A., Burns, S., Bates, M., Moran, C., Kearfott, H., Reyes-Denis, T., Cimpian, J. R., Vythoulikas, 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](https://doi.org/10.1145/3785022.3785069)
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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/csl2024.507823](https://doi.org/10.22318/csl2024.507823)
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1609/hcomp.v11i1.27560)
- Denny, P., Becker, B. A., **Bosch, N.**, Prather, J., Reeves, B., & Whalley, J. (2022). Novice reflections during the transition to a new programming language. *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education (SIGCSE)*, pp. 948-954. DOI: [10.1145/3478431.3499314](https://doi.org/10.1145/3478431.3499314)
- 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](https://doi.org/10.5281/zenodo.6853181)
- Hur, P. & **Bosch, N.** (2022). Tracking individuals in classroom videos via post-processing OpenPose data. *Proceedings of the 12th International Conference on Learning Analytics & Knowledge (LAK '22)*, pp. 465-471. DOI: [10.1145/3506860.3506888](https://doi.org/10.1145/3506860.3506888)
- Jiang, L. & **Bosch, N.** (2022). Mining and assessing anomalies in students' online learning activities with self-supervised machine learning. In A. Mitrovic & **N. Bosch** (Eds.), *Proceedings of the 15th International Conference on Educational Data Mining (EDM 2022)*, pp. 549-554. DOI: [10.5281/zenodo.6852948](https://doi.org/10.5281/zenodo.6852948)
- Prather, J., Margulieux, L., Whalley, J., Denny, P., Reeves, B. N., Becker, B. A., Singh, P., Powell, G., & **Bosch, N.** (2022). Getting by with help from my friends: Group study in introductory

- programming understood as socially shared regulation. *Proceedings of the 18th ACM Conference on International Computing Education Research (ICER 2022)*, pp. 164–176. DOI: [10.1145/3501385.3543970](https://doi.org/10.1145/3501385.3543970)
- Stinar, F. & **Bosch, N.** (2022). Algorithmic unfairness mitigation in student models: When fairer methods lead to unintended results. In A. Mitrovic & **N. Bosch** (Eds.), *Proceedings of the 15th International Conference on Educational Data Mining (EDM 2022)*, pp. 606–611. DOI: [10.5281/zenodo.6853135](https://doi.org/10.5281/zenodo.6853135)
- Belitz, C., Jiang, L., & **Bosch, N.** (2021). Automating procedurally fair feature selection in machine learning. *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society (AIES '21)*, pp. 379–389. DOI: [10.1145/3461702.3462585](https://doi.org/10.1145/3461702.3462585)
- Bosch, N.**, Zhang, Y., Paquette, L., Baker, R. S., Ocumpaugh, J., & Biswas, G. (2021). Students' verbalized metacognition during computerized learning. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21)*, pp. 680:1–12. DOI: [10.1145/3411764.3445809](https://doi.org/10.1145/3411764.3445809)
- Hutt, S., Ocumpaugh, J., Andres, J. M. A. L., Munshi, A., **Bosch, N.**, Baker, R. S., Zhang, Y., Paquette, L., Slater, S., & Biswas, G. (2021). Who's stopping you? Using microanalysis to explore the impact of science anxiety on self-regulated learning operations. *Proceedings of the Annual Meeting of the Cognitive Science Society*, pp. 1409–1415.
- Hutt, S., Ocumpaugh, J., Andres, J. M. A. L., **Bosch, N.**, Paquette, L., Biswas, G., & Baker, R. S. (2021). Investigating SMART models of self-regulation and their impact on learning. In I. Hsiao, S. Sahebi, F. Bouchet, & J. Vie (Eds.), *Proceedings of the 14th International Conference on Educational Data Mining (EDM 2021)*, pp. 580–587.
- Jiang, L. & **Bosch, N.** (2021). Predictive sequential pattern mining via interpretable convolutional neural networks. In I. Hsiao, S. Sahebi, F. Bouchet, & J. Vie (Eds.), *Proceedings of the 14th International Conference on Educational Data Mining (EDM 2021)*, pp. 761–766.
- Ocumpaugh, J., Hutt, S., Andres, J. M. A. L., Baker, R. S., Biswas, G., **Bosch, N.**, Paquette, L., & Munshi, A. (2021). Using qualitative data from targeted interviews to inform rapid AIED development. In M. M. T. Rodrigo, S. Iyer, & A. Mitrovic (Eds.), *Proceedings of the 29th International Conference on Computers in Education*, 69–74.
- Williams-Dobosz, D., Azevedo, R. F. L., Jeng, A., Thakkar, V., Bhat, S., **Bosch, N.**, & Perry, M. (2021). A social network analysis of online engagement for college students traditionally underrepresented in STEM. *Proceedings of the 11th International Conference on Learning Analytics & Knowledge (LAK '21)*, pp. 207–215. DOI: [10.1145/3448139.3448159](https://doi.org/10.1145/3448139.3448159)
- Bosch, N.**, Crues, R. W., Shaik, N., & Paquette, L. (2020). “Hello, [REDACTED]”: Protecting student privacy in analyses of online discussion forums. In A. N. Rafferty, J. Whitehill, C. Romero, & V. Cavalli-Sforza (Eds.), *Proceedings of the 13th International Conference on Educational Data Mining (EDM 2020)*, pp. 39–49.
- D'Angelo, C., Dyer, E., Krist, C., Rosenberg, J., & **Bosch, N.** (2020). Advancing computational grounded theory for audiovisual data from mathematics classrooms. *Proceedings of the 14th International Conference on Learning Sciences (ICLS 2020)*, pp. 2393–2394.
- Gliser, I., Mills, C., **Bosch, N.**, Smith, S., Smilek, D., & Wammes, J. D. (2020). The sound of inattention: Predicting mind wandering with automatically derived features of instructor speech. In I. I.

- Bittencourt, M. Cukurova, K. Muldner, R. Luckin, & E. Millán (Eds.), *Proceedings of the 21st International Conference on Artificial Intelligence in Education (AIED 2020)*, pp. 204-215. DOI: [10.1007/978-3-030-52237-7_17](https://doi.org/10.1007/978-3-030-52237-7_17)
- Hoang, L., Boyce, R. D., **Bosch, N.**, Stottlemeyer, B. A., Brochhausen, M., & Schneider, J. (2020). Automatically classifying the evidence type of drug-drug interaction research papers as a step toward computer supported evidence curation. *Proceedings of the American Medical Informatics Association (AMIA) Annual Meeting*, pp. 554-562.
- Hur, P., **Bosch, N.**, Paquette, L., & Mercier, E. (2020). Harbingers of collaboration? The role of early-class behaviors in predicting collaborative problem solving. In A. N. Rafferty, J. Whitehill, C. Romero, & V. Cavalli-Sforza (Eds.), *Proceedings of the 13th International Conference on Educational Data Mining (EDM 2020)*, pp. 104-114.
- Jay, V., Henricks, G. M., Anderson, C. J., Angrave, L., **Bosch, N.**, Williams-Dobosz, D., Shaik, N., Bhat, S., & Perry, M. (2020). Online discussion forum help-seeking behaviors of students underrepresented in STEM. *Proceedings of the 14th International Conference on Learning Sciences (ICLS 2020)*, pp. 809-810.
- Sanyal, D., **Bosch, N.**, & Paquette, L. (2020). Feature selection metrics: Similarities, differences, and characteristics of the selected models. In A. N. Rafferty, J. Whitehill, C. Romero, & V. Cavalli-Sforza (Eds.), *Proceedings of the 13th International Conference on Educational Data Mining (EDM 2020)*, pp. 212-223.
- Valdiviejas, H. & **Bosch, N.** (2020). Using association rule mining to uncover rarely occurring relationships in two university online STEM courses: A comparative analysis. In A. N. Rafferty, J. Whitehill, C. Romero, & V. Cavalli-Sforza (Eds.), *Proceedings of the 13th International Conference on Educational Data Mining (EDM 2020)*, pp. 686-690.
- Zhang, Y., Paquette, L., Baker, R. S., Ocumpaugh, J., **Bosch, N.**, Munshi, A., & Biswas, G. (2020). The relationship between confusion and metacognitive strategies in Betty's Brain. *Proceedings of the 10th International Conference on Learning Analytics and Knowledge (LAK20)*, pp. 276-284. DOI: [10.1145/3375462.3375518](https://doi.org/10.1145/3375462.3375518)
- Andres, A., Ocumpaugh, J., Baker, R. S., Slater, S., Paquette, L., Jiang, Y., Karumbaiah, S., **Bosch, N.**, Munshi, A., Moore, A. L., & Biswas, G. (2019). Affect sequences and learning in Betty's Brain. In C. Brooks, R. Ferguson, & H. U. Hoppe (Eds.), *Proceedings of the 9th International Conference on Learning Analytics & Knowledge (LAK19)*, pp. 383-390. DOI: [10.1145/3303772.3303807](https://doi.org/10.1145/3303772.3303807)
- Bosch, N.**, Huang, E., Angrave, L., & Perry, M. (2019). Modeling improvement for underrepresented minorities in online STEM education. *Proceedings of the 27th Conference on User Modeling, Adaptation and Personalization (UMAP 2019)*, pp. 327-335. DOI: [10.1145/3320435.3320463](https://doi.org/10.1145/3320435.3320463)
- Huang, E., Valdiviejas, H., & **Bosch, N.** (2019). I'm sure! Automatic detection of metacognition in online course discussion forums. *Proceedings of the 8th International Conference on Affective Computing and Intelligent Interaction (ACII 2019)*, pp. 241-247. DOI: [10.1109/ACII.2019.8925506](https://doi.org/10.1109/ACII.2019.8925506)
- Mills, C., **Bosch, N.**, Krasich, K., & D'Mello, S. K. (2019). Reducing mind wandering during vicarious learning from an intelligent tutoring system. In S. Isotani, E. Millán, A. Ogan, P. Hastings, B. McLaren, & R. Luckin (Eds.), *Proceedings of the 20th International Conference on Artificial Intelligence in Education (AIED 2019)*, pp. 296-307. DOI: [10.1007/978-3-030-23204-7_25](https://doi.org/10.1007/978-3-030-23204-7_25)

- Bosch, N.**, Mills, C., Wammes, J. D., & Smilek, D. (2018). Quantifying classroom instructor dynamics with computer vision. In C. Rosé, R. Martínez-Maldonado, H. U. Hoppe, R. Luckin, M. Mavrikis, K. Porayska-Pomsta, B. McLaren, & B. du Boulay (Eds.), *Proceedings of the 19th International Conference on Artificial Intelligence in Education (AIED 2018)*, pp. 30-42. DOI: [10.1007/978-3-319-93843-1_3](https://doi.org/10.1007/978-3-319-93843-1_3)
- Bosch, N.**, Crues, R. W., & Shaik, N. (2018). Diverse learners, diverse motivations: Exploring the sentiment of learning objectives. In K. E. Boyer & M. V. Yudelson (Eds.), *Proceedings of the 11th International Conference on Educational Data Mining (EDM 2018)*, pp. 553-556.
- Bosch, N.**, Crues, R. W., Henricks, G. M., Perry, M., Angrave, L., Shaik, N., Bhat, S., & Anderson, C. J. (2018). Modeling key differences in underrepresented students' interactions with an online STEM course. *Proceedings of TechMindSociety '18*, pp. 6:1-6:6. DOI: [10.1145/3183654.3183681](https://doi.org/10.1145/3183654.3183681)
- Crues, R. W., **Bosch, N.**, Perry, M., Angrave, L., Shaik, N., & Bhat, S. (2018). Refocusing the lens on engagement in MOOCs. In R. Luckin, S. Klemmer, & K. R. Koedinger (Eds.), *Proceedings of the 5th ACM Conference on Learning@Scale (L@S 2018)*, pp. 11:1-11:10. DOI: [10.1145/3231644.3231658](https://doi.org/10.1145/3231644.3231658)
- Crues, R. W., **Bosch, N.**, Anderson, C. J., Perry, M., Bhat, S., & Shaik, N. (2018). Who they are and what they want: Understanding the reasons for MOOC enrollment. In K. E. Boyer & M. V. Yudelson (Eds.), *Proceedings of the 11th International Conference on Educational Data Mining (EDM 2018)*, pp. 177-186.
- Jiang, Y., **Bosch, N.**, Baker, R. S., Paquette, L., Ocumpaugh, J., Andres, J. M. A. L., Moore, A. L., & Biswas, G. (2018). Expert feature-engineering vs. deep neural networks: Which is better for sensor-free affect detection? In C. P. Rosé, R. Martínez-Maldonado, H. U. Hoppe, R. Luckin, M. Mavrikis, K. Porayska-Pomsta, B. McLaren, & B. du Boulay (Eds.), *Proceedings of the 19th International Conference on Artificial Intelligence in Education (AIED 2018)*, pp. 198-211. DOI: [10.1007/978-3-319-93843-1_15](https://doi.org/10.1007/978-3-319-93843-1_15)
- Paquette, L., **Bosch, N.**, Mercier, E., Jung, J., Shehab, S., & Tong, Y. (2018). Matching data-driven models of group interactions to video analysis of collaborative problem solving on tablet computers. In J. Kay & R. Luckin (Eds.), *Proceedings of the 13th International Conference of the Learning Sciences (ICLS 2018)*, 312-319. DOI: [10.22318/csl2018.312](https://doi.org/10.22318/csl2018.312)
- D'Mello, S. K., Mills, C., Bixler, R., & **Bosch, N.** (2017). Zone out no more: Mitigating mind wandering during computerized reading. In X. Hu, T. Barnes, A. Hershkovitz, & L. Paquette (Eds.), *Proceedings of the 10th International Conference on Educational Data Mining (EDM 2017)*, pp. 8-15.
- Hutt, S., Mills, C., **Bosch, N.**, Krasich, K., Brockmole, J., & D'Mello, S. K. (2017). Out of the fr-"eye"-ing pan: Towards gaze-based models of attention during learning with technology in the classroom. *Proceedings of the 2017 Conference on User Modeling, Adaptation, and Personalization (UMAP 2017)*, pp. 94-103. DOI: [10.1145/3079628.3079669](https://doi.org/10.1145/3079628.3079669)
- Khan, S., Suendermann-Oeft, D., Evanini, K., Williamson, D. M., Paris, S., Qian, Y., Huang, Y., **Bosch, N.**, D'Mello, S. K., Loukina, A., & Davis, L. (2017). MAP: Multimodal assessment platform for interactive communication competency. In S. Shehata & J. P. Tan (Eds.), *Practitioner Track Proceedings of the 7th International Conference on Learning Analytics & Knowledge (LAK17)*, pp. 6-12.
- Stewart, A., **Bosch, N.**, & D'Mello, S. K. (2017). Generalizability of face-based mind wandering detection

- across task contexts. In X. Hu, T. Barnes, A. Hershkovitz, & L. Paquette (Eds.), *Proceedings of the 10th International Conference on Educational Data Mining (EDM 2017)*, pp. 88-95.
- Stewart, A., **Bosch, N.**, Chen, H., Donnelly, P. J., & D'Mello, S. K. (2017). Face forward: Detecting mind wandering from video during narrative film comprehension. In E. André, R. S. Baker, X. Hu, M. M. T. Rodrigo, & B. du Boulay (Eds.), *Proceedings of the 18th International Conference on Artificial Intelligence in Education (AIED 2017)*, pp. 359-370. DOI: [10.1007/978-3-319-61425-0_30](https://doi.org/10.1007/978-3-319-61425-0_30)
- Bosch, N.**, D'Mello, S. K., Baker, R. S., Ocumpaugh, J., Shute, V. J., Ventura, M., Wang, L., & Zhao, W. (2016). Detecting student emotions in computer-enabled classrooms. *Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI 2016)*, pp. 4125-4129.
- Bosch, N.** (2016). Detecting student engagement: Human versus machine. *Proceedings of the 2016 Conference on User Modeling, Adaptation, and Personalization (UMAP 2016)*, pp. 317-320. DOI: [10.1145/2930238.2930371](https://doi.org/10.1145/2930238.2930371)
- D'Mello, S. K., Kopp, K., Bixler, R., & **Bosch, N.** (2016). Attending to attention: Detecting and combating mind wandering during computerized reading. *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, pp. 1661-1669. DOI: [10.1145/2851581.2892329](https://doi.org/10.1145/2851581.2892329)
- Dillon, J., **Bosch, N.**, Chetlur, M., Wanigasekara, N., Ambrose, G. A., Sengupta, B., & D'Mello, S. K. (2016). Student emotion, co-occurrence, and dropout in a MOOC context. In T. Barnes, M. Chi, & M. Feng (Eds.), *Proceedings of the 9th International Conference on Educational Data Mining (EDM 2016)*, pp. 353-357.
- Stewart, A., **Bosch, N.**, Chen, H., Donnelly, P. J., & D'Mello, S. K. (2016). Where's your mind at? Video-based mind wandering detection during film viewing. *Proceedings of the 2016 Conference on User Modeling, Adaptation, and Personalization (UMAP 2016)*, pp. 295-296. DOI: [10.1145/2930238.2930266](https://doi.org/10.1145/2930238.2930266)
- Bosch, N.**, D'Mello, S. K., Baker, R. S., Ocumpaugh, J., & Shute, V. J. (2015). Temporal generalizability of face-based affect detection in noisy classroom environments. In C. Conati, N. T. Heffernan, A. Mitrovic, & M. Felisa Verdejo (Eds.), *Proceedings of the 17th International Conference on Artificial Intelligence in Education (AIED 2015)*, pp. 44-53. DOI: [10.1007/978-3-319-19773-9_5](https://doi.org/10.1007/978-3-319-19773-9_5)
- Bosch, N.**, D'Mello, S. K., Baker, R. S., Ocumpaugh, J., Shute, V. J., Ventura, M., Wang, L., & Zhao, W. (2015). Automatic detection of learning-centered affective states in the wild. *Proceedings of the 2015 International Conference on Intelligent User Interfaces (IUI 2015)*, pp. 379-388. DOI: [10.1145/2678025.2701397](https://doi.org/10.1145/2678025.2701397)
- Bosch, N.**, Chen, H., Baker, R., Shute, V., & D'Mello, S. K. (2015). Accuracy vs. availability heuristic in multimodal affect detection in the wild. *Proceedings of the 17th International Conference on Multimodal Interaction (ICMI 2015)*, pp. 267-274. DOI: [10.1145/2818346.2820739](https://doi.org/10.1145/2818346.2820739)
- Bosch, N.** (2015). Multimodal affect detection in the wild: Accuracy, availability, and generalizability. *Proceedings of the 17th International Conference on Multimodal Interaction (ICMI 2015 doctoral consortium)*, pp. 645-649. DOI: [10.1145/2818346.2823316](https://doi.org/10.1145/2818346.2823316)
- Chen, Y., **Bosch, N.**, & D'Mello, S. K. (2015). Video-based affect detection in noninteractive learning environments. In C. Romero, M. Pechenizkiy, J. Boticario, & O. Santos (Eds.), *Proceedings of the 8th International Conference on Educational Data Mining (EDM 2015)*, pp. 440-443.

- Kai, S., Paquette, L., Baker, R., **Bosch, N.**, D'Mello, S. K., Ocumpaugh, J., Shute, V. J., & Ventura, M. (2015). A comparison of face-based and interaction-based affect detectors in Physics Playground. In C. Romero, M. Pechenizkiy, J. Boticario, & O. Santos (Eds.), *Proceedings of the 8th International Conference on Educational Data Mining (EDM 2015)*, pp. 77-84.
- Mills, C., D'Mello, S. K., **Bosch, N.**, & Olney, A. (2015). Mind wandering during learning with an intelligent tutoring system. In C. Conati, N. T. Heffernan, A. Mitrovic, & M. Felisa Verdejo (Eds.), *Proceedings of the 17th International Conference on Artificial Intelligence in Education (AIED 2015)*, pp. 267-276. DOI: [10.1007/978-3-319-19773-9_27](https://doi.org/10.1007/978-3-319-19773-9_27)
- Bosch, N.**, Chen, Y., & D'Mello, S. K. (2014). It's written on your face: Detecting affective states from facial expressions while learning computer programming. In S. Trausan-Matu, K. E. Boyer, M. Crosby, & K. Panourgia (Eds.), *Proceedings of the 12th International Conference on Intelligent Tutoring Systems (ITS 2014)*, pp. 39-44. DOI: [10.1007/978-3-319-07221-0_5](https://doi.org/10.1007/978-3-319-07221-0_5)
- Bosch, N.** & D'Mello, S. K. (2014). It takes two: Momentary co-occurrence of affective states during computerized learning. In S. Trausan-Matu, K. E. Boyer, M. Crosby, & K. Panourgia (Eds.), *Proceedings of the 12th International Conference on Intelligent Tutoring Systems (ITS 2014)*, pp. 638-639. DOI: [10.1007/978-3-319-07221-0_89](https://doi.org/10.1007/978-3-319-07221-0_89)
- Mills, C., **Bosch, N.**, Graesser, A., & D'Mello, S. K. (2014). To quit or not to quit: Predicting future behavioral disengagement from reading patterns. In S. Trausan-Matu, K. E. Boyer, M. Crosby, & K. Panourgia (Eds.), *Proceedings of the 12th International Conference on Intelligent Tutoring Systems (ITS 2014)*, pp. 19-28. DOI: [10.1007/978-3-319-07221-0_3](https://doi.org/10.1007/978-3-319-07221-0_3)
- Rodeghero, P., McMillan, C., McBurney, P. W., **Bosch, N.**, & D'Mello, S. K. (2014). Improving automated source code summarization via an eye-tracking study of programmers. *Proceedings of the 36th International Conference on Software Engineering (ICSE 2014)*, pp. 390-401. DOI: [10.1145/2568225.2568247](https://doi.org/10.1145/2568225.2568247)
- Bosch, N.**, D'Mello, S. K., & Mills, C. (2013). What emotions do novices experience during their first computer programming learning session? In H. C. Lane, K. Yacef, J. Mostow, & P. Pavlik (Eds.), *Proceedings of the 16th International Conference on Artificial Intelligence in Education (AIED 2013)*, pp. 11-20. DOI: [10.1007/978-3-642-39112-5_2](https://doi.org/10.1007/978-3-642-39112-5_2)
- Bosch, N.** & D'Mello, S. K. (2013). Programming with your heart on your sleeve: Analyzing the affective states of computer programming students. In H. C. Lane, K. Yacef, J. Mostow, & P. Pavlik (Eds.), *Proceedings of the 16th International Conference on Artificial Intelligence in Education (AIED 2013)*, pp. 908-911. DOI: [10.1007/978-3-642-39112-5_143](https://doi.org/10.1007/978-3-642-39112-5_143)
- Mills, C., D'Mello, S. K., Lehman, B., **Bosch, N.**, Strain, A., & Graesser, A. (2013). What makes learning fun? Exploring the influence of choice and difficulty on mind wandering and engagement during learning. In H. C. Lane, K. Yacef, J. Mostow, & P. Pavlik (Eds.), *Proceedings of the 16th International Conference on Artificial Intelligence in Education (AIED 2013)*, pp. 71-80. DOI: [10.1007/978-3-642-39112-5_8](https://doi.org/10.1007/978-3-642-39112-5_8)

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](https://doi.org/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](https://doi.org/10.1145/3107990.3107998)

Peer-reviewed Workshop Papers

Belitz, C., **Bosch, N.**, Jiang, L., Jivet, I., Kirouchenassamy, B., Lee, H., Leporini, B., Mallocci, 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](https://doi.org/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 (TAFAC)
- 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