Mariah Bradford

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Summary

Ph.D. Student at Colorado State University interested in human-centered AI. I enjoy developing innovative solutions to human problems using state-of-the-art technology. I specialize in dialogue analysis and user experience with an emphasis on educational applications. I have experience in data collection, data analysis, system development, and system evaluation. I am particularly excited for problem-driven applied research.

Education

- **Ph.D. in Computer Science, Colorado State University** Expected Fall 2026
  Human-Centered AI
- **B.S. in Computer Science, Colorado State University** Spring 2022
  Human-Computer Interaction
- **B.S. in Psychology, Colorado State University** Spring 2022
  Human Subjects Research

Research

- **Research Projects**
  - **Disagreements**: Evaluating state-of-the-art large language models' ability to detect and support small group disagreements (in progress)
  - **Human-Agent User Study**: Evaluating agent interventions in small groups via performance, speed, and user experience (in progress)
  - **Interruption Detection**: Detecting interruptions in small groups and analyzing the impact of ambient background speech in a simulated noisy classroom
  - **Task-Belief Tracking**: Automatically tracking group and individual task beliefs in small groups using multimodal data
  - **Collaborative Problem Solving**: Automatically detecting collaborative problem-solving dialogue moves in small groups
- **Publications**
  - **Bradford, M.**, Krishnaswamy, N., & Blanchard, N. (2025, July). The Impact of Background Speech on Interruption Detection in Collaborative Groups. In International Conference on Artificial Intelligence in Education (pp. 118-131). Cham: Springer Nature Switzerland.
  - **Bradford, M.**, Khebour, I., VanderHoeven, H., Venkatesha, V., Blanchard, N., & Krishnaswamy, N. (2025, June). Tracking Individual Beliefs in Co-situated Groups Using Multimodal Input. In International Conference on Human-Computer Interaction (pp. 139-158).
  - **Bradford, M.**, Khebour, I., Blanchard, N., & Krishnaswamy, N. (2023, June). Automatic detection of collaborative states in small groups using multimodal features. In International Conference on Artificial Intelligence in Education (pp. 767-773). Cham: Springer Nature Switzerland.
  - **Bradford, M.**, Hansen, P., Lai, K., Brutti, R., Dickler, R., Hirshfield, L., ... & Krishnaswamy, N. (2022). Challenges and opportunities in annotating a multimodal collaborative problem-solving task. In Interdisciplinary Approaches to Getting AI Experts and Education Stakeholders Talking Workshop, AIEd.
  - **Bradford, M.**, Hansen, P., Ross, J. B., Krishnaswamy, N., & Blanchard, N. (2022, January). A deep dive into microphone hardware for recording collaborative group work. In Educational Data Mining Conference. Zenodo.
  - Zhu, Y., **Bradford, M.**, Lai, K., Obiso, T., Venkatesha, V., Pustejovsky, J., & Krishnaswamy, N. (2026). Distributed Partial Information Puzzles: Examining Common Ground Construction Under Epistemic Asymmetry. In Language Resources and Evaluation Conference.
  - Zhu, Y., Jung, C., Lai, K., Venkatesha, V., **Bradford, M.**, Fitzgerald, J., ... & Krishnaswamy, N. (2025, September). Multimodal Common Ground Annotation for Partial Information Collaborative Problem Solving. In ISO Workshop on Interoperable Semantic Annotation (ISA-21) (p. 85).
  - Venkatesha, V., **Bradford, M.**, & Blanchard, N. (2025, July). Dude, where's my utterance? evaluating the effects of automatic segmentation and transcription on cps detection. In International Conference on Artificial Intelligence in Education (pp. 144-151). Cham: Springer Nature Switzerland.

- Ibarra, B., Wisniewski, B., Terpstra, C., Venkatesha, V., **Bradford, M.**, & Blanchard, N. (2025, June). Investigating automated transcriptions for multimodal cps detection in groupwork. In International Conference on Human-Computer Interaction (pp. 214-224). Cham: Springer Nature Switzerland.
- Anindho, S., Venkatesha, V., **Bradford, M.**, Cleary, A. M., & Blanchard, N. (2025, June). An exploration of internal states in collaborative problem solving. In International Conference on Human-Computer Interaction (pp. 135-150). Cham: Springer Nature Switzerland.
- Palmer, D., Zhu, Y., Lai, K., VanderHoeven, H., **Bradford, M.**, Khebour, I., ... & Pustejovsky, J. (2025, April). Speech Is Not Enough: Interpreting Nonverbal Indicators of Common Knowledge and Engagement. In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 39, No. 28, pp. 29676-29678).
- VanderHoeven, H., Bhalla, B., Khebour, I., Youngren, A. C., Venkatesha, V., **Bradford, M.**, ... & Krishnaswamy, N. (2025, April). Trace: Real-time multimodal common ground tracking in situated collaborative dialogues. In Proceedings of the 2025 Conference of the Nations of the Americas Chapter of the Association for Computational Linguistics: Human Language Technologies (System Demonstrations) (pp. 40-50).
- Venkatesha, V., Nath, A., Khebour, I., Chelle, A., **Bradford, M.**, Tu, J., ... & Krishnaswamy, N. (2025). Propositional extraction from collaborative naturalistic dialogues. Journal of educational data mining.
- Nath, A., Venkatesha, V., **Bradford, M.**, Chelle, A., Youngren, A. C., Mabrey, C., ... Krishnaswamy, N. (2024, November). "Any Other Thoughts, Hedgehog?" Linking Deliberation Chains in Collaborative Dialogues. In Findings of the Association for Computational Linguistics: EMNLP 2024 (pp. 5297-5314).
- Seefried, E., Bahny, J., Jung, C., Venkatesha, V., **Bradford, M.**, Blanchard, N., & Arefin, M. S. (2024, October). Perceiving and learning color as sound in virtual reality. In 2024 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct) (pp. 523-524). IEEE.
- VanderHoeven, H., **Bradford, M.**, Jung, C., Khebour, I., Lai, K., Pustejovsky, J., ... & Blanchard, N. (2024, June). Multimodal design for interactive collaborative problem-solving support. In International Conference on Human-Computer Interaction (pp. 60-80). Cham: Springer Nature Switzerland.
- Zhu, Y., VanderHoeven, H., Lai, K., **Bradford, M.**, Tam, C., Khebour, I., ... & Pustejovsky, J. (2024, June). Modeling theory of mind in multimodal HCI. In International Conference on Human-Computer Interaction (pp. 205-225). Cham: Springer Nature Switzerland.
- Seefried, E., **Bradford, M.**, Aich, S., Siebert, C., Krishnaswamy, N., & Blanchard, N. (2024, June). Learning foreign language vocabulary through task-based virtual reality immersion. In International Conference on Human-Computer Interaction (pp. 203-213). Cham: Springer Nature Switzerland.
- Khebour, I. K., Lai, K., **Bradford, M.**, Zhu, Y., Brutti, R. A., Tam, C., ... & Pustejovsky, J. (2024, May). Common ground tracking in multimodal dialogue. In Proceedings of the 2024 Joint International Conference on Computational Linguistics, Language Resources and Evaluation (LREC-COLING 2024) (pp. 3587-3602).
- Venkatesha, V., Nath, A., Khebour, I., Chelle, A., **Bradford, M.**, Tu, J., ... & Krishnaswamy, N. (2024). Propositional Extraction from Natural Speech in Small Group Collaborative Tasks. International Educational Data Mining Society.
- Seefried, E., Jung, C., Fitzgerald, J., **Bradford, M.**, Chartier, T., & Blanchard, N. (2024). Balancing quality and quantity: The impact of synthetic data on smoke detection accuracy in computer vision. In Synthetic Data for Computer Vision Workshop@ CVPR 2024.
- Khebour, I., Brutti, R., Dey, I., Dickler, R., Sikes, K., Lai, K., **Bradford, M.**, ... & Krishnaswamy, N. (2024). When text and speech are not enough: A multimodal dataset of collaboration in a situated task. Journal of open humanities data, 10.
- Terpstra, C., Khebour, I., **Bradford, M.**, Wisniewski, B., Krishnaswamy, N., & Blanchard, N. (2023, June). How Good is Automatic Segmentation as a Multimodal Discourse Annotation Aid?. In Proceedings of the 19th Joint ACL-ISO Workshop on Interoperable Semantics (ISA-19) (pp. 75-81).
- Castillon, I., Venkatesha, V., VanderHoeven, H., **Bradford, M.**, Krishnaswamy, N., & Blanchard, N. (2022). Multimodal features for group dynamic-aware agents. In Interdisciplinary approaches to getting ai experts and education stakeholders talking workshop at aied. international aied society (pp. 1-6).

Experience

- **Research Assistant, Colorado State University** Fall 2021 - Present
  Institute for Student-AI Teaming
  - **Dialogue Analysis**: Utilize state-of-the-art software and approaches to detect and analyze dialogue moves in small groups. Includes traditional machine learning, deep learning, and LLM approaches.
  - **User Studies**: Develop and deploy user studies to evaluate an end-to-end agent intervention system in small groups. Includes study design, survey development, behavioral analysis, and data collection.

- **Feature Extraction**: Provide pipelines for automatic feature extraction using existing software for use across the lab. Includes speech segmentation, transcription, embedding encoding, audio features, and speaker detection.
- **Data Collection**: Develop and oversee IRB-approved data collection methods for human subjects research. Includes study design, securing ethics approval, maintaining data, and leading data collection teams.
- **Publishing**: Lead and collaborate on peer-reviewed publications. Includes literature review, problem/hypothesis formulation, experimental design, data analysis, writing conclusions, and presenting work. Published 24 peer-reviewed papers.

- **Research Fellow, AI Institutes Virtual Organization** Summer 2025
  AI4Ed Summer Fellowship
  - **Cross-Institute Groups**: Collaborated with a new short-term team to find common research interests and assign appropriate roles. Required quick, self-driven onboarding.
  - **Problem Formulation**: Developed a research question that leveraged the skills and interests of the team. Led the problem formulation toward my interest in supporting group disagreements.
  - **Approach**: My role on the team was dataset identification and detecting small group disagreements using state-of-the-art NLP techniques, including a custom transformer-based architecture and various LLM approaches.
  - **Final Presentation**: Communicated our findings in a presentation to AI and Educational experts and peers at a fellowship summit. Successfully predicted group disagreement using our approaches. Analyzed the pros and cons of each.

Service

- **Workshops**
  - Co-Organizer, Computer Vision for Education Workshop, CVPR, 2026 (upcoming)
  - Co-Organizer, Optimal Reliance and Accountability in Interactions with Generative Language Models Workshop, COLM, 2025
- **Reviewer**
  - Program Committee, COLING 2025
  - Program Committee, LREC-COLING 2024
  - Program Committee, AIED 2023
- **Mentor**
  - iSAT High School Internship Program (in progress)
  - Workshop Lead, STEM World in Fort Collins Summer Camp 2023

Honors and Awards

- **Collecting Classroom Data for Multimodal Detection of Key CPS Indicators**
  Funded $2,500
- **Rising Star Award at Colorado State University**