# Emily Jensen, Ph.D.

emilykjensen.com / ejensen@fandm.edu

## Research overview

I build **adaptive training systems** that help learners develop skills for **complex psychomotor tasks**. My research uses tools from formal methods and intelligent tutoring systems to create **explainable** systems that bring **pedagogical theories** into **modern learning scenarios**.

## Education

2024 **Ph.D. Computer Science and Cognitive Science**
University of Colorado Boulder
Advisors: Bradley Hayes and Sriram Sankaranarayanan
Dissertation: Adaptive Training Systems for Human-Robot Interaction

2022 **M.S. Computer Science**
University of Colorado Boulder

2018 **B.A. Cognitive Science and B.S. Mathematics**, summa cum laude
Case Western Reserve University

## Professional experience

2024 - present **Assistant Professor of Computer Science**
Franklin & Marshall College

2018 - 2024 **Graduate Research Assistant**
University of Colorado Boulder

2022 - 2023 **Journeyman Fellow**
U.S. Army Research Laboratory, HRED
Advisor: Anthony J. Ries

2017 **REU Undergraduate Researcher**
Florida Institute of Technology

## Journal Articles

[J1] Callahan-Flintoft, C., **Jensen, E.**, Naeem, J., Nonte, M. W., Madison, A. M., Ries, A. J., "A Comparison of Head Movement Classification Methods". In: *Sensors* (2024). DOI: 10.3390/s24041260.

[J2] D'Mello, S. K., Moulder, R. G., **Jensen, E.,** "Momentary Measures of Emotions During Technology-enhanced Learning Prospectively Predict Standardized Test Scores in Two Large Samples". In: *Learning and Instruction* 90 (2024). DOI: 10.1016/j.learninstruc.2023.101872.

[J3] Villanueva, C., Ibonie, S., **Jensen, E.**, Eloy, L., Quoidbach, J., Bryan, A., D'Mello, S. K., Gruber, J., "Emotion Differentiation and Bipolar Risk in Emerging Adults Before and During

the COVID-19 Pandemic". In: *Journal of Emotion and Psychopathology* (2023). DOI: 10.31234/osf.io/xya43. (In Press).

## Conference proceedings

[C1] **Jensen, E.**, Sankaranarayanan, S., Hayes, B., "Automated Assessment and Adaptive Multimodal Formative Feedback Improves Psychomotor Skills Training Outcomes in Quadrotor Teleoperation". 2024. URL: https://arxiv.org/abs/2405.15982. (Under Review at HAI).

[C2] Schirmer, S., Singh, J., **Jensen, E.**, Dauer, J. C., Finkbeiner, B., Sankaranarayanan, S., "Temporal Behavior Trees: Robustness and Segmentation". In: *Proceedings of the 2024 ACM International Conference on Hybrid Systems: Computation and Control*. 2024. DOI: 10.1145/3641513.3650180.

[C3] **Jensen, E.**, Hayes, B., Sankaranarayanan, S., "More Than a Number: A Multi-dimensional Framework For Automatically Assessing Human Teleoperation Skill". In: *Companion of the 2023 ACM/IEEE International Conference on Human-Robot Interaction*. 2023. DOI: 10.1145/3568294.3580167. [Included poster presentation].

[C4] **Jensen, E.**, Luster, M., Pitts, B., Sankaranarayanan, S., "Using Artificial Potential Fields To Model Driver Situational Awareness". In: *4th IFAC Workshop on Cyber-Physical Human-Systems*. 2022. DOI: 10.1016/j.ifacol.2023.01.118. [Included talk and poster].

[C5] **Jensen, E.**, Luster, M., Yoon, H., Pitts, B., Sankaranarayanan, S., "Mathematical Models of Human Drivers Using Artificial Risk Fields". In: *Proceedings of the Intelligent Transportation Systems Conference*. 2022. DOI: 10.1109/ITSC55140.2022.9922389. [Included conference talk].

[C6] Leite, W. L., Roy, S., Chakraborty, N., Michailidis, G., Huggins-Manley, A. C., D'Mello, S. K., Faradonbeh, M. K. S., **Jensen, E.**, Kuang, H., Jing, Z., "A Novel Video Recommendation System for Algebra : An Effectiveness Evaluation Study". In: *Proceedings of the 12th International Learning Analytics and Knowledge Conference (LAK22)*. 2022. DOI: 10.1145/3506906.

[C7] **Jensen, E.**, Pugh, S. L., D'Mello, S. K., "A Deep Transfer Learning Approach to Modeling Teacher Discourse in the Classroom". In: *Proceedings of the 11th International Learning Analytics and Knowledge Conference (LAK21)*. 2021. DOI: 10.1145/3448139.3448168. [Included conference talk].

[C8] **Jensen, E.**, Umada, T., Hunkins, N. C., D'Mello, S. K., Hutt, S., Huggins-Manley, A. C., "What You Do Predicts How You Do: Prospectively Modeling Student Quiz Performance Using Activity Features in an Online Learning Environment". In: *Proceedings of the 11th International Learning Analytics and Knowledge Conference (LAK21)*. 2021. DOI: 10.1145/3448139.3448151. [**Best Paper Runner-up**, included talk].

[C9] **Jensen, E.**, Dale, M., Donnelly, P. J., Stone, C., Kelly, S., Godley, A., D'Mello, S. K., "Toward Automated Feedback on Teacher Discourse to Enhance Teacher Learning". In: *2020 CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2020)*. 2020. DOI: 10.1145/3313831.3376418.

[C10] **Jensen, E.**, Hutt, S., D'Mello, S. K., "Generalizability of Sensor-Free Affect Detection Models in a Longitudinal Dataset of Tens of Thousands of Students". In: *The 12th International Conference on Educational Data Mining*. 2019. URL: https://eric.ed.gov/?id=ED599213. [Included conference talk].

[C11] Bryan, K. J., Solomon, M., **Jensen, E.**, Coley, C., Rajan, K., Tian, C., Mijatovic, N., Kiss, J. M., Lamoureux, B., Dersin, P., Smith, A. O., Peter, A. M., "Classification of Rail Switch Data Using Machine Learning Techniques". In: *Proceedings of the 2018 Joint Rail Conference*. 2018. DOI: 10.1115/JRC2018-6175.

## Book chapters

[B1] D'Mello, S. K., **Jensen, E.,** "Emotional Learning Analytics". In: *Handbook of Learning Analytics*. 2022. DOI: 10.18608/hla22.012.

## Workshop proceedings

[W1] **Jensen, E.**, Sankaranarayanan, S., Hayes, B., "Large Language Models Enable Automated Formative Feedback in Human-Robot Interaction Tasks". In: *Human-Large Language Model Interaction workshop at the 2024 ACM/IEEE International Conference on Human-Robot Interaction*. 2024. URL: https://arxiv.org/abs/2405.16344. [Included workshop talk].

[W2] Wilson, J. R., **Jensen, E.,** "HRI Curriculum for a Liberal Arts Education". In: *Designing an Intro to HRI Course Workshop at the 2024 ACM/IEEE International Conference on Human-Robot Interaction*. 2024. URL: https://arxiv.org/abs/2403.14025.

[W3] **Jensen, E.** "Specifying Drone Teleoperation Skill for Adaptive Curriculum Generation". In: *Humans in Cyber-Physical Systems: Safe Teleoperation through Shared Control Workshop at CPS-IoT Week*. 2023. [Included workshop talk].

## Invited talks

[T1] **Jensen, E.** "Skill Acquisition Using Automated Feedback From Generative AI Systems". Conversations on Generative AI series for University of Colorado Boulder Engineering's Office of Digital Education. Apr. 2024.

[T2] **Jensen, E.** "Defining and Assessing Skill for Human-Robot Interaction". Student colloquium talk at University of Colorado Boulder. Sept. 2023.

[T3] **Jensen, E.** "Defining and Assessing Skill for Human-Robot Interaction". Seminar talk at Colorado School of Mines. June 2023.

[T4] **Jensen, E.** "Revolutionizing Education with Personalized Learning Technologies". Bucknell University. Dec. 2023.

[T5] **Jensen, E.** "Revolutionizing Education with Personalized Learning Technologies". Franklin & Marshall College. Dec. 2023.

## Posters

[P1] Le, N., Manns, B. H., Villanueva, C. M., Ibonie, S. G., **Jensen, E.**, Eloy, L., Bryan, A., D'Mello, S. K., Gruber, J., "Mind Wandering and Bipolar Spectrum Disorder Risk in Emerging Adults: An Experience Sampling Approach". Presented at the 2024 Society for Research in Psychopathology (SRP) Annual Conference. 2024.

[P2] Manns, B. H., Le, N., Villanueva, C. M., Ibonie, S. G., **Jensen, E.**, Eloy, L., Bryan, A., D'Mello, S. K., Gruber, J., "Mind Wandering and Bipolar Disorder Risk in Emerging Adults: An Experience Sampling Approach". Presented at the 2024 Society for Affective Science (SAS) Annual Conference. 2024.

[P3] Schirmer, S., Singh, J., **Jensen, E.**, Dauer, J., Finkbeiner, B., Sankaranarayanan, S., "Temporal Behavior Trees – Segmentation". Presented at the 2024 ACM International Conference on Hybrid Systems: Computation and Control. 2024. [**Best Poster Award**].

[P4] Villanueva, C. M., Ibonie, S. G., **Jensen, E.**, Eloy, L., D'Mello, S. K., Gruber, J., "Emotion Differentiation and Bipolar Risk in Emerging Adults Before and During the COVID-19 Pandemic: An Experience-Sampling Approach". Presented at the 2021 Society for Research in Psychopathology (SRP) Annual Conference. 2024.

[P5] **Jensen, E.**, Dale, M., Donnelly, P. J., Stone, C., Kelly, S., Godley, A., D'Mello, S. K., "Toward Automatic Feedback on Teacher Discourse to Enhance Teacher Learning". Presented at the Institute of Cognitive Science at University of Colorado Boulder. 2020.

[P6] **Jensen, E.**, Hutt, S., D'Mello, S. K., "Generalizability of Sensor-Free Affect Detection Models". Presented at the Department of Computer Science at University of Colorado Boulder. 2019. [**Best Presentation Award**].

[P7] **Jensen, E.**, Hutt, S., D'Mello, S. K., "Generalizability of Sensor-Free Affect Detection Models". Presented at CRA-W Grad Cohort. 2019.

## Workshops organized

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| May 2023 | **Humans in Cyber-Physical Systems: Safe Teleoperation through Shared Control Workshop**<br>At CPS-IoT Week 2023 |
| March 2023 | **Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions Workshop**<br>At HRI 2023 |

## Teaching experience

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| Spring 2021 | CSCI 3202: Intro to Artificial Intelligence, Teaching Assistant |
| Fall 2020 | CSCI 5100/6100: Computer Science Colloquium, Teaching Assistant<br>CSCI 6000: Intro to the Computer Science PhD Program, Teaching Assistant |

## Outreach

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| Graduate Orientation | Healthy Advising Relationships (2022, 2023)<br>Navigating the Computer Science PhD (2021)<br>Financial Basics (2021) |
| Workshops | Intro to AI and Machine Learning Seminar - ARL Researchers (2023)<br>Intro to Computational Thinking - Grad Students (2022)<br>Intro to Data Analysis in Python - Undergraduate Students (2021 - 2023) |
| Volunteer | Graduate School Peer Mentor (2019 - 2020)<br>Science Fair Judge at Colorado STEM Academy (2019 - 2020)<br>Tech Help Facilitator at Boulder Public Library (2019 - 2023) |

## Professional service

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| Conference Leadership | International Conference on Multimodal Interaction (**ICMI**)<br>Webchair (2018)<br>Educational Data Mining (**EDM**)<br>Program Committee (2022 - 2024)<br>Learning Analytics and Knowledge (**LAK**)<br>Program Committee (2022)<br>Human-Robot Interaction (**HRI**)<br>Student Volunteer (2024) |
| Conference Reviews | Artificial Intelligence in Education (**AIED**; 2020, 2021)<br>Human Factors in Computing Systems (**CHI**; 2021)<br>Learning @ Scale (**L@S**; 2021)<br>Human-Robot Interaction (**HRI**; 2023) |
| Journal Reviews | Computers & Education (2022)<br>Higher Education Pedagogies (2022) |
| Students Supervised | Tetsumichi Umada (MS; 2019 - 2020)<br>Xuefei Sun (BS; 2019)<br>Jasdeep Singh (BS; 2023)<br>Kashyap Chapalli (BS; 2023)<br>Nora Su (BS; 2024)<br>Conner Malley (HS; 2019) |
| Department Leadership | Computer Science Graduate Student Association (2018 - 2021)<br>Various positions and projects, including Chair<br>Graduate and Professional Studnet Government (2018 - 2023)<br>Various positions and projects, including President of Engagement |

## Affiliations

**ACM**/SIGCHI, **IEEE**
**Phi Beta Kappa** Academic Honor Society, *Ohio Alpha Chapter*
**Pi Mu Epsilon** National Honorary Mathematics Society, *Ohio Sigma Chapter*
**Phi Sigma Rho** engineering sorority, *Omicron Chapter*
National Ritual Director (2021 - 2024)

## Honors and awards

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| 2024 | Dissertation Completion Fellowship (CU Boulder) |
| 2023 | Endowed Founders Fellowship (CU Boulder)<br>President's Commendation for outstanding service (Phi Sigma Rho)<br>Conference Support Fellowship (CU Boulder) |
| 2022 | CPHS Fellow (CPHS Workshop)<br>Volunteer of the Year Award (Phi Sigma Rho)<br>David T. Spalding Graduate Teaching Fund Fellowship Award (CU Boulder) |

2021 Graduate and Professional Student Government Travel Grant (CU Boulder)
Best Paper Runner-up (LAK)

2020 Outstanding Service Award (CU Boulder)
Student Travel Award (CU Boulder)

2019 Best Research Poster (CU Boulder)

2018 Computer Science Departmental Fellowship (CU Boulder)
Webster Godman Simon Mathematics Award (CWRU)

2017 President's Commendation for outstanding service (Phi Sigma Rho)

2016 Phi Beta Kappa Prize for outstanding sophomore in the liberal arts and sciences (CWRU)