

Morgan P Lee - Curriculum Vitae

23rd June 2025

Born: 12th September 2000
Status: Research Assistant in the ASSISTments lab @ WPI
Fields: Computer Science, Learning Sciences & Technologies
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I am a researcher and educator with software engineering and data science experience. I study the intersection between online tutoring systems and student behavior, seeking to leverage data to better predict student performance and personalize student experiences. I am committed to bringing insights from my research into real classrooms, and I strive to create inclusive learning environments that play to individual student strengths.

Research experience

2025-Present	Co-Project Lead – QUICKComments Live <i>ASSISTments Lab</i> Open response problems serve a valuable role in math education, helping students develop critical thinking and mathematical communication skills. Students benefit from these problems even more when given feedback, but grading individual responses and providing individual feedback imposes a time burden on educators. QUICKComments Live combines automated short answer grading and feedback generation into a single task, with the goal of providing on-demand grading and individual feedback to open response problems inside of ASSISTments.	📍 <i>Worcester Polytechnic Institute</i>
2023-Present	Project Lead – Reinforcement Learning Service <i>ASSISTments Lab</i> The use of crowdsourced student supports in ASSISTments requires some way to measure the effectiveness of different supports written for the same content. Ideally, we want to recommend the best hint messages to students, but this must be balanced with exploration of the effectiveness of different student supports. The Reinforcement Learning Service was designed to use contextual bandit algorithms to solve this exploration/exploitation problem, and further work to better personalize student supports to students could involve new RL algorithms utilizing different features to make content recommendations to students. Tasks include the design and implementation of content recommendation systems and the maintenance of a RESTful service which gives content recommendations. Technology stack: PostgreSQL, Python, Flask	📍 <i>Worcester Polytechnic Institute</i>
2022-Present	Project Lead – Mastery Service <i>ASSISTments Lab</i> ASSISTments has vast amounts of historical data about student performance on items linked to numerous standards. Leveraging these data, we can train, evaluate, and implement Knowledge Tracing (KT) models to assess student mastery across different standards, track changes in student knowledge over time, and utilize mastery statistics for a variety of downstream projects. Additionally, the amount of historical data spanning multiple years allows for the evaluation of KT models in a changing temporal context, yielding critical insights into how these models can lose predictive power over time.	📍 <i>Worcester Polytechnic Institute</i>
2021-2022	Student Support Analysis and Generation <i>ASSISTments Lab</i> Utilized a variety of Natural Language Processing techniques to analyze components of hint messages within the ASSISTment system, then attempted to generate useful hint messages using a Large Language Model (GPT-3). Tasks included part of speech analysis, sentiment analysis, and prompt engineering.	📍 <i>Worcester Polytechnic Institute</i>

2020-2021

Junior Software Architect – Common Wrong Answer Feedback

📍 Worcester

Polytechnic Institute

ASSISTments Lab

ASSISTments has gathered data about the most common wrong answers to problems in its system. This project aimed to crowdsource student-facing feedback for these specific common wrong answers to address gaps in student knowledge before frustration sets in. Tasks included design, implementation, and testing of features for a web-based content authoring tool at the database, server, API, and client layers. Technology stack: PostgreSQL, Java, maven, Javascript, Handlebars, JQuery, HTML, CSS

Teaching & Mentoring experience

Spring 2025

ASPIRE Teaching Fellowship

📍 Quinsigamond Community College

Central MA ASPIRE Regional Collaborative

I was chosen as an ASPIRE Teaching Fellow for the spring of 2025. I was paired with a senior instructor, who I met with weekly to discuss challenges and strategies specific to the community college environment. In-classroom experiences included shadowing to observe teaching strategies & the delivery of a guest lecture in a Databases course.

2022-Present

REU/IQP/MQP Supervisor

📍 Worcester Polytechnic Institute

ASSISTments Lab

Delegated tasks to undergraduates participating in the National Science Foundation's Research Experience for Undergraduates program. Undergraduate students were given appropriate coding, modeling, and design tasks to complete for the Mastery Service project, along with relevant instruction to be able to give them more abstract tasks. Delegated tasks included training Bayesian Knowledge Tracing models, implementing API calls in a python-based RESTful service, and creating testing suites for said API calls.

2020-2022

Student Assistant

📍 Worcester Polytechnic Institute

WPI Computer Science Department

Worked as an undergraduate assistant helping faculty members teach courses in the WPI Computer Science Department. Duties included grading, holding office hours for small-group or 1-on-1 tutoring, holding conferences for 20-30 student supplementary instruction, and exam proctoring. Assisted in teaching the following courses: Social Implications of Information Processing, Object-Oriented Design Concepts, and Introduction to Machine Organization and Assembly Language.

Student Mentorship:

- Frenk, A., Gupta, K. and Pham, T. (2024-2025) ASSISTments IQP
- Reisenbach, L. (2023-2024) ASSISTments IQP
- Weintraub, J. and Goodman, N. (2023-2024) ASSISTments MQP
- Smith, S., Khane, O. and Rodrigues, H. (2023) Mastery Service REU
- Tang, M. (2022) Summer Internship
- Smearsoll, N. (2022) Mastery Service REU

Education

2025-Present

Doctor of Philosophy, Computer Science

📍 Worcester Polytechnic Institute

School of Arts and Sciences

Dissertation pending

2022-2025	Master of Science, Computer Science <i>School of Arts and Sciences</i> Master's Thesis: Investigating the Robustness of Knowledge Tracing Models in the Presence of Student Concept Drift	📍 <i>Worcester Polytechnic Institute</i>
2018-2022	Bachelor's of Science, Computer Science <i>School of Arts and Sciences</i> Major Qualifying Project: Assessing Student Support Effectiveness	📍 <i>Worcester Polytechnic Institute</i>

Publications

Short Paper 2024	Expert Features for a Student Support Recommendation Contextual Bandit Algorithm. Lee, M., Siedahmed, A., and Heffernan, N. In Proceedings of the 14th Learning Analytics and Knowledge Conference (LAK '24). Association for Computing Machinery, New York, NY, USA, 864–870. https://doi.org/10.1145/3636555.3636909
Poster Paper 2023	Comparing Different Approaches to Generating Mathematics Explanations Using Large Language Models. Prihar, E., Lee, M., Kalai, A.T., Vempala, S., Wang, A. Wickline, G., Murray, A., Heffernan, N. Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops, and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium, and Blue Sky. pp 290-295
Conference Paper 2023	How Common are Common Wrong Answers? Crowdsourcing Remediation at Scale. Gurung, A., Baral, S., Lee, M., Sales, A., Vanacore, K., McReynolds, A., Kreisberg, H., Heffernan, C., Haim, A., Heffernan, N. Learning@Scale 2023, pp 70-80
Short Paper 2023	Knowledge Tracing Over Time: A Longitudinal Analysis. Lee, M., Croteau, E., Gurung, A., Botelho, A., Heffernan, N. The Proceedings of the 16th International Conference on Educational Data Mining, pp 296-301

Honors & Awards

Dean's List	Fall 2018, Spring & Fall 2019, Spring 2020, Spring 2021, Spring 2022
Charles O. Thompson Scholar	For achieving a 4.0 GPA both semesters as a Freshman, Fall 2019

Technical Skills

Knowledge	Object Oriented Programming, Object Relational Modeling, Version Control Systems (git), AWS, PostgreSQL
Languages	Highly experienced in Python, Java, Javascript, and SQL. Moderate experience with C/C++, R