

# Thavishka Gamage

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## EDUCATION

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### Northeastern University

Boston, MA

*Doctor of Philosophy, Industrial Engineering | AI/ML Track*

*August 2026 - Present*

- Doctoral research with Prof. Alp Akcay in the Department of Mechanical and Industrial Engineering on machine learning for decision-making under uncertainty and multi-agent systems

### University of Cincinnati

Cincinnati, OH

*Master of Engineering, Industrial and Systems Engineering | GPA: 4.00/4.00*

*May 2026*

- Data Science specialization with coursework in Advanced Methods in Machine Learning, Deep Learning, Machine Learning, Applied AI and Machine Learning Tools, Introduction to Industrial Artificial Intelligence, Cloud Computing, Supply Chain Management for Engineers, and Quality Control
- Graduate Incentive Award | Dean's List, Full Academic Tenure | Golden Key Honor Society

*Bachelor of Science, Computer Science | Summa Cum Laude | GPA: 3.9/4.00*

*May 2025*

- International Outreach & Global Scholarship | Dean's List, Full Academic Tenure | Golden Key Honor Society | Phi Theta Kappa Honor Society | Innovation Challenge 2nd Place
- Senior 100, 2025 Cohort: Selected for exceptional academic achievements and extensive involvement on campus
- Software Engineering Undergraduate Certificate (conferred January 2025)
- Relevant Coursework: Artificial Intelligence, Data Structures, Design and Analysis of Algorithms, Operating Systems and Systems Programming, Programming Languages, Database Design, Large Scale Software Engineering, Computer Networks, Network Security, Discrete Computational Structures

## PUBLICATIONS

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- Gamage, T. *A Multi-Agent LLM Game for Healthcare Decision Support: Combining Mathematical Optimization with AI-Driven Debate for Experiential Learning*. M.Eng. Capstone Paper, University of Cincinnati, Spring 2026

## RESEARCH EXPERIENCE

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### Research Assistant, Multi-Agent LLM Systems

October 2025 - Present

*University of Cincinnati. Advisor: Prof. Tommaso Giovannelli*

*Cincinnati, OH*

- Designed and developed a multi-agent LLM educational game for healthcare operations decision-making under uncertainty, combining mathematical optimization with AI-driven structured debate
- Built a Python/Flask backend with a SciPy optimization engine (SLSQP) solving resource allocation problems under three demand assumptions (optimistic, balanced, pessimistic), integrated with three LLM agent personas via the Anthropic Claude API
- Implemented a structured two-round debate protocol with guardrails, data curation, and a mediator synthesis phase, inspired by recent research on autonomous multi-agent supply chain systems
- Developed a React browser interface with a five-step game flow: initial decision, optimization comparison, live AI debate, revision, and stress-test evaluation across multiple demand scenarios
- Validated the system across three live debate sessions showing agents produced diverse recommendations (\$13,500 to \$14,500 range) while consistently surfacing the core cost-vs-safety trade-off
- Authored a capstone paper documenting the system design, optimization formulations, agent architecture, and experimental results
- Presented seminar on Sections 1.1 to 1.4 of Advances and Challenges in Foundation Agents, covering the rise of AI agents, brain-agent parallels, and the foundation agent framework

### Undergraduate Research Co-op Fellowship, Topological Data Analysis

January 2023 - April 2023

*University of Cincinnati*

*Cincinnati, OH*

- Conducted research on Persistent Homology, contributing to 5+ projects analyzing high-dimensional data patterns using both theoretical methods and applied computational frameworks

- Developed Python and C++ scripts to collect, process, and analyze performance data from TDA experiments using real and synthetic datasets, improving consistency and reproducibility
- Managed a Linux-based compute cluster for TDA workloads, allocating resources and ensuring stable execution of large-scale experiments

### **Undergraduate Research Assistant, Prosthetic Limb Design**

January 2022 - January 2023

*Enable Cincy, University of Cincinnati*

*Cincinnati, OH*

- Analyzed medical publications to determine range of motion calculations and joint angles for a custom prosthetic limb designed for a client with an injured brachial plexus nerve
- Collaborated on a 12-member interdisciplinary team to develop the prosthetic using CAD, Ultimaker Cura, and a Prusa 3D printer through full design, testing, and production phases

## **PROJECTS**

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### **TheraThrive: Integrated Therapy Software**

August 2024 - May 2025

*Senior Design Capstone, University of Cincinnati*

*Cincinnati, OH*

- Led a cross-disciplinary team to design and implement a full-stack AI chatbot delivering guided CBT-style sessions for users with depression, low motivation, and social withdrawal
- Built a React.js frontend and Django/Python backend integrated with the OpenAI API and PostgreSQL to manage user sessions, prompts, and conversation history
- Defined functional requirements, data models, and evaluation criteria, then ran usability testing on conversation templates to improve engagement and clarity of AI feedback

### **Bye Bye Birdie: AI-Driven Ultrasonic Bird Deterrent**

Summer 2023

*Innovation Challenge, University of Cincinnati*

*Cincinnati, OH*

- Awarded 2nd Place at the University of Cincinnati Innovation Challenge with a \$750 fellowship for an AI-driven ultrasonic bird deterrent designed to prevent agricultural crop damage
- Led software development, vision systems, and hardware integration for a two-axis turret with an ultrasonic modulated speaker and AI-driven tracking
- Conducted market analysis and business modeling, estimating a \$6.2 million market opportunity in the agricultural bird repellent industry, and presented the final pitch deck to industry judges

## **PROFESSIONAL EXPERIENCE**

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### **Business Analyst Co-op**

May 2024 - August 2024

*Insight*

*Cincinnati, OH*

- Ran 10+ cross-functional stakeholder sessions and requirement reviews, producing user stories, technical documentation, and Power BI dashboards that improved team clarity and aligned development with business goals
- Managed Agile backlogs for two concurrent projects, authored 30+ user stories with acceptance criteria, and facilitated stand-ups and retrospectives to address blockers and improve delivery speed
- Launched an automated SLA reporting system using Power BI and ServiceNow exports, replacing manual Excel reconciliation with consistent weekly dashboards and improving reporting efficiency by roughly 30%

### **Computer Science Co-op**

August 2023 - December 2023

*SHP*

*Cincinnati, OH*

- Developed 15+ custom AutoCAD Revit functions in C# to automate design tasks, reducing manual effort and standardizing drafting output across commercial and residential projects
- Worked with architects and developers to gather requirements, implement tooling updates, and test integrations so new functions met project goals and fit cleanly into existing Revit workflows
- Contributed to Agile cycles within a 30+ person team, supporting sprint planning, backlog prioritization, and timely delivery of Revit updates

### **Software Engineering Co-op**

May 2022 - August 2022

*Procter & Gamble, UC Simulation Center*

*Cincinnati, OH*

- Built and debugged 3 custom JMP-based applications supporting hybrid production systems, reducing manual effort for 50+ plant engineers and operators
- Redesigned internal application interfaces based on stakeholder feedback, improving usability across tools used in production workflows

- Coordinated with global P&G teams on software updates, aligning changes with international standards and validating frontend and backend functionality

## TECHNICAL SKILLS

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**Programming:** Python (PyTorch, SciPy, Flask), C++, C#, SQL, JavaScript, R, MATLAB

**AI and Data:** Multi-agent LLM systems, agentic AI, structured debate protocols, deep learning, mathematical optimization, chain-of-thought prompting, experiment design and evaluation, topological data analysis

**Web and Backend:** Django, Flask, React.js, HTML, CSS, Bootstrap, REST APIs, OpenAI API, Anthropic Claude API

**Cloud, Data, and BI:** AWS (including Lambda), Power BI, Tableau, PostgreSQL, JMP, Excel, ServiceNow

**Tools and Platforms:** Docker, GitHub, GitLab, JIRA, Visual Studio, VS Code, PyCharm, Microsoft Office, Google Workspace, SharePoint, Miro, Figma

**Modeling and CAD:** Fusion 360, AutoCAD, Autodesk Revit, Ultimaker Cura, 3D printing workflows

**Project Management:** Agile (Scrum, Kanban), sprint planning, user story development, backlog management, stakeholder workshops

## CERTIFICATIONS

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- Software Engineering Undergraduate Certificate, University of Cincinnati
- 3D Printing, Laser Cutting, Woodshop A, and Metal Shop A Certifications, University of Cincinnati