

Eugene Park

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EDUCATION

New York University, Courant Institute of Mathematical Sciences

New York, NY

M.S. in Mathematics

Sept. 2021 - May 2023

Advisor: Prof. Kenneth Winston

Thesis: *"PCA and Hidden Markov Model for Forecasting Stock Returns"*

Boston College

Chestnut Hill, MA

B.A. in Mathematics, B.A. in Economics (Honors)

Aug. 2017 - May 2021

Advisor: Prof. Robert Murphy

Thesis: *"Stock Market Approach for the Financial Instability Hypothesis"*

RESEARCH EXPERIENCE

MIT Media Lab, Personal Robots Group

Nov. 2024 - Present

Advisor: Prof. Cynthia Breazeal

Development on Deployed AI Tutoring System

- Implemented advanced RAG pipeline with multimodal LLM-based document parsing and context-enriched chunking.
- Integrated an LLM-based student progress tracker for individualized responses.
- Built a feedback generation feature based on student classroom performance (e.g. quiz results) for LLM-generated longitudinal feedback that further contextualizes tutor responses.

Evaluating Pedagogy and Effectiveness of Language Models as AI Tutors

- Developed a two-layer evaluation framework that decomposes pedagogical behaviors into pedagogically harmful behaviors and instructional styles.
- Designed a controlled study across multiple sessions with varied learning scenarios and an assessments grounded on the Bloom's taxonomy to measure student learning outcomes.

Exploring Multimodal Tutoring with Large Language Models

- Built a multimodal data collection system that captures, cleans, and synchronizes drawing and conversational data from real human tutoring sessions.
- Conducted experiments on the sketch-generation capabilities of frontier large language models for visual tutoring with Calculus problems.

Language Model Alignment in High-Stakes Scenarios

- Benchmarked language models on their susceptibility to insider-threat behaviors (e.g. blackmail).
- Designed a user study to validate multi-tier LLM agent decisions in real medical triage scenarios.
- Curated a multi-modal dataset of 6,876 NEJM clinical case reports, containing text, images, and tabular data, used to finetune LLMs for proactive clinical assistance.

Skills Demand Analysis for AI Curriculum Development

- Analyzed AI skills demand patterns in 301K+ U.S. job postings to inform AI curriculum designs.

MIT Open Learning

Mar. 2024 - Oct. 2024

Advisor: Dr. George Westerman

- Modeled U.S. job mobility pathways using first-order Markov chains built from 59M+ worker career histories and derived high-value origin roles for advanced manufacturing career pipelines.

- Analyzed transactions data in the Bitcoin blockchain to identify adverse entities in the Bitcoin network and determine the reward structures of large mining pools.

PUBLICATIONS

In Preparation

- [1] **Eugene Park**, Daniel Wjendel, Grace Lin, Sharifa Alghowinem, Eric Klopfer, Cynthia Breazeal. “Pedagogical Misalignment: Instructional Integrity in Large Language Models”. *International Conference on Machine Learning (ICML)*. 2026.

In Submission

- [1] **Eugene Park**, Daniel Wjendel, Grace Lin, Sharifa Alghowinem, Eric Klopfer, Cynthia Breazeal. “An Evaluation Framework for Pedagogical Large Language Models”. *International Society of the Learning Sciences (ISLS) Workshop*. 2026.

Under Review

- [1] Yubin Kim, Taehan Kim, **Eugene Park**, Chunjong Park, Cynthia Breazeal, Daniel McDuff, Hae Won Park. “InvThink: Towards AI Safety via Inverse Reasoning”. *International Conference on Learning Representations (ICLR)*. 2026.
- [2] Yubin Kim, Hyewon Jeong, Chanwoo Park, **Eugene Park**, Haipeng Zhang, Xin Liu, Hyeonhoon Lee, Daniel McDuff, Marzyeh Ghassemi, Cynthia Breazeal, Samir Tulebaev, Hae Won Park. “Tiered Agentic Oversight: A Hierarchical Multi-Agent System for AI Safety in Healthcare”. *International Conference on Learning Representations (ICLR)*. 2026.

Peer-Reviewed

- [1] Yubin Kim, Zhiyuan Hu, Hyewon Jeong, **Eugene Park**, Shuyue Stella Li, Chanwoo Park, Shiyun Xiong, MingYu Lu, Hyeonhoon Lee, Xin Liu, Daniel McDuff, Cynthia Breazeal, Samir Tulebaev, Hae Won Park. “BehaviorSFT: Behavioral Token Conditioning for Clinical Agents Across the Proactivity Spectrum”. *Empirical Methods in Natural Language Processing (EMNLP) Findings*. 2025.
- [2] Yubin Kim, Taehan Kim, Wonjune Kang, **Eugene Park**, Joonsik Yoon, Dongjae Lee, Xin Liu, Daniel McDuff, Hyeonhoon Lee, Cynthia Breazeal, Hae Won Park. “VocalAgent: Large Language Models for Vocal Health Diagnostics with Safety-Aware Evaluation”. *Interspeech*. 2025. (Oral Presentation).

Preprints

- [1] Yubin Kim, Hyewon Jeong, Shan Chen, Shuyue Stella Li, Mingyu Lu, Kumail Alhamoud, Jimin Mun, Cristina Grau, Minseok Jung, Rodrigo Gameiro, Lizhou Fan, **Eugene Park**, Tristan Lin, Joonsik Yoon, Wonjin Yoon, Maarten Sap, Yulia Tsvetkov, Paul Liang, Xuhai Xu, Xin Liu, Daniel McDuff, Hyeonhoon Lee, Hae Won Park, Samir Tulebaev, Cynthia Breazeal. “Medical Hallucination in Foundation Models and Their Impact on Healthcare”. *medRxiv*. 2025.
- [2] Chris Compton, **Eugene Park**, Matthew Walsh, George Westerman. “Swamps, Springboards, and the Demographic Dynamics of Occupational Mobility Identifying Enablers and Inhibitors of Career Growth by Mining Education and Employment Histories for Millions of U.S. Workers”. *SSRN*. 2024.
- [3] Jeff Dieffenbach, **Eugene Park**, George Westerman. “Real-World Pathways to Manufacturing Jobs”. *SSRN*. 2024.
- [4] **Eugene Park**. “Principal Component Analysis and Hidden Markov Model for Forecasting Stock Returns”. *ArXiv*. 2023.

RESEARCH INTERESTS

AI Alignment; AI Interpretability; AI systems for decision making under uncertainty

SELECTED PROJECTS

Robo-Advisor for the Korean Individual Retirement Pension Funds Feb. 2024

Developed a systematic algorithmic trading strategy for Individual Retirement Pension (IRP) accounts in South Korea. The system passed the six-month evaluation by the Robo Advisor Test Bed Center and was launched in November 2024 with \$6.7k capital, generating a 15.58% annualized return.

Pricing Exotic Derivative Contract May 2022

Developed a pricing routine for an exotic put option by modeling equity and interest-rate dynamics using stochastic differential equations and implementing a Monte Carlo simulation to estimate fair value.

INDUSTRY EXPERIENCE

Giant Oak, *Student Research Assistant* Jun. 2022 – May 2023

Analyzed dimensionality reduction for affect-based embeddings to improve entity representation.

Brain Asset Management, *Research Intern* Winter 2019

Conducted market analysis on the global semiconductor industry.

Mertiz Securities, *Research Intern* Summer 2018

Analyzed financial statements and wrote investment reports for YG Entertainment and Facebook.

HONORS & AWARDS

2021 - Omicron Delta Epsilon, International Honor Society in Economics

2019 - Boston College Portfolio Challenge, 3rd Place

2018 - Citi Investment Banking Case Competition, 1st Place

SELECTED COURSEWORK

Pure Mathematics: Linear Algebra*, Real Analysis*, Differential Geometry*, Abstract Algebra, Complex Variables*

Applied Mathematics: Partial Differential Equations*, Ordinary Differential Equations*, Dynamical Systems, Time Series Analysis, Probability & Stochastic Processes*, Stochastic Calculus & Option Pricing*, Risk & Portfolio Management*

Economics & Finance: Advanced Econometrics, Intermediate Microeconomic Theory, Intermediate Macroeconomic Theory, Monetary Economics, International Trade and Finance, Corporate Finance

* graduate-level

TECHNICAL SKILLS

Deep Learning Frameworks: PyTorch, HuggingFace transformers

Programming Languages: Python, SQL, R, Stata

Libraries: Pandas, NumPy, Scikit-learn, Matplotlib

Other Tools: FastAPI, Svelte, Firebase, Vercel, Render, Git, Docker

REFERENCES

Prof. Cynthia Breazeal

MIT Media Lab

Professor of

Media Arts & Science

cynthiab@media.mit.edu

Prof. Hal Abelson

MIT Department of EECS

Professor of

CS & Engineering

hal@mit.edu

Dr. Aikaterini Bagiati

MIT Open learning

Principal Research Scientist

abagiati@mit.edu