

Samantha Pease (She/Her)

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SUMMARY

Machine Learning Engineer with expertise in graph ML, personalization, and scalable ML pipelines. PhD in Pure Mathematics with strong foundations in statistics, modeling, and algorithmic thinking. Experience prototyping and deploying ML systems in computer vision, graph neural networks, and retrieval-augmented generation. Passionate about building ethical, user-centered ML systems that scale.

SKILLS

Languages/Tools: Python, PyTorch, NumPy, SQL, Git, Dash, OpenCV, FAISS, FastAPI, Render

Concepts: Recommender Systems, Personalization, Machine Learning, Retrieval-Augmented Generation (RAG), Graph Neural Networks (GNNs), Large Language Models (LLMs), Vision Transformers, Topological Data Analysis (TDA), Data Visualization

Libraries/Frameworks: PyTorch Geometric, NetworkX, Jupyter, LangChain, LangGraph

EXPERIENCE

Machine Learning Engineer Intern

Summer 2024

Covar

Durham, NC

- Prototyped end-to-end pipelines converting raw video (2K–10K frames each) into 3D Gaussian Splatting models via automated structure-from-motion (SfM) workflows.
- Integrated and adapted open-source implementations of cutting-edge models (e.g., Segment Anything, Gaussian Splatting, Grounded-SAM) for rapid experimentation.
- Synthesized insights from 20+ research papers to guide architecture choices and feasibility; built demos to showcase prototype capabilities to internal teams and an external client.

Math Instructor

2017–Present

Duke University & Rutgers University–Newark

Durham, NC & Newark, NJ

- Independently taught undergraduate courses including Applied Calculus and Calculus I across multiple terms
- Supported large-lecture courses (100+ students) in Precalculus, College Algebra, and Applied Calculus
- Clarified abstract mathematical concepts; praised for clear communication and mentorship

PROJECTS

Trans Advice Agent

Summer 2025

- Developed an end-to-end retrieval-augmented generation (RAG) system using FAISS + SQLite for semantic search, enabling personalized question answering at scale for serving community need.
- Integrated LLMs for query rewriting, summarization, and response generation through modular pipelines.
- Deployed system on Render with a FastAPI backend, optimized for low memory usage and real-time performance under resource constraints.

Instagram Network Analysis

Summer 2025

- Scraped mutual follow data from Instagram to construct a directed social graph and visualized with PyVis
- Implemented link prediction and clustering analysis with GNNs to explore graph-based inference tasks.
- Designed filtering and export tools enabling user-driven exploration of network structures.

Additional Projects

- Built an image classification neural net in pure NumPy; analyzed architectural tradeoffs (ML course project)
- Applied persistent homology to LiDAR forest canopy data to differentiate forests (TDA research project)

EDUCATION

Rutgers University–Newark - *Ph.D. Mathematics*

January 2026

Duke University - *B.S. Mathematics & Computer Science, with Distinction*

May 2020