Ainesh Chatterjee

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Education

University of Maryland - College Park

Dual BS in Computer Science (Machine Learning) and Mathematics
December 2025 | GPA: 3.384
University, Departmental Honors; Dean's List

- **AI/ML**: Graduate NLP; HRI/Embodied AI; Computer Vision; Intro to: Multimodal DL, AI, ML, Data Science
- **Math**: Calc III; Advanced Linear Algebra; Differential Equations; Advanced Calculus; Abstract Algebra; Mathematical Finance: Derivatives & Stochastic Models; Transform Methods; Numerical Analysis
- **CS**: Quantum Computing; Algorithms; Data Structures; Computer Systems; Object-Oriented Programming; Language Design
- **Stat**: Applied Prob&Stat; Probability Theory

Projects

OpenSkills (active) | Solo Developer

- Open-source, agent-framework-agnostic implementation of Anthropic's Skills protocol that achieves full parity with their closed-source, first-party-only version
- Matches and exceeds baseline skill activation by agents without manual prompting, by replacing the Anthropic `Skill` mcp-style tool approach with a clean CLI tool + AGENTS.md specification

context-mcp (active) | Solo Developer

- Open-source context-gathering tools (ask-docs-agent, fetch-docs, fetch-site) for agents that minimize token burn and latency while maximizing relevant information retrieval
- fetch-docs tool outperforms Context7's MCP by wrapping their API to be more agent-friendly, reducing round-trip invocation to a single call
- fetch-site tool achieves 25-50% lower token usage than most agent CLIs default `WebFetch` tools by auto-saving extracted content locally so agents can read what they need vs forcing full reads + re-fetches

climb-cli (active) | Solo Developer

- Open-source tool that auto-generates user-friendly TUI interfaces for almost any command-line program by extracting arg info and man pages
- Non-interactive mode for LLM agents enables easy learning of complex call-graphs and arg-structures for CLI tools, without guesswork or web searches
- Eliminates manual lookup of complex CLI arguments, reducing agent/human errors and improving usability

CoronaSafe | Team Lead/Backend Developer

- Python/Flutter app for global COVID-19 risk assessment using time-weighted foot traffic and urban density analytics
- **Award:** Congressional App Challenge Winner: 2021 District MD08
- **Recognition:** Guest Speaker at USPTO's 2022 APPLY Yourself event

Resourceful | Team Lead/Backend Developer

- NLP-driven matching tool connecting underrepresented students to resources (NLTK, spaCy, semantic similarity)
- **Award:** Best Education @ 2022 Blairhacks_5 Hackathon

Skills

- **Agent Infrastructure**: MCP, Kosong, LMCache, DSPy/GEPA, Claude Code SDK, Google Agent ADK/A2A, Pocketflow, LiteLLM, Context Engineering
- **ML/AI**: Transformers, Agentic LLMs, RAG, Deep RL, Mechanistic Interpretability, GAIfO, PyTorch, HuggingFace
- **Engineering**: Python, C/C++, Rust, Docker, Git/GitLab CI, FastAPI, React
  - Familiar: Java, MATLAB, ROS, Qiskit
- **Cloud & Data**: AWS (Bedrock, SageMaker, Lambda, Fargate), PostgreSQL/NeonDB, Neo4j, Dask, Selenium/BeautifulSoup
- **Quantitative Finance**: Stochastic Calculus, Black-Scholes, Delta Hedging
- **Recognitions**: Interim Security Clearance, Congressional App Winner, Eagle Scout, National Merit Scholar, Dean's Scholarship

Experience

Tilli Software

AI Engineering MTS
Applied Research:XDEX
July 2025 - Present | Hybrid

- **Engineered** the Tilli Agent MVP (Kosong + DSPy + lastmileai/mcp-agent) to act autonomously on behalf of users, on any crawled site ***at < $0.01/task***
- **Developed** site2mcp and leading the effort to extract structured data from arbitrary sites and generated template-derived MCP servers (Kosong + browser-use + Claude Agent SDK)
- **Architected** a shared, multi-tenant MCP Super-Server as a centralized auth and tool/resource store across usecases; instrumented automated performance logging for post-hoc analysis and GEPA-optimization pipelines, ***increased cache-hit rate; reduced p50 latency and token cost***
- **Leading** Tilli Agent (tilli.ai) launch for an ***initial 150k+ users; planned rollout to ~3M***

University of Maryland CMNS

Student Researcher
Crowd Simulation
September 2024 - June 2025 | College Park, MD

- **Investigated** non-Euclidean formulations for crowd navigation and interaction (Hilbert-ball/hyperbolic distance models; curvature-aware interaction costs)
- **Applied** transformer-based models to language-directed crowd navigation, mapping natural-language instructions to motion goals and primitives

Johns Hopkins University Applied Physics Laboratory

Computer Science Intern - Interim Security Clearance
Force Projection Sector: Ocean Systems & Engineering Group
May 2024 - Aug 2024 | Laurel, MD

- **Developed** an optimized GAIfO variant leveraging architectural insights that ***improved long-horizon performance versus prior iterations that already outperformed baselines imitation models***
- **Extended** GTRI's SCRIMMAGE mass-simulation framework with ***higher scenario complexity and expert controller functionality***
- **Revamped** GitLab CI pipelines to remediate vulnerabilities and achieved a ***≈25% speedup and efficiency gains; ≈50% faster builds; ≈40% lower memory footprint for project-wide Docker base image***
- **Led** the winning team for the sector Intern Challenge, delivering a secure, non-GPS intra-campus navigation prototype
- **Authored** literature reviews on state-of-the-art Transformer models to inform future project strategies

University of Maryland MIND Lab

Research Intern
Breathing Analysis Project
October 2023 - December 2024 | College Park, MD

- **Optimized** dataset loading with Dask and multithreading ***≈400%+ higher throughput, with real-time dataset visualization capabilities for large-scale analysis and feature extraction***
- **Implemented** supervised learning approaches for improved breath segmentation

University of Maryland CMNS

Lead Teaching Assistant
CMSC351H (Algorithms Honors)
Spring 2024 | College Park, MD

- **Co-designed and graded** homeworks, exams, and lecture material for 38 honors students; held weekly office hours for advanced topic support

Publications

- *Ipelets for the Convex Polygonal Geometry*, published at SoCG 2024, 2024
- *AgreeMate: Teaching LLMs to Haggle*, published at arXiv, 2024