Tailai Ying

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Education

College of Engineering, Cornell University — Ithaca, NY
B.S. in Computer Science, GPA: 3.54 — *Expected May 2027*

Coursework

Object-Oriented Programming and Data Structures, Discrete Structures, Probability Models and Inference, Linear Algebra, Analysis of Algorithms, Data Structures and Functional Programming, Digital Logic and Computer Organization, Robotics, Database Systems, Machine Learning

Technical Skills

Languages: Java, Python, SQL, JavaScript, TypeScript, HTML, CSS, Sass, OCaml, Verilog, Assembly, XML
Frameworks and Libraries: React, React Native, Next.js, Angular, Tailwind CSS, Node.js, Flask, Spring Boot, Prisma, PostgreSQL, PyTorch, OpenCV, NumPy, PyBullet, MyoSuite, MuJoCo, Gymnasium, depRL, ROS, Hydra
Tools and Technologies: Linux/Unix, Ubuntu, Windows, Docker, Git, GitHub Actions, Copilot, Figma, Postman, Wandb

Experience

EmPRISE Lab — May 2025 – Present
Research Assistant — *Ithaca, NY*
- Built MyoSuite-based reinforcement learning pipeline, featuring realistic MyoSim models and custom Gymnasium environments for real-time patient biomechanics adaptation
- Scaled reinforcement learning experiments on Cornell's G2 high-performance computing cluster by automating multi-run configurations with Hydra and managing job scheduling with SLURM and shell scripting, improving experiment throughput by 3-5x and reducing manual configuration time by over 80%
- Developing end-to-end representation learning pipeline for personalized user functionality aware robots: (1) Bayesian information gain maximization for adaptive physical test generation, (2) Custom transformer architecture for permutation-invariant mapping from variable tests to latent reachability space representation, (3) Probabilistic decoder for continuous 3D reachability space prediction

Aria Lab — May 2025 – Aug 2025
Research Software Engineer Intern — *Salt Lake City, UT*
- Created scalable 3D swarm physics platform for swarm robotics research in PyBullet, featuring configurable sensor models and automated data processing to enable rapid prototyping of multi-agent coordination algorithms
- Discovered 15+ emergent collective behaviors by augmenting platform with custom novelty search and k-medoids clustering algorithm

Cornell Autonomous Drone — Feb 2024 – Present
Software Engineer — *Ithaca, NY*
- Integrated stereo visual odometry with YOLOv10 object detection, achieving 95% localization accuracy for autonomous navigation
- Developed real-time computer vision trajectory planning system using OpenCV to calculate target distances and optimal flight paths

CommuniCare — Jan 2025 – Aug 2025
Technical Lead — *Ithaca, NY*
- Led healthcare platform development for startup that raised $32,000+ and secured hospital partnerships across greater NY area
- Managed 8-member team, providing mentoring while streamlining development with Agile workflows and CI/CD pipeline automation
- Spearheaded front-end development of a full-stack web app in React/Flask, building reusable UI components, optimizing performance, and coordinating with backend services to deliver scalable features

Freelance — May 2023 – Present
Tutor — *Remote & Onsite*
- Instructing students in computer science, AMC competition math, and K-12 math, resulting in measurable performance improvements

Projects

CritterEvo | *Java* — Dec 2024 – Feb 2025
- Built complex ecosystem simulator with evolving entities on a procedurally generated cell world, demonstrating natural selection
- Implemented neural network with NEAT genetic algorithm from scratch, integrating A* pathfinding for intelligent behavioral adaptation
- Achieved over 80% performance improvement through multithreading, lazy loading and caching strategies, supporting over 2M+ cell world size and 500+ entity count
- Developed comprehensive JUnit test suite with 800+ lines of code ensuring robust functionality across edge cases

Lockd - BigRed//Hacks Finalist and Beginner's Prize | *React Native, Flask, Python* — Oct 2024
- Won top 5 placement among 41 teams and 135 competitors with innovative IoT smart lock security solution
- Engineered end-to-end system integrating React Native mobile app (for Android and iOS), Flask, and Raspberry Pi hardware for real-time threat detection
- Implemented multi-modal sensing with shock/sound detection triggering instant push and email notifications

Ear Trainer v2 | *Spring Boot, Angular, VexTab, Tone.js, PostgreSQL, TypeScript* — Jun 2025 – Present
- Develop full-stack music learning platform generating infinite exercise variations across 10 grade levels aligned with RCM standards
- Implement real-time music notation rendering and audio synthesis with VexFlow and Tone.js
- Build secure user system with bCrypt authentication and PostgreSQL for progress tracking supporting personalized learning paths

OCaml Web Server | *OCaml, Lwt* — Mar 2025 – May 2025
- Developed concurrent HTTP server handling 1000+ simultaneous requests with RESTful API architecture on Linux (WSL/Ubuntu) OS
- Engineered persistent CSV-based database system supporting full CRUD operations with CSV-based storage and JSON processing
- Achieved over 95% line coverage through comprehensive OUnit2 test suites with 67 test cases ensuring production-ready reliability