# Tailai Ying

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## EDUCATION

**College of Engineering, Cornell University**                           Ithaca, NY
*B.S. in Computer Science*                                     *Aug. 2023 – May 2027*

## COURSEWORK

Intro CS: Design and Development, 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

## TECHNICAL SKILLS

**Languages**: Java, C++, Python, SQL, JavaScript, TypeScript, HTML, CSS, OCaml, Verilog
**Web and App Development**: Next.js, React, Express, Flask, Node.js, TailwindCSS
**Tools and Technologies**: Git, GitHub Actions, Figma, Postman, Prisma, PostgreSQL
**Machine Learning and Computer Vision**: PyTorch, TensorFlow, OpenCV

## EXPERIENCE

**Research Assistant**                                       May 2025 – Present
*EmPRISE Lab, Cornell University*                                    *Ithaca, NY*
- Collaborating on user functionality-aware caregiving robot research, focusing on developing robots that adapt to individual user needs and capabilities by predicting functional range of motion from functional assessments

**Research Intern**                                          May 2025 – Present
*Aria Lab, University of Utah*                                 *Salt Lake City, UT*
- Extending two-dimensional swarm behavior to three-dimensional swarm behavior for deployment in drone swarms
- Developing and implementing swarm controller models with novelty search algorithms to evolve and discover emergent collective behaviors

**Technical Lead**                                           Jan. 2025 – Present
*CommuniCare*                                                       *Ithaca, NY*
- Developed full-stack web application with React and Express as technical lead, connecting underserved communities to healthcare resources
- Spearheaded the software development life cycle, including system design, implementation, testing, and deployment
- Implemented Agile methods with weekly sprints and meetings, greatly enhancing collaboration and team productivity
- Conducted code reviews and mentored team in design/development best practices to maintain codebase integrity and scalability
- Configured GitHub Actions CI/CD pipeline, automating deployment processes and streamlining team workflow

**CS Subteam Member**                                        Feb. 2024 – Present
*Cornell Autonomous Drone*                                          *Ithaca, NY*
- Implemented mono and stereo camera based visual odometry algorithms including dynamic distance and angle calculation in conjunction with the YOLOv10 object detection model to enhance localization precision for autonomous drone navigation
- Automated data preparation and training with Python scripting, reducing manual processing time by more than 50%

## PROJECTS

**OCaml Web Server** | *OCaml, Lwt*                           Mar. 2025 - May 2025
- Designed and implemented a thread-safe HTTP server with RESTful API in OCaml, featuring a modular architecture with routing, request/response handling, and JSON parsing
- Engineered a persistent CSV-based database system with CRUD operations and comprehensive query functionality
- Developed extensive test coverage using OUnit2, ensuring reliability across all server components including TCP connections, request parsing, and error handling

**CritterEvo** | *Java*                                      Dec. 2024 – Feb. 2025
- Built an artificial life simulator with genetic inheritance and mutation to simulate natural selection and evolution
- Developed a procedurally generated terrain system using Simplex Noise for environmental realism and diversity
- Improved pathfinding with the A* search algorithm, enabling critters to navigate obstacles and locate resources efficiently
- Implemented a neural network from scratch for high level decision-making, integrating the NEAT genetic algorithm to dynamically evolve critter intelligence for emergent behavior
- Designed robust JUnit black and glass-box test suites to validate functionality and maintain consistency across edge cases
- Optimized application performance with multithreading, achieving up to 80% faster execution time by utilizing all CPU cores effectively

**Lockd - BigRed//Hacks Finalist and Beginner's Prize** | *React Native, Flask, Typescript, Python*                Oct. 2024
- Assembled a smart lock system, integrating React with RESTful Flask APIs to create a companion mobile app, enabling remote control and break-in detection, winning Finalist and Beginner's Prize among 41 teams and 140+ competitors
- Configured Raspberry Pi with shock and sound sensors and servo for intrusion detection, triggering push and email notifications upon suspicious activity

**Ear Training App** | *Next.js, Prisma, PostgreSQL, TailwindCSS, Figma, Typescript*                Jul. 2024 – Sep. 2024
- Developed a full-stack Next.js web application for ear training, using VexFlow and Tone.js to display and play dynamically generated, interactive music exercises, and Lucia for user authentication and authorization
- Integrated PostgreSQL with Prisma ORM for efficient relational data management and user progress tracking