

WILL GUFFEY

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SUMMARY

- Strong Python and C++ development experience in autonomous systems (low-latency path planning, robot behavior design, robot simulation, computer vision, state machines), data processing, automated testing, cloud infrastructure, and observability.
- Comfortable and experienced in translating academic literature into software.
- 8 years of professional software development; 5 years included engineering management.
- Excellent at rapid prototyping and building strong cross-functional relationships.
- Deep Linux experience; comfortable with *nix systems in general.
- Problem solver with a passion for performance engineering and strong academic rigor.

EDUCATION

University of North Carolina at Chapel Hill

Chapel Hill, NC

BA Mathematics, BA Physics

Aug 2015 - May 2018

Finished all department classes in 5 semesters. Member of Carolina Math Club and Society of Physics Students.

WORK EXPERIENCE

Tenfour AI

Pasadena, CA

Co-founder / Chief Product Officer / Lead Software Engineer

Apr 2024 - Dec 2024

- **AI order taking system for restaurants:** A demo of an early version can be seen [here](#). Hands-on experience testing/fine-tuning models, working with data for model training, and designing low-latency and reliable agent-based workflows. (*Natural Language Processing, prompt engineering*)
- **Ordering system backend:** Developed a real-time, async WebSocket backend in FastAPI to handle streaming speech input and LLM responses in an AI ordering system. (*Python, LangChain, asyncio, Unicorn*)
- **Ordering system frontend:** Developed the frontend architecture of a configurable React web app using dynamic route-based module loading and theming. (*React, TypeScript, Material UI*)
- **LLM agent design:** Designed ordering workflow using LangGraph and function calling to ensure reliable, multi-step conversational behavior. (*LangGraph, LLM function calling*)
- **Fast iteration cycles:** Built tools to evaluate model outputs across thousands of test cases to enable fast iteration and regression protection for our speech-to-text and order prediction systems. (*Pytest, Jupyter, Huggingface datasets*)

Miso Robotics

Pasadena, CA

Simulations Intern (May 2017) → Robotics Engineer (Jan 2018) → Senior Robotics Engineer (Jan 2020) →

Lead Robotics Engineer (Mar 2021) → Software Engineering Manager (Apr 2022 - Apr 2024)

- **Team leadership:** Led the robot movement team, which was responsible for all software related to moving our 7 DOF fryer cooking robot. I set the strategic direction of team, did sprint planning and day-to-day management of team members. With individual reports, I did one-on-ones, goal setting and tracking, and performance reviews.
- **Robot behavior platform:** Enabled faster deployment of new robot behaviors by creating a modular behavior definition framework. Notable aspects of this framework were its well-defined configuration management and automated testing systems. (*Python, YAML, Unittest, ROS, OOP*)
- **Motion planning:** Worked heavily on our path planning stack, including a custom implementation of trajopt (sequential convex optimization solver) for kinematics planning and an MPC layer for dynamics and trajectory smoothing. (*C++, Python, ROS, Trajopt, MPC, MoveIt*)
- **Motion cache system:** Developed memory and database (SQL) based caching system. Also developed cache invalidation and eviction protocols and an offline cache filling service. This caching system reduced behavior planning time by nearly two orders of magnitude in some cases (10 s to 0.1 s), and one order of magnitude on average (10 s to 0.9 s). (*sqlalchemy*)
- **Data lake and observability platform:** Made significant contributions to our observability platform, including data lake architecture using AWS S3/Athena/Glue, writing ETLs, setting up dashboards/alerts on Grafana and led the team's adoption of them.
- **Academic research:** Led two collaborations between Miso Robotics and Caltech's AMBER Lab (premier robotics research lab led by Prof. Aaron Ames).
- **Other highlights:** Computer vision performance engineering (developed bias map), extrinsic camera calibration routine (increased accuracy and decreased duration of routine), system identification, scheduling algorithms, custom state machines, and CI/CD architecture.

SKILLS

Programming: Python (advanced), C++ (STL, templates, metaprogramming), JavaScript, SQL (schema definition, query writing/optimization), Bash

Frameworks/Tools: Docker, React, NextJS, LangChain, OpenCV, Pytest, Unittest, ROS, Gazebo, GitHub Actions, Jenkins, Grafana, Terraform, SQLAlchemy, Kubernetes, Ansible, PUML, debuggers (pudd, gdb, Valgrind)

Cloud: AWS (Step Function state machines, Athena, S3, Glue, etc), GCP (Cloud Functions, Container Registry)

Leadership: Engineering management, cross-org alignment, project planning

Math/Eng: State machines, Optimization (modeling, using LP, QP, or nonlinear solvers), Model Predictive Control, Networking, Stats, translating research to production

PAPERS AND PATENTS (GOOGLE SCHOLAR)

- Papers: Safety-critical manipulation for collision-free food preparation (**Finalist for Best Paper at IROS 2022**),
 Direct collocation for dynamic behaviors with nonprehensile contacts: Application to flipping burgers
- Patents: Automated bin system for accepting food items in robotic kitchen workspace