Robert G. Gambee

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Experienced software engineer passionate about improving the world for future generations

Professional Experience

FutureSearch: Startup using AI for research and predictions — 2025 to Present
AI Research Engineer

Formlabs: Building industry-leading, professional 3D printers in Somerville, MA — 2015 to 2025
Systems Integration Engineer III

Responsibilities

- Architect software which is maintainable, scalable and testable
- Own key printer systems for the entire product cycle, driving them from inception to public release
- Rapidly shift priorities and gain skills in response to project needs
- Understand complex interactions between printer systems, keeping both details and big picture in mind
- Optimize for printer reliability through robust design and failure mode prediction
- Analyze and visualize printer data to answer pressing questions and inform business decisions
- Mentor junior team members to foster their technical abilities
- Facilitate communication between engineering teams and across departments

Technical Projects

- Senior embedded developer for Form 4 and Form 4L — 2021 to 2025
  - Thoughtfully crafted powerful yet understandable API to control all aspects of product functionality
  - Comprehensively audited API for security vulnerabilities and coordinated plan to address them
  - Advised architectural decisions for embedded and desktop software
- Data management on user-replaceable components for Form 4 and Form 4L — 2023 to 2024
  - Designed a unified architecture for all components, agnostic to interface and data format
  - Wrote extensive validation checks to be robust to failures when reading or writing
  - Secured system against counterfeiting to protect company's primary revenue stream
  - Thoroughly tested all code with automated checks
- Print preparation routine for Form 4 and Form 4L — 2021 to 2024
  - Sped up routine by a factor of 5 to 10 compared to previous product, vastly improving user experience
  - Wrote predictive checks to give user advance warning of issues and avoid interrupting prints
  - Implemented specification for how to handle over 50 possible errors
- Automated resin sensing and dispensing for Form 4 and Form 4L — 2021 to 2025
  - Sped up initialization routine by a factor of 5 to 10 compared to previous product
  - Designed an algorithm that is robust to signal disturbances and sensor faults
  - Wrote predictive checks to give user advance warning of issues and avoid interrupting prints
- Prototype firmware for early iterations of Form 4 — 2021 to 2022
  - Independently developed prototype firmware in Python to support crucial conceptual testing
  - Balanced competing desires for flexibility and stability using a modular design
  - Rapidly responded to feature requests and bug reports, addressing them in days if not hours
- Dashboard for plotting live sensor data — 2021
  - Independently developed over four days during company hackathon
  - Wrote backend in Go, wrote frontend in JavaScript, streamed data via WebSockets
  - Recognized by the CEO in a company-wide email as one of the most impressive projects that year

Achievements

- Recipient of Formlabs' Perform Award, which recognizes top 10% of employees — 2020 and 2023

Software Skills

Proficient

- Python
  - NumPy, SciPy, Pandas, Matplotlib
  - asyncio, Django, Twisted
- C++
- Git, Jira
- AI coding assistants

Experienced

- PyTorch, scikit-learn
- JavaScript, TypeScript, React
- HTML, CSS, Bootstrap
- SQL, BigQuery, Grafana
- Docker
- Bash
- GitHub Actions

Familiar

- Go
- Rust
- Amazon Web Services
- Google Cloud Platform
- Make, CMake

Volunteer Experience

AI Governance and Safety Canada 2024

- Designed and implemented flexible system for scraping information relevant to the AI safety community
- Leveraged state-of-the-art AI language model to robustly scrape many sites
- Initially developed to find upcoming events, but can be extended to other types of content, e.g. publications
- Created automated workflow using GitHub Actions to run scraper and publish output to database
- Overhauled collection of introductory AI resources with updated list covering many topics and formats

Personal Projects

Independent AI Research 2023

Reproduction of "The Capacity for Moral Self-Correction in Large Language Models" by Ganguli et al.

- Loaded and processed tens of thousands of samples from three different datasets
- Submitted API requests asynchronously, with automatic retries and rate limiting
- Analyzed bias in model responses according to three different metrics
- Compared and contrasted results to demonstrate influence of RLHF training vs. prompt engineering

Chronicle 2023

Web app to keep track of how one spends one's time

- Used Django framework to manage HTTP requests and access SQLite database
- Presented data as a table for sorting and filtering, as well multiple charts for visualization
- Set up automated test and deployment workflows using GitHub Actions

SCAFFOLD 2023

Completed as part of AI Safety Camp (3 person team plus advisor)

- Built React web app to generate feedback on one's research ideas using GPT
- Fine tuned model to make its responses more relevant to AI safety research

Advent of Code 2018 to 2021

Annual set of programming challenges

- Solved problems in different language each year teach myself something new

Education

Harvey Mudd College, Claremont, CA
Bachelor of Science in Engineering with High Distinction 2011 to 2015

- GPA: 3.8
- Inducted into Tau Beta Pi, national engineering honor society 2014
- Recognized on Dean's List of top performing students 2012 to 2015

Continuing Education

- NYU's Deep Learning with Prof. Yann LeCun 2022
- Google's Machine Learning Crash Course 2022
- fast.ai's Practical Deep Learning for Coders 2022

Undergraduate Projects

SpaceX, Hawthorne, CA & Harvey Mudd College 2014 to 2015
Recoverable Flight Data Recorder (5 person team)

- Designed housing and selected materials to protect electronics from rocket explosion
- Built and tested prototypes according to SMC-S-016 and other specifications
- Contributed to software for receiving flight data over UDP and saving to SD card

Academic Research, Harvey Mudd College 2014 to 2015
Gas Permeation Across Nanocomposite Polymer Membranes (5 to 8 person team)

- Performed gas permeation experiments on synthesized membranes
- Ran and analyzed molecular simulations containing over ten thousand atoms each
- Wrote grant proposal for Amazon EC2 resources that decreased runtime by an order of magnitude

Sandia National Laboratories, Albuquerque, NM & Harvey Mudd College 2013 to 2014
Measurement of Barium Titanate Nanoparticle Permittivity (5 person team)

- Developed analytical and numerical models for interpretation of experimental data
- Presented work at Materials Research Society meeting as invited speaker
- Project findings were later submitted to several scientific journals for publication