Suyash **Kumar**

Software & Biomedical Engineer

(Ask) | suyash@suyashkumar.com | suyashkumar.com | suyashkumar

Education

Duke University

B.S.E, Biomedical Engineering and Computer Science (double major)

Private Pilot

Federal Aviation Administration

Skills

Go, C++, Python, Apache Beam, Javascript, Java, ReactJS, ElectronJS, Kubernetes, Docker, gRPC, Postgres, MySQL

Fullstack application development, distributed systems, microservices, firmware, signal processing, computer vision

Work Experience

Google (Health Research)

Palo Alto, CA & Durham, NC

Senior Software Engineer — *2019-Present*

Led, initiated, and built several projects on Google's **Health Research and Health AI** teams, working on things like streaming FHIR enrichment systems, EHR search indexing, open source healthcare tooling, health data and LLMs, machine learning in healthcare, health LLMs, and more.

Awards:

- Awarded **8 spot bonuses and 16 peer bonuses** (in addition to the typical yearly bonuses) for above and beyond work and outstanding leadership.

Select Projects

- **Care Studio: world class search and intelligence for health records.**
  - Led and developed several key components for a **high-performance scalable streaming health data enrichment system in C++.** This included inference from various ML models.
  - Also responsible for building full-stack search features, massively scalable batch jobs, and internal research features.
  - Delivered performance improvements in production and ensured system reliability, including on-call responsibilities.
  - Worked with customers and external stakeholders to identify and implement new features launched in our product.
- **CQL Interpreter:** Tech lead and engineer for a high-performance open source healthcare programming language (CQL) interpreter we built from scratch in **Go** (github).
  - Led a team of 3, fostering a high-velocity culture with a focus on execution and quality.
  - Scoped out both technical and product roadmaps, drove the launch, and implemented many system components.
  - Actively collaborated with external stakeholders to advocate for and contribute to enhancements in the core CQL specification, leading to significant improvements. Selected to represent Google on the DQIC committee.
- **Bulk FHIR Tools:** I spearheaded a 20% project to create seamless tools for Bulk FHIR ingestion in Go (github), which evolved into a full-time initiative. Successfully launched as an open-source project, now used in production and recognized within the community.
- **FHIR Community Contributions:** Identified and made meaningful contributions to many of Google's open source FHIR libraries like google/FHIR, google/fhir-py, google/bulk_fhir_tools, google/cql.
- **ML & Other projects**: Worked on several research explorations across the ML and LLMs in healthcare spectrum.
- **Mentorship:** I mentored 4 engineers and one intern, helping them in achieving their personal, career, and growth goals.

Gradient Health

Durham, NC

Chief Technology Officer & Vice-President — *2017-2019*

Gradient Health is a deep-learning in healthcare company building an interoperable platform for deploying computer vision research into the clinic.

- Responsible for leading technical team and for designing fault-tolerant, secure, and scalable technical infrastructure
- Drove many key product and strategic decisions, and held a board of directors seat and actively participated in board meetings.
- Implemented a fault-tolerant backend **microservice** ecosystem deployed using **Go, gRPC, Kubernetes and Docker**.
- Built plug-and-play machine learning pipelines for deploying sandboxed TensorFlow models in the clinic
- Developed key improvements in open source high-performance medical image parser in Go (github) improving pipeline latency by 1100%.
- Developed frontend client application using React/Redux

Uber

San Francisco, CA

Software Engineer, New Modalities Team

June 2016 - August 2017

Uber's fast paced New Modalities team is responsible for developing products around vehicle fleets, car rentals, bike/scooter rentals, and more.

- Responsible for the design and implementation of **highly scalable backend and frontend systems that millions of people use** (working with **Go, Python, PostgreSQL, Cassandra, Javascript, ReactJS**)
- Consents Service: Responsible for the **end-to-end architecture and development of an Uber-wide system** for managing legal consents. This work was presented before Uber's CTO and garnered much praise.
- Built a newly revamped onboarding funnel experience for the New Modalities team with **40% conversion lift** over existing (worked across the stack in React, Javascript, and Go).
- Won the "Big Bold Bets" award from the Uber Driver Team for work spearheading the Consents service and other internal projects.
- Performance: Consistently rated above average, promoted within my first year of joining Uber

MicroElastic Ultrasound Systems

Durham, NC

Chief Technology Advisor

August 2017 - 2019

We have developed a patented handheld device that can measure the elasticity of tissues non-invasively using ultrasound at low cost.

- Developed modern cross-platform image capture GUI application for the device (ElectronJS, React, Python, C, React)
- Spun out of research I performed at Duke with Dr. Mark Palmeri and Dr. Peter Hollender with a prestigious NIH STTR grant
- Reviewed and helped architect overall system design (electronics, firmware, digital logic, software, GUI, post-processing)
- Developed high-frequency analog acquisition library able to capture >1.2 MHz on cheap hardware (AM335X assembly & C)

Teaching

Duke University

Durham, NC

Associate Instructor, Department of Biomedical Engineering

August 2017 - 2019

- Appointed as an **Associate Instructor** in the Duke Department of Biomedical Engineering
- I co-teach a graduate-level Medical Software Design course
- Prepare and deliver lectures, hold office hours, develop instructional material, develop grading software
- Serve as chief software engineering expert on a variety of Duke research projects including a cloud-connected colposcope to diagnose cervical cancer and a Gates Foundation funded sanitation project.

Personal Projects

dicom

Durham, NC & San Francisco, CA

Go DICOM Medical Imaging Library

2018 - Now

dicom is currently the **most popular** dicom medical imaging library in Go (**900+ stars**)!

- Made it to the frontpage of YCombinator HackerNews (link).
- Continue to maintain the project, address issues, review PRs, and more.
- **900+ stars** on GitHub.

Conduit

San Francisco, CA

IoT Web Service for Cloud Connected Devices

July 2016

Conduit is a full-stack SDK and web application (built using Go, PostgreSQL, C++, and ReactJS) that allows developers to easily control and interface with cloud-connected microcontrollers using a central RESTful API from anywhere in the world.

- Featured in engineering blog Hackaday
- Conduit has been used for a variety of applications such as home automation, connected medical devices, and more.

ssl-proxy

San Francisco, CA

Single-command SSL reverse proxy with autogenerated certificates

Oct 2018

ssl-proxy is a fast, easy-to-use reverse proxy that adds encrypted TLS/SSL to any server. It autogenerates and serves SSL/TLS certificates as required in a single command (either self-signed or via LetsEncrypt). Built in Go.

- **700+ stars** on Github
- Top 15 "Show HN" on YCombinator Hacker News

CO2

Durham, NC

CO_2 Air Quality Monitor

2024

CO2 is an ESP32-based CO_2 air quality monitor. Includes initial C++ firmware, OpenSCAD 3D enclosure models, python anlaysis, and more. Still a work in progress.

CloudPulse *Durham, NC*

Cloud Connected Pulse Plethysmograph *August 2015*

CloudPluse is a cloud connected pulse device and platform from scratch.

- The device acquires your pulse, pushes it to a cloud server for processing, which ultimately pushes data to a frontend web client for viewing.
- Designed and built frontend, backend, firmware, and analog electronics myself

Research Experience

POCkeT Colposcope, Dr. Nimmi Ramanujam, Dr. Mark Palmeri *San Francisco, CA*

Technical Software Lead *January 2016 - August 2017*

The device and software platform allows for ultra-low cost cervical cancer diagnosis without the need for trained medical personnel in low-resource communities.

- Led the software group on the architectural design and implementation of a HIPPA-compliant cloud-based diagnosis platform and desktop client as the Technical Software Lead (TL).
- Built high-performance cross-platform desktop application to replace initial Matlab application. The new app is currently being tested in Duke Hospital.
- Participating in FDA 510k application development and submission

Anaerobic Pasteurization and Digestion Latrine, Dr. Mark Palmeri, Aaron Stokes *Durham, NC*

Software Engineer *2016*

Self-contained developing world sanitation system that digests waste into biogas which is used to sanitize the waste and provide heat. Currently deployed in India, Kenya, and the Philippines.

- Funded by the **Gates Foundation**
- Developed a robust cloud platform that utilizes low-power cellular networks to relay key metrics and alerts to a central server.
- Built text interface capabilities so text messages can be used to fetch relevant data from the server in the field.

Low-Cost Ultrasonic Elasticity Device, Dr. Mark Palmeri & Dr. Kathy Nightingale *Durham, NC*

Researcher *September 2015-May 2016*

Honors & Awards

Research

2014	**Awardee**, HHMI's Janelia Undergraduate Scholar Research Fellowship	*Ashburn, VA*
2014	**Awardee**, SNCURCS Barthalmus Research Grant	*Charlotte, NC*
2013	**Awardee**, SMIF Undergraduate Research Grant by the Lord Foundation and Donald Alstadt Funds	*Durham, NC*

Publications

Kao, D., Lai, A. G., Stamataki, E., Rosic, S., Konstantinides, N., ... Kumar, S., ... Aboobaker, A. (2016). The genome of the crustacean Parhyale hawaiensis, a model for animal development, regeneration, immunity and lignocellulose digestion, 1–45. https://doi.org/10.7554/eLife.20062