Suyash **Kumar**

Software & Biomedical Engineer

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Education

Duke University

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

Skills

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

Fullstack application development, microservices, service oriented architecture, firmware, signal processing, computer vision

Work Experience

Gradient Health

Durham, NC

Chief Technology Officer & Vice-President

Present

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
- 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 pipleline latency by 1100%.
- Developed open source autogenerated protocol buffers for all dicom medical imaging specification (medium, github)
- 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 Officer

August 2017 - Now

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 - Now

- 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

Conduit *San Francisco, CA*

IoT Web Service for Cloud Connected Devices *July 2016 - Now*

Conduit is a full-stack 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.

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

CloudPulse *Durham, NC*

Cloud Connected Pulse Plethysmograph *August 2015*

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

General Electric (GE) Healthcare *Waukesha, WI*

Edison Engineering Intern, CT Systems *March 2015 - August 2015*

Implemented several automation, calibration and image quality projects on the CT systems engineering team:

- Implemented pinch mode focal spot calibration software in python, 2x faster than previous MATLAB process.
- Developed automated GUI tool to generate scan mode config files for new builds (previous a manual process)

CRISPR/Cas9 mediated genome editing in Parhyale Hawaiensis *Ashburn, VA*

Janelia Undergraduate Scholar @ Howard Hughes Medical Institute *Summer 2014*

Awarded the Janelia Undergraduate Scholar fellowship to work with Dr. Anastasios Pavlopoulos. I developed CRISPR/Cas9 based genetic engineering tools to study embryogenesis in Parhyale Hawaiensis for the first time at high resolution.

- Wrote computational tools to automate analysis of genomic datasets produced in my research.
- My CRISPR validation in this new model organism was published in eLife (see publications below).
- Presented poster to HHMI Investigators: http://suyashkumar.com/assets/docs/hhmi_poster.pdf

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

Technical Software Lead *January 2016 - August 2017*

The device and software allows for cervical cancer diagnosis without 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 & desktop client to replace initial MATLAB client.
- 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.

- Funded by the **Gates Foundation** Currently deployed in India, Kenya, and the Philippines.
- Developed a robust cloud platform that utilizes low-power cellular networks to relay key metrics and alerts.

Honors & Awards

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