

Suyash Kumar

SOFTWARE & BIOMEDICAL ENGINEER

San Francisco, CA

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“Make the change that you wish to see in the world.”

Education

Duke University

Durham, NC

B.S.E, BIOMEDICAL ENGINEERING AND COMPUTER SCIENCE (DOUBLE MAJOR)

2012-2016

Work Experience

Uber

San Francisco, CA

SOFTWARE ENGINEER

July 2016 - Now

Working on the end-to-end development of highly scalable and fault-tolerant cloud systems using some of the latest technologies (like Go, Python Tornado, PostgreSQL, & Cassandra). I also work across the stack, building key frontend components for our onboarding service used by millions of people each year. I've independently led and executed on many key product features with high business impact. Recent projects:

- Consents Service: Responsible for the end-to-end architecture and development of a centralized Uber-wide system for managing legal consents. This work was presented before Uber's CTO and garnered much praise.
- Flow 2.0: A newly revamped onboarding funnel experience for vehicle solutions with 40% conversion lift.
- OSM Refactors: Identified and implemented key refactors in the onboarding state machine for the onboarding funnel.

Performance review for first half: Above average, got 10% raise 6 months on the job, currently up for promotion ahead of schedule.

General Electric (GE) Healthcare

Milwaukee, WI

EDISON ENGINEERING INTERN, CT SYSTEMS

Jan. 2013 - Feb. 2013

Implemented several automation, calibration, and image quality projects on the CT Systems Engineering team:

- Implemented Pinch Mode focal spot calibration software to be included in 1.5 product release (Python), at least 2x faster than previous process.
- Developed an automated tool for scan mode config file generation at build time.
- Developed a critical platform for automated IQ Scorecarding for dual-energy imaging (Python, Bash).

Research Experience

POCkeT Colposcope, Dr. Nimmi Ramanujam, Dr. Mark Palmeri

San Francisco, CA

TECHNICAL SOFTWARE LEAD

January 2016 - Now

Leading 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). The device and software platform allows for ultra-low cost cervical cancer diagnosis without the need for trained medical personnel in low-resource communities. I've been driving forth software on this project while also working full-time as Software Engineer at Uber.

- 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
- Developing cloud infrastructure using Golang, PostgreSQL, & ReactJS to serve clinical exams to medical professionals for diagnosis and to potentially provide future diagnosis via machine learning.

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

Durham, NC

INDEPENDENT STUDY

September 2015-May 2016

Worked on developing a low-cost ultrasonic elasticity device using off the shelf parts like the BeagleBoneBlack.

- Architected a high-frequency analog acquisition library which was able to capture at >1.2 MHz on \$50 hardware in AM335X assembly and C.
- Developed open-source python toolset to control Agilent function generators precisely over USB for use in calibration experiments

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

Durham, NC

SOFTWARE ENGINEER

2016

Developed a robust cloud platform for a developing-world sanitation system that utilized low-power cellular networks to relay key metrics and alerts to a central server. I built in text interface capabilities so text messages can be used to fetch relevant data from the server in the field. The system digests waste into biogas which is used to sanitize the waste and provide heat. Currently deployed in India, Kenya, and the Philippines. This was pro bono work that I continue to support.

HHMI Janelia Research Campus, Dr. Anastasios Pavlopoulos, Dr. Phillip Keller

Ashburn, VA

JANELIA UNDERGRADUATE SCHOLAR

Summer 2014

I was awarded the [Janelia Undergraduate Scholar fellowship](#) to participate in research at Howard Hughes Medical Institute's Janelia Farm Research Campus (JFRC). I developed CRISPR/Cas9 based genetic engineering tools to study embryogenesis in *Parhyale hawaiiensis* for the first time at high resolution. We were able to leverage developments in light sheet-microscopy to track cell lineages during development with single-cell resolution.

- Wrote computational tools to automate analysis of genomic datasets produced in my research. Reduced typical analysis time at least 300%.
- 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

Gersbach Lab

Durham, NC

RESEARCH FELLOW

2014-2015 (Sophomore)

- Worked on the development of new Cas9 fusion proteins to make targeted epigenetic modifications in the epigenome.
- Developed and proposed a microfluidic based platform for the directed evolution of Cas9 to increase specificity.
- Gave a talk at UNC Charlotte, won undergraduate Bartholomus Research grant award
- Wrote proposal and won Duke URS Independent Study grant award

You Lab

Durham, NC

IGSP FELLOW

Summer 2013 (Freshman)

- As a freshman worked on the development of microfluidic devices to study microbial behavior
- Submitted proposal for and won the SMIF Undergraduate Research Grant sponsored by the Lord Foundation and Donald Alstadt Funds

Select Side Projects

Conduit

San Francisco, CA

OPEN-SOURCE WEB SERVICE FOR CLOUD-CONNECTED HARDWARE

July 2016 - Now

Conduit allows developers to quickly build cloud connected hardware that can be controlled from anywhere in the world via a RESTful API using the popular and inexpensive ESP8266 chip.

- Featured on engineering blog Hackaday: <http://hackaday.com/2017/01/17/servo-controlled-iot-light-switches/>
- I built a proof of concept cloud-connected light-switch for under \$10—with electronics, firmware, and 3D models designed myself.

<https://github.com/suyashkumar/conduit>

CloudPulse

Durham, NC

CLOUD CONNECTED PULSE PLETHYSMOGRAPH

August 2015

Developed a cloud connected pulse plethysmograph device & platform from scratch. I designed and built the frontend, backend, firmware, and analog electronics myself. My analog circuit design isolates the pulse pressure waveform from finger which is pushed over WiFi to a NodeJS server to process data, add data to a MongoDB database, and push the data to an AngularJS Web client for viewing. This was my one of my first cloud projects.

<https://github.com/suyashkumar/CloudPulse>

OpenSpiro

Durham, NC

CLOUD CONNECTED SPIROMETER

August 2015

This was a 3-person team project in Dr. Adam Wax's Mobile Medical Devices class. A full stack cloud-based spirometer solution to measure respiratory health. Bluetooth device and companion app acquire data. All data pushed to server (NodeJS) for storage. Web and android client apps display clinical parameters over time and in relation to certain tags. I was responsible for all server/database/web development (NodeJS, AngularJS, MongoDB), implementing Bluetooth communication (C, Java), several Android app modules, and hardware testing.

<https://github.com/suyashkumar/OpenSpirometer>

Select Leadership

Duke University Union (DUU)

Durham, NC

CTO

2015-2016

After running Jazz programming across campus as the Jazz Committee Chair, I created the first ever CTO position on DUU's executive board to run a lean team of technology creators to serve the Union's needs.

- led a 5-person dev team to identify and develop software/hardware tools for Duke University's student union (w/ \$1M expenditures annually).
- The team developed various open-source technologies for event data collection/management/review.
- I also consulted and advised on all technical matters for DUU and reported to University admin.

Duke University Union (DUU)

Durham, NC

JAZZ COMMITTEE CHAIR

2014-2015

Led a team of students in developing, planning, and organizing over 15 successful events a semester, managed over \$25k in funds to put on innovative Jazz Programming on campus through this Duke University Union (DUU) committee.

SmartHome Dorm

Durham, NC

PRESIDENT

2015-2016

I was president of Duke's premier live-in technology incubator and makerspace. I helped organize everything from outreach programming (like hack nights & tech tutorials) to helping out with project funding.

Honors & Awards

RESEARCH

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| 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 |
| 2012 | Winner , National Merit Scholarship | Boca Raton, FL |

PROFESSIONAL

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| 2017 | Awardee , Uber Driver Team: "Big Bold Bets" Award | San Francisco, CA |
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Publications

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