

# Nithin Raghavan

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## EDUCATION

### University of California, Berkeley (Class of 2020)

*Aug 2017 – present*

Computer Science *Bachelor of Arts*, Applied Mathematics *Bachelor of Arts*

(GPA: 3.67)

- CS61B: Data Structures
- CS170: Efficient Algorithms
- EE127: Optimization Models and Applications
- Math 128a: Numerical Analysis
- Math 126: Partial Differential Equations
- CS189: Introduction to Machine Learning

### Georgia Institute of Technology

*Aug 2015 – May 2017*

Courses taken while in high school

- Applied Combinatorics
- Number Theory and Cryptography

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## EXPERIENCE

### → Samsung Advanced Computing Lab

*May 2019 – Aug 2019*

- Conducted extensive research on the potential routes of optimization and quantization of deep learning models such as MobileNet, R-FCN, SRCNN and ESRGAN as part of Samsung's GPU team
- Researched the graphics pipeline and became acquainted with AMD's compute and graphics architecture, and wrote + ran 2D register-blocked GEMM kernels with increased WPT in OpenCL on AMD architecture
- Wrote and trained two neural networks; the first to perform ambient occlusion on complex OpenGL-rendered scenes, and the second to convert a flat-rendered scene to a lifelike, physically based rendered one

### → Mobile Sensing Lab, UC Berkeley

*Oct 2018 – Present*

- Currently writing code implementing a parallelized Frank-Wolfe algorithm for dynamic traffic assignment in C++/CUDA using contraction hierarchies
- Helping research the impact of different optimization models of routing behaviour on the Waze traffic problem

### → RISE Lab, UC Berkeley

*Jun 2018 – Dec 2018*

- Designed and implemented a data visualization tool for Jupyter Notebook for hyperparameter optimization for Cirrus, a serverless machine learning framework
- Helped write code to spawn AWS Lambdas that parallelize training of models like logistic regression

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## PROJECTS

### → Resource-Provisioning GPU Server

*Dec 2017 – present*

- Developed a shell in Python automating on-demand request processing + resource provisioning in GPU cluster
- Collaborated on a team to create a program that utilizes Slurm for cluster management and deploys tasks in Docker containers

### → Software Renderer

*Jul 2019*

- Developed a software-based rasterizer and renderer with pixel and vertex shader support in C++, and increased its runtime with block-based rasterization
- Renders with SDL, and is capable of barycentric interpolation, backface culling and texture mapping

### → LASSO/Wavelet Based Compressed Sensing Algorithm

*Jul 2019*

- Lossily compresses audio/images by computing LASSO on the matrix-vector product representation of the discrete wavelet transform of the input signal
- Uses orthogonal Daubechies wavelets, and preprocesses data for ML training

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## SKILLS

**Awards:** Exploravision National Contest

*2016*

- Wrote a paper proposing blockchain's potential link to autonomous vehicles, and won honorable mention.

**Models/Algorithms:** Regression/classification (ridge, logistic, SVM, decision trees, OLS), PCA/SVD, ensemble learning, k-means, deep learning (CNNs, LSTMs, GANs), Frank-Wolfe

**Frameworks/Softwares:** Numpy, Scipy, Pytorch, OpenCV, Docker, Slurm, d3js, OpenCL, OpenGL

**Programming Languages:** Python, Java, C, C++, C#, Bash, Latex, SQL, JavaScript, Matlab

**Operating Systems:** Unix-like systems (Linux, FreeBSD, Mac OS X), Windows

**Certifications:** Android Development (University of Maryland through Coursera)