

ANIRUDH BADDEPUDI

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EDUCATION

Carnegie Mellon University School of Computer Science (Aug 2017 – May 2021)

B.S. Computer Science, Minor in Mathematics

GPA: 3.91, Dean's List with High Honors

Selected Coursework:

- **Graduate:** Theoretical CS Toolkit (PhD), Advanced Algorithms (PhD), Machine Learning (PhD), Advanced Machine Learning and Game Theory (PhD), Probability and Mathematical Statistics (PhD)
- **Undergraduate:** Algorithm Design & Analysis, Distributed Systems, Matrix Theory (Honors), Vector Analysis (Honors), Probability Theory (Honors), Real Analysis, Abstract Algebra, Differential Equations, Computer Systems, Parallel Data Structures and Algorithms, Mathematical Finance, Discrete Time Finance, Intermediate Macroeconomics

Work Experience

Google

Software Engineering Intern

May - Aug 2020

- Re-wrote Google Cloud Storage Python libraries to enable concurrency functionality for Cloud Storage operations. Created approximately x5 speedup in storage library operations (resumable uploads/downloads etc).
- Re-wrote Google Python Authentication libraries and credentials flow which enable Google's server-to-server authentication mechanisms to access all Google Cloud Platform APIs.
- Both libraries currently used by 100K active developers with 1.2 billion total API calls monthly.
- Received a full time return offer at the end of the internship.

Automation Anywhere

Software Engineering Intern

June - Aug 2019

- Constructed tools for the Bot Analytics team that generates real-time statistical insights from bot-generated data.
- Built back-end features to the Robotic Process Automation analytics dashboard such as a search bar with autocomplete features using Elasticsearch.
- Developed and implemented data aggregation algorithms to summarize automation processes using RestAPI framework.

Earth Computing

Research Engineer Intern

June - Aug 2018

- Developed original algorithms to create metrics to measure company product performance - e.g. measuring data center resilience under machine failures by finding number of spanning trees in modified graphs in real-time
- Implemented spectral graph theory algorithms based on related papers for company use in analyzing performance of product.

Research & Projects

Research: Cryptography and Blockchains

Advised by Vipul Goyal

Aug 2019-Present

- Developed and Implemented a smart private ledger, a private blockchain network that facilitates secure and private data storage and retrieval.
- Studying Secure Multi-party computation protocols and Fully Homomorphic Encryption constructions, currently working on a project to run Secure MPC protocols on smart contracts.

Research Project: Algorithmic Game Theory

Advised by Fei Fang

Aug 2020-Present

- Working on research extending current work on solving Security Games (Attacker-Defender Stackelberg Extensive Form Games) with the introduction of multiple strategic informants.
- Applications in problems related to protecting wildlife and natural resources from activities such as poaching.

Probabilistic and Deep Learning Methods for Sequential Music Generation

Dec 2019

- Extended current music generation techniques by building and testing 3 new generative models based on LSTM Recurrent Neural Networks (RNNs) and Autoencoders
- Designed and implemented a pre-training approach using Autoencoders (dimensionality reduction, reconstructing input vectors) for our best performing model - led to high improvement in model performance compared to baseline and existing models.

Research: Numerical Linear Algebra

Advised by Jason Howell

May – Aug 2018

- Worked on finding tight lower bound estimates for the smallest eigenvalue of large, sparse, tridiagonal matrices.
- Explored improving initial iterates to non-negative matrix factorization (NMF) algorithms with applications in areas such as text processing
- Applications in partial differential equations and research on solving large, sparse systems of linear equations.

Research: An Original Proof to the Theorem of Quadratic Reciprocity

Aug 2016

- Invited to attend the Ross Mathematics Program. Constructed an original proof to the Theorem of Quadratic Reciprocity using similar lattice point techniques to Gauss' original proof of the theorem.

Teaching Experience

Carnegie Mellon University School of Computer Science

Teaching Assistant

Aug 2018 - Present

Responsible for leading 20 member recitation sessions, grading assignments, designing/writing problems, organizing workshops and giving review lectures for the following classes:

- 15-451/651 Algorithm Design and Analysis (Spring 2020)
- 15-251 Great Ideas in Theoretical Computer Science (Spring 2019, Fall 2019, Fall 2020)
- 15-151 Mathematics for Computer Scientists (Fall 2018)

Awards

- Putnam Mathematical Competition Top 500
- 2019 Heap Fellow
- CMU Hackathon Winner
- British Math Olympiad Medallist
- IGSCCE Cambridge Mathematics Top of the World Award (Highest Score Worldwide)
- Princeton Singapore Alumni Association Book Award (Given to 2 students in country)
- Outstanding contribution to college service award for developing an extension curriculum for an elementary school in Singapore

Leadership and Community Involvement

CMU OM (Vice President):

- Organize events on campus, plan events, manage budgets and raise funds for events on campus.

SCS Deans Advisory Council

- Serve on the Deans Advisory Council for the School of Computer Science, meeting and collaborating with the Dean and Associate Dean representing undergraduates in the School of Computer Science.

CMU Quant Club (Exec board):

- Responsible for organizing all Quant Club projects and events on campus. Leading a new initiative on quantitative trading, conducting workshops on trading strategies and the markets.

Carnegie Mellon Informatics and Math Competition

- Help organize the competition at CMU. Responsible for writing problems and grading.

CMU Cricket Team (Co-President)

- Lead training sessions and manage club budgets and tournaments.

Technical Skills

- **Languages:** Python, C, Java, SML
- **Technologies:** Elasticsearch, GIT, Google Cloud Platform, Unix, Latex