

# Adithya Balaji

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Raleigh • North Carolina

Please see [Adithya's LinkedIn profile](#) for more experiences/references.

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## Work Experience

### Microsoft

REDMOND, WA

May '21–Aug '21

#### Software Engineer Intern

Developed a new product for the Quantum Systems Team.

- Developed design docs to specify business impact of a Quantum Resource Estimation Hub
- Built a platform MVP backend API using Django with a code runner backed by RabbitMQ (2.6k lines of code)
- Delivered frontend dashboard using NextJS and Plotly
- Enabled future project success by deploying documentation on Azure Static Web Apps and enabling continuous integration (CI) tooling using Azure Pipelines

### Synthego | 8VC Fellow

SAN FRANCISCO, CA

May '20–Aug '20

#### Software Engineer Intern

Matched with Synthego through the [competitive \(30/1000\) fellowship](#) program. Was a member of the team that developed the core software operationalizing CRISPR advances

- Operated in a full-stack capacity (Django and React) to deploy 9 new production-ready features
- Modernized 3 large (10,000 lines of code) codebases to use Python best practices: linting (black, flake8) and type checking (mypy)
- Prototyped and implemented automatic Django API documentation compliant with OpenAPI v3. Deployed API and developer documentation using Swagger and Sphinx

### Georgian Partners

TORONTO, ON

May '18–Aug '19

#### Data Science Intern

Led the development of [Foreshadow](#), an open-source Python AutoML package.

- Architected and developed the tool to automatically build and tune an end-to-end machine learning pipeline that interoperates sklearn and pandas (100% branch test coverage)
- Wrote an [extensible AutoML benchmark](#) package using boto3, AWS Batch, and EC2 and an accompanying [engineering research paper](#) that gained [significant Twitter traction](#)
- Authored three Medium blogs on [automatic machine learning](#) and [Python tooling](#) that were read 5,000+ times

### Bitzer Lab

RALEIGH, NC

August '17–May '19

#### CS Research Assistant

Was advised by [Dr. Donald Bitzer](#) (*inventor of plasma screen TV*) in the development of advances in bioinformatics

- Upgraded a broken, legacy Python Django intranet protein optimization website used by a team of 10 researchers
- Implemented an updated version of an mRNA optimization algorithm to increase protein yield

### Oklahoma City Thunder

RALEIGH, NC

January '19–May '19

#### Data Science Intern

After a strong performance at the [NBA Hackathon](#), was recruited to develop a basketball shot quality model

- Grokked input data using game footage and developed dynamic data visualizations using seaborn and bokeh
- Presented a shot quality model (ROC AUC, 0.92) to team executives that increased downstream accuracy by 1%
- Delivered a deployable CLI for the model that could be rerun yearly to mitigate model drift

### Precision Lender

CARY, NC

May '17–Aug '17

#### Software Engineer Intern

Was invited by the CEO to work on the company's core product: a commercial loan pricing tool

- Architected and developed a scalable natural language processing (NLP) system that cached queries using a C# Azure Service Fabric Stateful microservice
- Demoed to the entire company and deployed the solution to production currently used by 100s of banks worldwide
- Documented a [major release](#) and developed a JavaScript web tooling interface operating on the production database

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## Extracurriculars

### Liquid Rocketry Lab

RALEIGH, NC

Aug '18– May '20

#### Chief Business Officer

Founded and developed NC's first liquid propulsion laboratory developing a space bound rocket (Karman Line, 100km)

- Recruited a talented, diverse core team of 50 students.
- Managed a team of 15 students to raise \$250,000. Brokered partnerships with companies such as RedBull and Jacobs.

- Managed legal matters including nonprofit registration, tax exempt status and insurance procurement.

## NC State IEEE Chapter

RALEIGH, NC

### President, Chair

Aug '17–May '20

Responsible for the largest professional society at NC State.

- Established a \$400 scholarship for students in the ECE department
- Increased student membership by 20% (to 400+ members) by conducting technical talks of interest to members.
- Coordinated the yearly student delegation to the South East Regional conference where the team has won 5+ awards.
- Organized the NC State IEEE Extreme Hackathon with significant student participation. (2017, 2018, 2019)

## NC State FIRST Alumni Association

RALEIGH, NC

### President

Aug '18–May '19

Founded and grew North Carolina's first collegiate alumni program for high school robotics participants.

- Grew the organization to over 70 members in the first year.
- Organized a special event with FIRST's founder, Dean Kamen, at NC State.
- Empowered students to volunteer for over 1,000 hours across local FIRST robotics events in dire need of help through club funds.

## Tau Beta Pi NC Alpha Chapter

RALEIGH, NC

### Vice President

Aug '18–May '19

Responsible for managing the organization's day-to-day operations of the largest honors society at NC State.

- Assisted in the organization of professional development and volunteering events for student induction requirements.
- Inducted a class of the top 30 students in the engineering department into the prestigious society.

## Robotics at NCSSM

DURHAM, NC

### Team Captain

Aug '15–May '17

Responsible for delivering strong competition results for one North Carolina's oldest robotics teams.

- Managed a team of 50 students to fabricate a 120 lb. robot in the span of 6 weeks to compete in a yearly challenge.
- Successfully spearheaded significant technical advancements in robot perception and control using deep learning and ROS, respectively.
- Led the team to a world championship quarterfinal berth and, later, open sourced our winning code.

## Sustainability at NCSSM

DURHAM, NC

### Sustainability Project Leader

Aug '16–May '17

Managed the implementation of the strategic sustainability vision of the school.

- Created and performed Energy Star portfolio analysis for the school and made recommendations to reduce the carbon footprint.
- Converted the cafeteria to a zero waste zone through a partnership with local composting organization, CompostNow.

## MIT Lincoln Laboratory

BOSTON, MA

### Beaver Works Summer Institute Member

Aug '16–May '17

Developed and programmed a miniature autonomous car.

- One of 46 students selected to develop a miniature autonomous cars covered under a full scholarship.
- Developed skills in ROS, Sensor fusion, computer vision, path planning under guidance from faculty from MIT and NASA JPL.

## Volunteering

### FIRST Robotics

USA

### Referee / Field Technical Advisor

Aug '17–Current

Responsible for upholding the spirit of gameplay in FIRST robotics events and debugging technical issues on a 52×26 ft. game-play field.

- Devoted over 320 hours to serving the high school robotics community spanning the entire State of North Carolina.
- Impacted over 4000 students, yearly, across both North Carolina events and the World Championship event where students bring 120 lb. robots to compete in the highest level of high school robotics.

## Navarasa

RALEIGH, NC

### Finance Chair

Aug '18–May '19

Responsible for managing the financial operation and previously technical operations of the North Carolina's largest, Indian classical dance competition.

- Raised over \$10,000 for CRY, Children's Rights and You, an organization devoted to improving the lives of children in impoverished nations.

## Education

### Carnegie Mellon University

PITTSBURGH, PA

### MS in Computer Science

2020–2022

Attended the #1 graduate computer science program in the US.

- *Relevant Courses:* Machine Learning with Large Datasets, Space Robotics, Deep Learning Systems, Cryptography Theory and Applications

NC State University	RALEIGH, NC
BS in Electrical Engineering	2017–2020
BS in Computer Engineering	2017–2020

Studied at a top 10 ECE program on multiple scholarships.

- *Relevant Courses:* Discrete Mathematics, Data Structures, Control Systems, Industrial Robotics, Embedded Systems, Computer Vision, Object Oriented Development

NC School of Science and Mathematics	DURHAM, NC
High School Diploma	2015–2017

Attended a public residential school, heralded as the top high school education in the U.S., on a full-scholarship.

- *Relevant Courses:* Differential Equations, L<sup>A</sup>T<sub>E</sub>X, Data Structures, Mathematical Modeling, Complex Systems, Modern Networks, Multivariable Calculus (III), Graph Theory,
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## Selected Awards and Achievements

Year	Description	Award
2021	Global	Featured in NY Times
2020	Global (25/400)	8VC Fellowship
2020	University (1/1505)	NC State Senior Leadership Award
2019	Global (28/2700)	IEEE Xtreme Hackathon 13.0
2019	Departmental (1/285)	NC State Faculty Senior Scholar Award
2019	Regional (3 <sup>rd</sup> )	IEEE Website Design Competition
2019	University	Carolina FinTech University Winner
2018	Global (30/500)	NBA Hackathon Finalist
2018	Regional (2 <sup>nd</sup> )	IEEE SouthEastCon Hackathon
2018	National	Tau Beta Pi (Engineering Honors Society)
2018	National	IEEE Eta Kappa Nu (ECE Honors Society)
2018	National	Phi Kappa Phi (Academic Honors Society)
2017	International (Top 2%)	FIRST Robotics World Quarter Finalist
2017	National	IBM Watson Scholar
2017	School (Awarded \$2k)	NCSSM Bowman Brockman Endowed Scholar
2016	International (Top 7%)	HiMCM Finalist
2016	National (selected 30)	MIT Beaverworks Robotics Institute
2016	International	Conrad Spirit of Innovation Power Pitch Winner

## Selected Publications

### Publications (non-reviewed)

- Adithya Balaji and Alexander Allen. “Benchmarking Automatic Machine Learning Frameworks”. In: *arXiv preprint arXiv:1808.06492* (2018).
- Adithya Balaji and Alon Greyber. “Zebravision 5.0: ROS for FRC”. In: *Chief Delphi* (Sept. 2017).

### Technical Blogs

- Adithya Balaji. *Python Tooling Makes a Project Tick*. Aug. 2019.
- Adithya Balaji and Alexander Allen. *Automatic Machine Learning (AutoML) Landscape Survey*. Aug. 2018.
- Adithya Balaji and Alexander Allen. *Choosing the best AutoML Framework*. Aug. 2018.

### Talks

- Adithya Balaji. “DevOps, Continuous Integration, and an intro to Azure Pipelines”. NC State IEEE Chapter. 2019.
- Adithya Balaji. “Advanced Git”. NC State IEEE Chapter. 2019.
- Adithya Balaji. “An Opinionated Overview of Python Environments and Tooling”. NC State IEEE Chapter. 2019.
- Adithya Balaji. “An Introduction to Git for Beginners”. NC State IEEE Chapter. 2018.

## Skills

**Programming:** Python, C, C++,  $\text{\LaTeX}$ , JavaScript, Objective-C, Assembler, Java, Unix command suite, Git, and GitHub.

**Data Science:** AWS EC2/Batch/Lambda, SQLAlchemy, BeautifulSoup, Selenium, OpenCV, Pandas, Numpy, Keras, Tensorflow, PyTorch, Scikit-Learn, Dask, Matplotlib, Seaborn, and Bokeh.

**Dev Ops:** First principles (CI/CD and incremental testing), Travis CI, Azure Pipelines, Bash, pre-commit hooks, and Python (PyPI) package management & deployment.

**Research:** Tests of statistical significance, mathematical modeling, parsing research papers & patents efficiently, typesetting for articles & beamer presentations, and scientific communication.

## Selected Projects

**Foreshadow:** An automatic machine learning (AutoML), pipeline package built on top of sklearn and pandas to intuitively construct and tune machine learning models in Python.

**AutoML Benchmarking:** A command line utility to scalably validate the performance of open source AutoML solutions.

**Loanchain:** A novel smart contract generator utilizing the Ethereum blockchain to broker transparent loan agreements. Used an oracle voting architecture to resolve loan interest rates.

**Embedded Systems Car:** An embedded systems car from the ground up using TI’s MSP 430 development board. Features included, a scrolling LCD menu and an autonomous mode using PID control.

**Credit Suisse NLP Model:** A machine learning model that constructs a user profile for developer onboarding steps based on job descriptions. Developed this as a part of NC State Entrepreneurship Clinic at HQ Raleigh.

**Entrust (GoFundMe for Loans):** A business case / hackathon project to build a peer-to-peer loan system with a full design concept alongside a machine learning model to automatically set loan rates based on federal interest rates. Recognized as the university winner.

**YCombinator Hackathon (2018): Duolingo for Music** Invited to Mountain View to compete in a 24 hour product hackathon. Develop the DuoLingo for instruments with an MVP that used advanced signal processing to provide user feedback and instrument play style.

**NBAHackathon:** A player lineup optimization model using LSTM based deep neural network architecture that efficiently parsed aggregated play by play data.

**VideoVote:** A Twitch bot that builds an ephemeral MTV for YouTube where the chat could vote on the top video they wanted to see.

**ROS for FIRST Robotics:** The first implementation of the Robot Operating System (ROS) robot sensor information processing protocol at the high school level of robotics.

**High Power Rocketry Payload:** A sensor bay payload deployed from a high power rocket launched to 5000 feet. Interesting features include a spring-loaded camera and embedded operating system that uses ROS to transmit telemetry back to a ground station.

**Simplecalc (Python DevOps):** An example repository that accompanies a Medium blog on Python DevOps best practices.

**NC State IEEE Website:** The open source website that powers the NC State IEEE Student Branch.

**YCombinator Hackathon (2019): SeamlessFits** A new look into social fashion. A mobile platform to explore and buy clothes that are trending in just a few clicks.

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## Interests

**Non-exhaustive and in alphabetical order:** Basketball, Competitive programming & mathematics, Chess, Cricket, International Food, Graphic Design, Machine Learning, Philosophy, Popular Economics, Puzzles, Robotics, Science Fiction Movies, Technical Blogging, and UX Design