

Abhijit Chowdhary

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<https://abhijit-c.github.io/>

Education

- **North Carolina State University** Raleigh, NC
Applied Math PhD, Computational Math Concentration Aug. 2020 - Present
 - Recipient of the Siewert Fellowship (Aug. 2020 - May 2021).
- **New York University** New York, NY
B.A. Joint Mathematics and Computer Science, Classics Minor Sep. 2016 - May 2020
 - (In Major GPA: 3.657)
 - Relevant undergraduate courses: Algorithms, Chaos and Dynamical Systems, Computer System Organization, Operating Systems, Honors Algebra I/II, Honors Analysis I/II, Honors Linear Algebra, Honors Probability Theory, Numerical Computation, Topology.
 - Relevant graduate/PhD courses: Algebra, Basic Probability, Convex and Nonsmooth Optimization, Finite Element Method, Fundamental Algorithms, Geometric Modeling, High Performance Computing, Methods of Applied Math, Numerical Methods I/II, Partial Differential Equations.
- **University of Maryland** College Park, MD
Visiting Student (GPA: 3.925) Summer 2017, 2018
 - Coursework: Complex analysis, Number theory, Partial Differential Equations, Introduction to Artificial Intelligence.

Projects and Activities

- **Math REU: Imperfect Periodic Patterns** Athens, OH
Ohio University June 2019 - August 2019
 - I joined a research team under professor Qiliang Wu, and another undergraduate Mason Haberle from Berkeley in researching the field of pattern formation.
 - Our team specifically set out to prove nonlinear stability of the 2D Swift-Hohenberg equation at the zigzag boundary, and as of now we've completed the proof and the paper is in the draft stages.
 - The challenge here was mostly on how to adapt known techniques first to the Swift-Hohenberg equation, and second to higher dimensions. This was mostly a conceptual difficulty in the functional analysis framework surrounding the current research which we had to resolve.
- **Tutor and TA at Courant** New York, NY
NYU Sep. 2017 - Present
 - I work at a Tutor and TA to Professor Siegel at NYU for his undergraduate basic algorithms and graduate fundamental algorithms course.
 - I host tutoring sessions for students to come in and answer questions, and I help to build course materials.
- **Parareal**
High Performance Computing and Numerical Methods II (Grad) Apr. 2019 - May 2019

- For a class final project, I decided to look into parallel techniques for solving ordinary differential equations, and something that caught my eye was the parallel-in-time algorithm, *Parareal*.
- For this project, I implemented and analyzed this algorithm, and further tested it's scaling properties on the HPC cluster Prince here at NYU.
- Heavy use of Eigen and OpenMP, it's a header only library. Written in C++
- You can see the project here: <https://github.com/abhijit-c/Parareal>

• Algebraic Point Set Surfaces Implementation

Geometric Modeling (Grad)

Apr. 2018 - May. 2018

- For a class final project, I implemented the theory in the paper *Algebraic Point Set Surfaces* by Gaël Guennebaud and Markus Gross from ETH Zurich.
- The Paper presented an alternative method to take a point cloud to a triangularized mesh, and another method to estimate normals from a point cloud using algebraic fitting of a sphere.
- This was mostly a challenge in comprehension of the paper and implementation, notably fighting with Eigen to try and construct and solve the systems in an efficient manner.
- Heavy use of the libraries Eigen, libigl, and nanoflann. Written in C++.

• ffpoly

Personal Project

Dec. 2018 - Present

- After learning some algebraic number theory in my graduate algebra course, I decided to code an implementation of elements of the polynomial field $\mathbb{F}_n[x]$.
- Still in the infancy stages of the project and learning some of the theory in computational algebraic number theory as I code. I eventually plan to come back to this.
- You can see the project here: <https://github.com/abhijit-c/ffpoly>

• Project Euler

Personal Hobby

2016 - Present

- Participant in the Project Euler mathematical programming challenges.
- Have solved 60 problems (Top 3.8% as of Jan 2019)

• First Robotics Team Member, Team 2849: Ursa Major

Columbia, MD

Hammond High School

Sep. 2012 - Present

- A robotics team; every new year they gather for a challenge created by FIRST Robotics to build a robot in six weeks.
- I worked as a build-team / programming-team flex member and team captain during my student years, and now I help as a programming and design mentor during their season.
- Has managed to consistently reach elimination and championship rounds at the regional level.
- See their github here: <https://github.com/teamursamajor>

Skills

Programming and Markup Languages: C, C++, Python, Matlab, Mathematica, \LaTeX .

Libraries and Technologies: OpenMP, MPI, HPC Tooling (slurm, etc.), CUDA and ROCm (learning)

Languages: English, Latin, Somewhat broken Hindi

Minor Mechanical Fabrication Skills

Interests

Academic: Numerical Methods and Algorithms, High Performance Computing, Dynamical Systems, Approximation of the solutions to PDEs, Computational Algebra and Number Theory.

ACM: Student member of ACM and in the EBoard of the ACM Chapter of NYU.

Computers: Have built and maintained my PC since 2012, and have modded my thinkpad X230 with various screen and hardware upgrades. Fulltime Linux enthusiast since 2012.