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*

- **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 Gaēl Gunnebaud 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 constuct and solve the sytems 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 consistantly reach eliminantion 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.