Daniel Yoontae **Hwang**

MATHEMATICIAN · EDUCATOR · SOFTWARE ENGINEER

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Education

Georgia Institute of Technology
Atlanta, Georgia

PH.D. IN MATHEMATICS
Aug. 2022 - Present

- Cumulative GPA: 3.91
- Third-year graduate student and Graduate Teaching Assistant for the School of Math, advised by Josephine Yu.

Duke University
Durham, North Carolina

B.S. IN MATHEMATICS AND COMPUTER SCIENCE, GRADUATION WITH DISTINCTION
Aug. 2018 - May 2022

- Cumulative GPA: 3.864
- **Received a 4-year full-tuition scholarship** as the top scorer in the North Carolina Comprehensive Contest.

Academic Research

Georgia Tech School of Math
Atlanta, GA

STUDENT RESEARCHER | ADVISOR: DR. JOSEPHINE YU
Jan. 2024 - Present

- Currently researching weighted Ehrhart theory of alcoved polytropes using vector partition functions and triangulations.
- Drafted code to generate polytropes and an initial report gathering our observations.

Los Alamos National Laboratory
Los Alamos, NM

STUDENT RESEARCHER | ADVISOR: DR. LAURA MONROE
June 2023 - Present

- Performed research starting Summer 2024 on maximal sets of constructions of edge-disjoint spanning trees on star-product networks.
- Performed research during Summer 2023 on fully homomorphic encryption schemes utilizing novel mathematical techniques.

Duke Math Department
Durham, NC

PRUV 2021 FELLOW AND INDEPENDENT RESEARCHER | ADVISOR: DR. MARGARET REGAN
May 2021 - May 2022

- Researched the set of solutions to a parameterized system corresponding to the steady states of the ERK biochemical network for various combinations of parameters.
- Utilized homotopy continuation via Bertini to find the pseudo-witness set points of the discriminant locus,separating the parameter space into distinct regions yielding the same number of real solutions.
- Implemented MATLAB code that repeatedly samples over a 2-dimensional subspace of the parameterspace to generate the discrete set of pseudo-witness set points for a given parameterization.

Duke Math Department
Durham, NC

DOMATH RESEARCHER | ADVISORS: PROFS. THOMAS WITELSKI AND JEFFREY WONG
May 2019 - July 2019

- Modeled the motion of a slider on top of a body of fluid as a MATLAB simulation using differential equations from fluid dynamics.

Work and Coding Experience

Graduate Teaching Assistant
Atlanta, GA

GEORGIA TECH SCHOOL OF MATHEMATICS
Aug. 2022 - Present

- Run weekly studio/discussion sections for roughly 30-40 students and office hours. Grade/proctor quizzes and exams.
- Classes taught include Linear Algebra, Survey of Calculus, and Finite Mathematics.

Backend Head Teaching Assistant for Data Structures and Algorithms
Durham, NC

DUKE COMPUTER SCIENCE DEPARTMENT
Aug. 2019 - May 2022

- Configured and maintain the autograder, starter code, and JUnit test code for Java projects on GitLab and Gradescope.
- Troubleshooted assignments, student submissions, and students' use of programming tools, as needed.

The Social Institute
Durham, NC

DEVELOPER INTERN
May 2021 - Aug. 2021

- Performed comprehensive QA review; wrote detailed feedback and bug reports on their platform promoting healthy social media use.
- Communicated with the Marketing department; contributed to a website advertising their annual summit.

WoTo
Durham, NC

BACKEND ENGINEER
May 2020 - Jan. 2021

- Contributed to the backend of WoTo, a web app designed for scheduling and holding office hours.
- Created and tested new endpoints on the backend Express API, restructured a MongoDB database to improve user functionality.

4th Medical Group, Duke Phoenix Project   *Goldsboro, NC*

Mobile Developer Intern   *May 2020 - August 2020*
- Implemented a redesigned prototype of 4th Medical Group's mobile application using React Native.
- Lead engineer on navigation menu allowing users to switch between different screens, along with a news screen and directory screen.

Presentations

Chesapeake Large-Scale Analytics Conference   *Annapolis, MD*

Presenter   *November 1, 2023*
- Presented a poster titled *Fully Homomorphic Encryption Schemes For Real-World Usage* based off summer work from Los Alamos.

48th Annual New York State Regional Graduate Mathematics Conference   *Syracuse, NY*

Presenter   *April 1st, 2023*
- Gave a 20-minute expository talk titled *Chip-firing, served three ways* based on Part 1 of "*Divisors and Sandpiles: An Introduction to Chip Firing*" by Scott Corry and David Perkinson.
- Chip-firing asks a simple question: "Given an group of people and an initial distribution of dollars among the people, including people in debt, can we redistribute the money such that no one ends up in debt?" This simple question with its origins in combinatorics can be reformulated using concepts from linear algebra, graph algorithms, and even Riemann surfaces.

Honors & Awards

2024	**David Brown Fellowship Award,** Georgia Tech SoM 2024 Awards	*Atlanta, GA*
2023	**Thank-A-Teacher Award,** Georgia Tech CETL 2023 Awards	*Atlanta, GA*
2022	**Rebecca DeNardis Memorial Award,** Duke Computer Science Commencement	*Durham, NC*
2022	**Excellence in Community Service Award,** Duke Mathematics Commencement	*Durham, NC*
2018	**NC Math Scholar - Duke Full-Tuition Scholarship,** NC State Math Comprehensive Contest	*Durham, NC*

Service To The Department

2024	**Graduate Student Representative,** Georgia Tech Graduate Committee and Grad Student Council	*Atlanta, GA*
2023	**Organizer,** Georgia Tech High School Math Day	*Atlanta, GA*
2022	**Organizer,** Duke Math Meet	*Durham, NC*