

# Samuel King

PHD STUDENT · GEORGETOWN UNIVERSITY

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## Education

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### Georgetown University

PHD, COMPUTER SCIENCE

- Advisor: Sasha Golovnev
- Research Interests: Algorithms, Data Structures, Discrete Math, Complexity

Washington D.C.

Fall 2021 - present

### University of Rochester

HONORS BS, MATHEMATICS

- Computer Science Minor
- Thesis: Sampling Young Tableaux and Contingency Tables
- Take Five Scholar: The Role of Music in Video Games and Film
- Magna Cum Laude, GPA: 3.96

Rochester, NY

Fall 2016 - Spring 2021

## Publications & Patents

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*Authors listed in alphabetical order*

Karthik Gajulapalli, Alexander Golovnev, Samuel King, and Sidhant Saraogi. Online Orthogonal Vectors Revisited. To appear in *Symposium on Discrete Algorithms (SODA)*, 2026.

Karthik Gajulapalli, Alexander Golovnev, and Samuel King. On the Power of Adaptivity for Function Inversion. *Conference on Information-Theoretic Cryptography (ITC)*, 2024.

Aniruddha Bapat, Andrew M. Childs, Alexey V. Gorshkov, Samuel King, Eddie Schoute, and Hrishee Shastri. Quantum routing with fast reversals. *Quantum*, 5, 533, 2021.

U.S. Patent Application 18178491, filed Mar 3, 2023.

U.S. Patent Application 18669111, filed May 20, 2023.

Erin Bevilacqua, Samuel King, Jürgen Kritschgau, Michael Tait, Suzannah Tebon, and Michael Young. Rainbow numbers for  $x_1 + x_2 = kx_3$  in  $\mathbb{Z}_n$ . *Integers: Electronic Journal of Combinatorial Number Theory*, 20(A50):A50, 2020.

## Work Experience

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### Predict Health, Inc.

Arlington, VA

May 2024 - Present

DATA SCIENTIST

- Researched and developed retention models for Medicare populations to expand Predict Health's data science capabilities
- Built a custom Python package to ensure efficient, reusable capabilities for future retention projects
- Streamlined codebase to reduce project completion time from months to days
- Designed experiments to detect and mitigate data leakage in temporal prediction tasks

## Selected Coursework & Skills

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**Mathematics:** Combinatorial Optimization, Spectral Graph Theory, Linear Algebra, Computational Statistics, Combinatorics, Algebra I & II

**Computer Science:** Algorithms, Data Structures, Sampling Algorithms, Analytical Methods, Cryptography, Parallel Algorithms, Databases, Gems of Theoretical CS

**Artificial Intelligence:** Experimental AI, Neural Networks, Artificial Intelligence, Philosophy of AI

**Skills:** Python (primary language), R, Mathematica, SQL (familiar languages), Git, L<sup>A</sup>T<sub>E</sub>X, PyTorch, NetworkX, Pandas, VSCode, Cursor, Databricks, Technical Communication

## Projects

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### **Reinforcement Learning for Ramsey Numbers**

Georgetown University

Summer 2024

#### PERSONAL RESEARCH PROJECT

- Conducted research on RL approaches for finding counterexample graphs for lower bounds on Ramsey numbers
- Experimented with deep Q-learning, cross-entropy method, game-playing, and Monte Carlo tree search
- Experiments conducted using PyTorch, Gymnasium, Stable-Baselines3

### **Exploring Subitizing in Convolutional Neural Networks**

Georgetown University

Fall 2022

#### NEURAL NETWORKS CLASS PROJECT

- Trained convolutional neural networks to count the number of simple shapes in an image
- Compared performance between classification and regression models
- Tested model robustness with different synthetic datasets

### **Stratego AI**

University of Rochester

Spring 2018

#### HONORS SEMINAR RESEARCH PROJECT

- Implemented traditional state-space tree search algorithms to play the board game Stratego
- Experimented with using neural networks in Tensorflow to learn the state value function
- Experiments were unsuccessful, but the problem was solved by a team of 34 DeepMind scientists 4.5 years later

## Teaching Experience

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### **Gems of Theoretical CS**, Teaching Assistant & Lecturer

Georgetown U, Fall '25

### **CS Department Tutoring**, Head Tutor & Program Founder

Georgetown U, Spring & Fall '25

### **Data Structures**, Guest Lecturer

Amherst College, Fall '24

### **Introduction to Algorithms**, Teaching Assistant & Lecturer

Georgetown U, Fall '24

### **Math Methods for CS**, Teaching Assistant & Lecturer

Georgetown U, Spring '24

### **Intro to Databases**, Teaching Assistant & Lecturer

Georgetown U, Fall '23

### **New Horizons in Theoretical Computer Science**, Teaching Assistant

TTIC (Virtual), Summer '23

### **Graduate Algebra I**, Teaching Assistant & Lecturer

U of Rochester, Fall '20

### **Honors Calculus I & II**, Teaching Assistant & Workshop Leader

U of Rochester, Fall '17-Spring '20

## Honors and Awards

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2025 **Outstanding Teaching Assistant Award**, Georgetown U. Computer Science Department

2024 **Outstanding Teaching Assistant Award**, Georgetown U. Computer Science Department

2020 **Arthur S. Gale Memorial Prize**, University of Rochester Mathematics Department

2019 **Take Five Scholarship**, University of Rochester

**Deans' Award for Symposium Presentation**, University of Rochester

**Joint Mathematics Meetings 2019 Outstanding Poster Distinction**, JMM 2019