

# Walter McKelvie

CS/Math at Columbia University (Class of 2024)

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## NOTABLE COURSEWORK

- Analysis of Algorithms
- Algorithms for Massive Data
- Complexity Theory
- Computational Learning Theory
- Operating Systems
- Distributed Systems
- Programming Languages
- Cryptography
- Property Testing
- Differential Equations
- Multivariable Calculus
- Linear Algebra
- Complex Analysis
- Real Analysis I and II
- Abstract Algebra I and II
- Algebraic Curves
- Algebraic Topology
- Probability Theory
- Advanced Probability Theory
- Modern Physics
- Organic Chemistry

## SKILLS

Linux/Bash, Docker, Java, Python, C/C++, x86 Assembly, ROS

## WORK EXPERIENCE

- May - August 2023 **Visiting Scholar at Purdue University**  
Purdue University  
Research in distribution testing, advised by Paul Valiant.
- 2022 - Present **Teaching Assistant at Columbia University**  
New York, NY  
TA for Computer Science Theory, Complexity Theory, and Cryptography.
- Sep 2021 - Present **Technical Lead at Columbia University Robotics Club (CURC)**  
New York, NY  
Coded and provided technical leadership for F1TENTH self-driving car project
- Set up AWS-hosted remote development and deployment system
  - Moved code build system to Docker, increasing portability and testability
  - Assisted in design and implementation of API's between software modules
  - Forward kinematic modeling for robot localization
  - Designed mapping model using Gaussian blur on sensor input point map
- May - August 2022 **Software Engineer Intern at Apple, Inc.**  
Cupertino, CA  
Core Motion team in Sensing and Connectivity
- Invented and benchmarked novel digital signal processing algorithm
  - Data collection framework and real-time implementation using C++
  - Data analysis and algorithm prototyping with NumPy/SciPy
- 2020 - 2021 **Research Assistant at Stevens Institute of Technology**  
Hoboken, NJ  
Worked on project using static and dynamic analysis to isolate unwanted or insecure features in a binary, detecting entry points to these machine code blocks at runtime and self-healing so that the program can safely continue without execution of that feature. Specific work included:
- Used Intel Pin to collect traces of binary execution from fuzzed inputs
  - Evaluated and debugged feature entry point detection heuristics.

## EDUCATION

- 2021 - 2024 **Bachelor of Science, Computer Science**  
Columbia University in the City of New York  
4.0/4.0 GPA. Concentration in mathematics.  
Robotics Club, Chess Club, Ski Team, Theoretical Computer Science Group, Jazz Ensemble, Cryptography Lab Research Assistant.
- 2020 - 2021 **Bachelor of Science, Computer Science, Pure and Applied Mathematics**  
Stevens Institute of Technology  
4.0/4.0 GPA. Presidential Scholarship, Edwin A Stevens Scholarship, Dean's List both semesters. Transferred to Columbia University.  
Chess Club President, Computer Science Club. TA for Discrete Structures.