Elijah Sanderson

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Education

Tufts University 2021 – Present
MS, Mathematics (expected May 2023) GPA: 3.89 Medford, Massachusetts

Wentworth Institute of Technology 2018 – 2021
BS, Applied Mathematics - Summa cum laude CGPA: 3.90 Math GPA: 3.98 Boston, Massachusetts

Research Work

2. *Factor Ordering and Quantum Diffusion in (1+1) Gravity* (with R. Maitra and A. Liberatore); ongoing.
1. *Constraints on Maximal Entanglement Under Groups of Permutations* (with A. Meill and J. Butts); ArXiv 2020.
   - arXiv link: https://arxiv.org/abs/2011.14507

Expository and Presentation Work

- *Compression of Large Images via the Random Singular Value Decomposition* Fall 2021
  - Presentation of an approach to analyzing and comparing different algorithms of random singular value decomposition applied to high-resolution images.
  - GitHub link (for presentation): Here
  - GitHub link (for code): Here
  - GitHub link (for paper): Here
- *Modern Algebra in Modern Music: Understanding sound through a mathematical lens* Fall 2020
  - Seminar presentation of the vector space of all sounds with analysis based in inner product spaces and Fourier analysis.
  - GitHub link: Here
- *Fermat Numbers, Goldbach's Theorem, and the Infinitude of Primes* Fall 2019
  - Poster presentation analyzing properties of Fermat numbers using mathematical induction.
  - GitHub link: Here
- *Java Periodic Table* Spring 2019
  - Java application which provides the user with an interactive periodic table which contains relevant data on each element. Atomic number, mass, critical points, density, phase, category, radioactivity, and links to Wikipedia articles are included.
  - GitHub link: Here
- *Optimization: A Method to Expand Binomials Raised to the nth Power, where $n \in \mathbb{R}$* Spring 2018
  - IB HL Mathematics Internal Assessment which analyzes a method to extend the definition of the binomial expansion to those which have non-integer powers.
  - GitHub link: Here
- *Finding an Unknown Variable Based on the Equation for the Launch Angle* Spring 2018
  - IB HL Physics Internal Assessment which examines the formula for launch angle of a projectile and attempts to mathematically manipulate the equation to figure out an unknown quantity.
  - GitHub link: Here

Teaching Experience

Graduate Experience – Tufts University; Department of Mathematics September 2021 - Present
- Spring 2022: Grader – Math 136: Real Analysis II
- Fall 2021: Grader – Math 32: Calculus I

Undergraduate Experience – WIT; School of Computing and Data Science January 2019 - August 2021
- Summer 2021 – MATH 1850: Engineering Calculus II
  - Embedded tutor and TA with office hours; all in-person
- Spring 2019 - Summer 2021 – Academic Tutor (courses listed below)
  - MATH 1750: Engineering Calculus I
  - MATH 1850: Engineering Calculus II
  - MATH 1900: Introduction to Operations Research
  - MATH 2025: Multivariable Calculus

  - MATH 2100: Probability and Statistics for Engineers
  - MATH 2500: Differential Equations
  - MATH 2860: Linear Algebra and Matrix Theory
  - COMP 1000: Computer Science I
  - PHYS 1250: Engineering Physics I
- Spring 2021 – IB HL Mathematics TA
  - Held a TA position to help high school seniors prepare and study for their final exams in IB HL Mathematics; all in-person

Relevant Coursework

Graduate Coursework – Tufts University; Department of Mathematics September 2021 - Present

- Spring 2022
  - Math 285: Manifolds
  - Math 240: Special Topics in Algebra: Arithmetic Statistics
  - Math 175: Algebraic Topology I
- Fall 2021
  - Math 245: Algebra I
  - Math 235: Analysis
  - Math 123: Math Aspects of Data Analysis

Relevant Undergraduate Coursework – WIT; School of Computing and Data Science September 2018 - May 2021

- Spring 2021
  - Math 321: Real Analysis II (cross-registered at Simmons University)
- Fall 2020
  - Math 390: Applied Linear Algebra (cross-registered at Simmons University)
  - Math 320: Real Analysis I (cross-registered at Simmons University)
  - MATH 4900: Partial Differential Equations
- Spring 2020
  - MATH 3950: Numerical Analysis II
  - MATH 2860: Linear Algebra & Matrix Theory
  - MATH 2200: Advanced Statistics
- Fall 2019
  - MATH 4400: Intro to Abstract Algebra
  - MATH 3900: Numerical Analysis I
  - MATH 2550: Transition to Advanced Math
- Spring 2019
  - MATH 4575: Complex Variables
  - MATH 2500: Differential Equations
  - MATH 2300: Discrete Math
- Fall 2018
  - MATH 2025: Multivariable Calculus
  - PHYS 1750: Engineering Physics II

Skills

- Software: MATLAB, Mathematica, Adobe Suite, Microsoft Office, Logic Pro
- Programming languages: LaTeX, R, Java, JSON, Python
- Interests: Analysis, Number Theory, Group Theory, Topology, Algebraic Geometry, Quantum Physics and Relativity

Awards and Extracurriculars

- Graduate Recognition Award for highest GPA of graduating BSAM candidate (Wentworth, Summer 2021)
- Dean's List (Wentworth, each semseter from Fall 2018 - Summer 2021)
- Member of SIAM (Wentworth chapter) (2018-2021).
- Coordinated Wentworth's team for the 80th Putnam Competition; top scorer at WIT; top 43% overall.

References

Dr. Fulton Gonzalez
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Data Scientist
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(Former associate professor at WIT)