

## Education

### Columbia University

Bachelor of Science, Applied Mathematics. Minor in Computer Science. GPA: 4.00  
Dean's List (2022-2025)

New York, NY  
2022 - 2026

### BASIS Independent Brooklyn

High School Diploma. GPA: 4.00  
Graduated Salutatorian. Honor Roll (2018 - 2022)

New York, NY  
2018 - 2022

## Research Experience

### Research Project with Prof. Nakul Verma Dimension Reduction Research

Columbia University, New York, NY  
February 2023 – Present

- Studied shortcomings of data visualization methods including t-SNE and UMAP from a theory perspective
- Received \$6000 in funding through SUMMER@SEAS for research during summer of 2025
- Co-authored two theory papers currently submitted for review

### Research Project with Prof. Alexandr Andoni Nearest Neighbor Algorithms Research

Columbia University, New York, NY  
June 2025 – Present

- Working towards proving data-dependent lower bounds for nearest neighbor search with a focus on the List-Of-Points model

### COMS 6998: Theoretical Foundations of Large Language Models with Prof. Daniel Hsu

Columbia University, New York, NY  
January 2025 – May 2025

- Surveyed theory literature on NLP, learning theory, transformers, and chain-of-thought
- Completed a final project on the plausibility of stealing model weights via black-box queries which included proving a uniform convergence bound for learning non-i.i.d. data

### Research Project with Prof. Yuri Faenza Online Matching Theory Research

Columbia University, New York, NY  
June 2024 – August 2024

- Studied online bipartite matching and welfare functions
- Received \$6000 in funding through SUMMER@SEAS for research during summer of 2024
- Authored an unpublished note proving the impossibility of constant-factor approximation for online bipartite matching with respect to the Nash Social Welfare function

### COMS 6998: Unconditional Lower Bounds and Derandomization with Prof. Rocco Servedio

Columbia University, New York, NY  
January 2024 – May 2024

- Surveyed lower bounds and pseudorandom generators for several restricted models of computation
- Conducted final project on constructing deterministic approximate counters for  $\mathbb{F}_2$  Polynomials under the polarizing random walks framework via correlation-based Fourier tail bounds

## Publications

- Szymon Snoeck**, Noah Bergam, and Nakul Verma. Compressibility Barriers to Neighborhood-Preserving Data Visualizations. Under Review at International Conference on Algorithmic Learning Theory (ALT). 2025
- Noah Bergam, **Szymon Snoeck**, and Nakul Verma. t-SNE Exaggerates Clusters, Provably. Under Review at International Conference on Learning Representations (ICLR). 2025

## Manuscripts

- Szymon Snoeck**. A Uniform Convergence Result for Learning Text Data. 2025
- Szymon Snoeck**. The Negative Inter-Dependencies of the Multivariate Hypergeometric Distribution. 2025
- Szymon Snoeck**, Christopher En, Yuri Faenza. The Difficulty of Approximating Nash Social Welfare in Online Matching. 2024
- Szymon Snoeck**, Sam Wang. Deterministic Approximate Counting F2 Polynomials Via Correlation-based Fourier Bounds. 2024

## Teaching Experience

**Computer Science Department** Columbia University, New York, NY  
**Unsupervised Learning Teaching Assistant** September 2025 – Present

- Host weekly office hours and tutor students in unsupervised machine learning
- Coordinate with another TA to develop assignments, create rubrics, write solutions, and grade homework

**Computer Science Department** Columbia University, New York, NY  
**Machine Learning Teaching Assistant** January 2024 – May 2025

- Hosted weekly office hours and tutored students in applied and theoretical machine learning
- Devised intuitive approaches to complex topics to make them palatable for a range of mathematical backgrounds
- Coordinated with other TAs to develop assignments, create rubrics, write solutions, and grade homework

**Peer Tutoring** BASIS Independent Brooklyn, New York, NY  
**Peer Tutor** September 2019 – 2022

- Tutor K-12 students struggling in math and science
- Weekly one-on-one meetings with students to help with homework and studying

## Skills

**Technical:** Proficiency with L<sup>A</sup>T<sub>E</sub>X, Java, Python, C, HTML, CSS, SKLearn, NumPy, SciPy, TensorFlow, and Pandas  
**Artistic:** Photography, inking, oil painting, Adobe Photoshop, and Adobe Lightroom  
**Language:** Dutch (Fluent), and French (Elementary Proficiency)

## Awards

**CRA Outstanding Undergraduate Researcher Award Nomination** | CRA Fall 2025  
**Dean's List** | Columbia University Fall 2022 - Spring 2025  
**Salutatorian** | BASIS Independent Brooklyn Spring 2022  
**Honor Roll** | BASIS Independent Brooklyn Fall 2018 - Spring 2022  
**7th Place at State Championship** | New York City Urban Debate League Spring 2021  
**2 gold keys, 1 silver key, and an honorable mention** | Scholastic Art & Writing Awards Spring 2020  
Exhibited a photograph at The Metropolitan Museum of Art along with 250 works chosen from +10,000 submissions to Scholastic Art & Writing Awards  
**National AP Scholar** | College Board Fall 2020