

# Szymon Gustav Snoeck

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## 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- Authored an unpublished note proving the impossibility of constant-factor approximation for online bipartite matching with respect to the Nash Social Welfare function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

<b>Computer Science Department</b> <b>Unsupervised Learning Teaching Assistant</b>	Columbia University, New York, NY September 2025 – Present
<ul style="list-style-type: none"><li>Host weekly office hours and tutor students in unsupervised machine learning</li><li>Coordinate with another TA to develop assignments, create rubrics, write solutions, and grade homework</li></ul>	

  

<b>Computer Science Department</b> <b>Machine Learning Teaching Assistant</b>	Columbia University, New York, NY January 2024 – May 2025
<ul style="list-style-type: none"><li>Hosted weekly office hours and tutored students in applied and theoretical machine learning</li><li>Devised intuitive approaches to complex topics to make them palatable for a range of mathematical backgrounds</li><li>Coordinated with other TAs to develop assignments, create rubrics, write solutions, and grade homework</li></ul>	

<b>Peer Tutoring</b> <b>Peer Tutor</b>	BASIS Independent Brooklyn, New York, NY September 2019 – 2022
<ul style="list-style-type: none"><li>Tutor K-12 students struggling in math and science</li><li>Weekly one-on-one meetings with students to help with homework and studying</li></ul>	

## 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

<b>CRA Outstanding Undergraduate Researcher Award Nomination   CRA</b>	Fall 2025
<b>Dean's List   Columbia University</b>	Fall 2022 - Spring 2025
<b>Salutatorian   BASIS Independent Brooklyn</b>	Spring 2022
<b>Honor Roll   BASIS Independent Brooklyn</b>	Fall 2018 - Spring 2022
<b>7th Place at State Championship   New York City Urban Debate League</b>	Spring 2021
<b>2 gold keys, 1 silver key, and an honorable mention   Scholastic Art &amp; Writing Awards</b>	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	
<b>National AP Scholar   College Board</b>	Fall 2020