Curriculum Vitae

Zachary S. Siegel

Princeton University

Department of Computer Science

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Education

Princeton University, Department of Computer Science, 2021 – 2025

Columbia University, School of Professional Studies, 2020 – 2021

Scarsdale High School, 2017 – 2021

Stanford Online High School, 2016 – 2020

Publications

Preprints

T. Galanti, Z. Siegel, A. Gupte, T. Poggio. (2022). "SGD and Weight Decay Provably Induce a Low-Rank Bias in Deep Neural Networks." https://arxiv.org/abs/2206.05794.

2021

Siegel, Zachary & Kulp, Scott. (2021). "Superimposing Height-Controllable and Animated Flood Surfaces into Street-Level Photographs for Risk Communication." Weather and Climate Extremes. 32. 100311. 10.1016/j.wace.2021.100311.

Workshops

2022

Tomer Galanti, Tomaso Poggio, Zachary S. Siegel. (2022). "SGD Noise and Low-Rank Bias in Deep Neural Networks," Deep Math Conference.

Talks

2020

Siegel, Zachary & Kulp, Scott. (2020). "Fast and Flexible Composition of Animated Flood Surfaces into Street-Level Photographs." American Geophysical Union Fall 2020 Meeting, Oral Presenter.

Research

Poggio Lab, MIT

Undergraduate Research Assistant, May 2022 – Present

poggio-lab.mit.edu

Undergraduate Research Assistant for the Poggio Lab at the Center for Brains, Minds, and Machines at MIT. Analyzing the low-rank bias in the weight matrices of neural networks from both theoretical and empirical perspectives.

Human Computer Interaction Lab, Princeton University
Undergraduate Research Assistant, Spring 2022
hci.princeton.edu
Developed models to simulate efficiency of decentralized, gig-economy work, such as
ride-sharing and food-delivery platforms. Utilized agent-based modeling software to determine
how changes to driver dispatch algorithms affect overall system performance, with an emphasis
on improving working-conditions for gig-economy workers.

Climate Central
Research Intern, 2018 – 2022
www.climatecentral.org
Developed applications to superimpose the ocean onto street level images to warn residents
about the risks of flooding, by leveraging leverage machine learning for depth completion of
sparse LIDAR data, Blender to render the ocean, and novel techniques to generate a composite
image that contains both rendered ocean water and a real street level image.

<u>Teaching</u>
Course Assistant, MAT 204: Advanced Linear Algebra with Applications, Spring 2023
Course Assistant, MAT 203: Advanced Vector Calculus, Fall 2022
Precept Assistant, COS 226: Algorithms and Data Structures, Spring 2022

<u>Experience</u>
Youth Passion Project Inc.
Chairman of the Board, August 2020 – Present
Founder and President, March 2020 – June 2021
www.youthpassionproject.org
Founded the Youth Passion Project, a 501(c)(3) non-profit organization that provides a platform
for high school students to teach classes to elementary and middle school learners. Courses
taught on subjects not commonly found in school, including Introduction to Origami, Basics of
3D Modeling, Intermediate Sanskrit, and more. Managed a team of over 200 instructors
comprising 8 chapters throughout the world with over 2,000 student sign ups.

Golf This Spring
Founder and Co-President, 2017 – 2021
Founded Golf This Spring, an organization that promotes adaptive golf in Westchester County.
Led the team in hosting fundraiser events, raising money, purchasing an adaptive wheelchair, and
promoting its use. Raised over $7,000 and purchased the wheelchair to make golf more
accessible for people with disabilities.

Lincoln-Douglas Debate Team

Captain of Debate, 2020 – 2021
Officer, 2019 – 2020
Member, 2017 – 2019

Organized tournament logistics for Lincoln-Douglas debate, including registration for tournaments, travel plans, and hotel bookings. Taught freshmen debate by developing curricula, holding lessons, facilitating practice rounds, and coaching them during tournaments. Instructed novices from other lower income schools through a program called Pep Talk Debate. Ranked 18th nationally.

Robotics Team

Co-Captain, 2020 – 2021
Director of Engineering, 2018 – 2020
Member, 2017 – 2018

www.scarsdalerobotics.com

Co-Captain of the Scarsdale Robotics team. Managed a team of thirty members, overseeing engineering, programming, and outreach efforts. Facilitated communication within and between departments, coordinated strategy for competition, and taught new members the basics of engineering. Coordinated an effort for the team to tackle real-world problems that have solutions to benefit our local community during COVID-19 pandemic.

Selected Projects

Circuit Debater

ld.circuitdebater.org

Created circuitdebater.org to allow debaters to post arguments, readings, and other resources to benefit students from lower-income communities without adequate access to coaching resources. Learned Google Compute Engine, PHP, MySQL, Linux, and Media Wiki to implement project. 1,000+ users.

Coding Tutorials

www.codingtutorials.org

While in middle school, produced tutorial videos on the Scratch programming language to help younger students learn to code. Expanded project to help K-12 teachers implement Scratch in their classrooms.

Publicity

Podcast Episode, The Genius Generation, May 2021
Segment on Youth Passion Project, NBC New York, June 2020

Honors and Awards

Science Excellence Award, Scarsdale High School, 2021
Finalist, National Merit, 2021
2nd in Westchester-Rockland Junior Science & Humanities Symposium for Computer Science
18th in Nation for Lincoln-Douglas Debate, National Debate Coaches Association, 2021

Relevant Coursework
Columbia University

COMS 3203:	Discrete Mathematics	(Summer 2020)
COMS 3261:	Computer Science Theory	(Summer 2020)
E 2000:	Multivariable Calculus	(Fall 2020)
COMS 3251:	Linear Algebra	(Spring 2021)

Princeton University

COS 226:	Algorithms and Data Structures	(Fall 2021)
COS 217:	Introduction to Programming Systems	(Fall 2021)
MAT 203:	Advanced Vector Calculus	(Fall 2021)
COS 240:	Reasoning About Computation	(Spring 2022)
MAT 204:	Advanced Linear Algebra with Applications	(Spring 2022)
COS 316:	Principles of Computer System Design	(Fall 2022)
ORF 309:	Probability and Stochastic Systems	(Fall 2022)
PSY 255:	Cognitive Psychology	(Fall 2022)
COS484:	Natural Language Processing	(Spring 2023)
ORF307:	Optimization	(Spring 2023)