

Clayton H. Sanford

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EDUCATION

Columbia University

September 2019 - May 2024 (expected)

Ph.D. Student in Computer Science

M.S in Computer Science (Feb. 2021)

GPA: 4.24/4.33

- Advisors: Rocco Servedio and Daniel Hsu

Brown University

September 2014 - May 2018

Sc.B. with Honors in Applied Mathematics - Computer Science

GPA: 3.9/4.0

- Thesis: “Applying Rademacher-Like Bounds to Combinatorial Samples and Function Selection.”
- Thesis Advisor: Eli Upfal; Concentration Advisor: Caroline Klivans
- Magna Cum Laude

PUBLICATIONS

C. Sanford, V. Chatziafratis. “Expressivity of Neural Networks via Chaotic Itineraries beyond Sharkovsky’s Theorem.” *Submitted for Publication*.

T. Chin*, J. Ruth*, C. Sanford*, R. Santorella*, P. Carter*, B. Sandstede*. “Enabling equation-free modeling via diffusion maps.” *Appearing in Journal of Dynamics and Differential Equations*, 2022.

N. Ardeshir*, C. Sanford*, D. Hsu. “Support vector machines and linear regression coincide with very high-dimensional features.” *Neural Information Processing Systems*, 2021.

D. Hsu*, C. Sanford*, R. Servedio*, E.-V. Vlatakis-Gkaragkounis*. “On the Approximation Power of Two-Layer Networks of Random ReLUs.” *Conference on Learning Theory*, 2021.

K. Cygan*, C. Sanford*, W. Fairbrother. “Spliceman2 - A Computational Web Server That Predicts Sequence Variations in Pre-mRNA Splicing.” *Bioinformatics* 33 (18), 2017.

J. Gross*, C.Sanford*, G. Kocks*. “Projected Water Needs and Intervention Strategies in India.” *Undergraduate Mathematics and its Applications* 37 (2), 2016.

* Contributed equally

FELLOWSHIPS AND AWARDS

NSF GRFP Fellowship

March 2021

National Science Foundation

- Competitive fellowship that provides three years of full funding for graduate research.

Department Service Award

May 2020

Columbia Computer Science

Computer Science Senior Prize

May 2018

Brown Computer Science

- Cash prize awarded to the top students in the computer science department based on academic achievement and department service.

Outstanding Winner

April 2016

*Interdisciplinary Contest in Modeling**Consortium for Mathematics and its Applications*

- Designation given to five out of over 3000 teams for mathematical modeling of water scarcity in the ICM contest.

INDUSTRY EXPERIENCE

Software Engineering Intern

April 2019 - August 2019

Lumi Labs

- Front-end and back-end development with direct ownership of new features core to the product.

Associate Analytics Data Scientist

August 2018 - April 2019

LinkedIn

- Used Hive and SQL to create stable and frequently-used datasets that repopulate daily.
- Performed deep-dive analyses on open questions for the LinkedIn Learning product.
- Co-coordinated a bi-weekly machine learning reading group.

Data Analytics Intern

June 2017 - August 2017

LinkedIn

- Analyzed subscription patterns with LinkedIn Learning team using Pig, HDFS, SQL, and Python.
- Contextualized findings in the Learning business and presented to stakeholders.

RELEVANT COURSEWORK

Algorithms and Theory: Models of Computation, Analysis and Design of Algorithms, Advanced Algorithms Seminar, Computational Linear Algebra, Intro to Cryptography, Randomized Algorithms, Computation and the Brain

Artificial Intelligence: Machine Learning, Artificial Intelligence, Foundations of Prescriptive Analytics, Independent Study for ML research, Optimization Methods for ML, ML Theory, Algorithmic Game Theory

Probability and Statistics: Probability and Computation, Information Theory, Recent Applications in Probability and Statistics, Probabilistic Methods in Computer Science

Dynamical Systems: Applied Ordinary Differential Equations, Applied Partial Differential Equations I, Topics in Chaotic Dynamics, Independent Study for Dynamical Systems Research

Pure Mathematics: Linear Algebra, Abstract Algebra, Analysis: Functions of One Variable

Non-Technical: Persuasive Communication, Classrooms in Context: Public Education in Providence

TEACHING EXPERIENCE

Graduate Teaching Assistant

January 2021 - April 2021

Columbia University Department of Computer Science

- Holds office hours, grades assignments, and prepares course materials for Introduction to Computational Learning Theory.

Head Teaching Assistant

April 2017 - December 2017

Brown University Department of Computer Science

- Led a staff of 14 UTAs through grading assignments, running review sessions, and holding office hours.
- Hired UTAs after interviewing 35 candidates for the job.

- Managed an Algorithms class with 170 students and coordinated interactive grading sessions and exams.
- Taught an supplemental section on NP-hardness to a group of forty students for 90 minutes.
- Brainstormed, wrote-up, and edited problems for homework assignments and exams.

Undergraduate Teaching Assistant

September 2015 - May 2017

Brown University Departments of CS and Applied Math

- Served on the course staffs of four courses: Accelerated Intro to CS, Discrete Structures and Probability, Theory of Computation, Topics in Chaotic Dynamics.
- Created problems for and graded homework assignments and exams.
- Hosted office hours for helping students understand course material and solve homework problems.

Tutor and Volunteer Representative

January 2015 - May 2016

Swearer Tutoring Enrichment in Math and Science (STEMS)

- Tutored math and science in class and after school at a nearby public school in Providence.
- Interviewed potential volunteers and planned meetings to help train tutors.

Tutor

September 2011 - June 2014

Soquel High School

- Tutored math at homework club after school twice a week for three years.

DEPARTMENT SERVICE

- Ran events at and coordinated the Columbia Visit Day for admitted students in Spring 2020.
- Started the Columbia Theory Student seminar, where students share their research on a weekly basis.
- Advised two cohorts of undergraduate theory seminars on ML theory.
- Planned the Columbia TCS student retreat for fall 2021.

LEADERSHIP AND MENTORSHIP EXPERIENCE

President

February 2015 - May 2018

Applied Math Department of Undergraduates (APMA DUG)

Brown University

- Hosted well-attended advising panels for students interested in Applied Math courses and research.
- Created problems for and managed a casual math competition every semester.
- Coordinated lectures by Applied Math faculty members for undergrads every semester.
- Welcomed prospective students and new concentrators by planning department-sponsored celebrations.

President

November 2014 - May 2018

Outing Club

Brown University

- Led an executive board of forty members that ran trips every weekend of the academic year.
- Managed and apportioned a \$27000 annual budget.
- Recruited, interviewed, and trained new trip leaders.

Peer Advisor

September 2017 - May 2018

Matched Advising Program for Sophomores (MAPS)

Brown University

- Advised two sophomore Applied Math students as they declared their concentrations and decided on coursework and internships.

Peer Advisor

September 2015 - May 2017

Meiklejohn Peer Advisory Program

Brown University

- Advised eleven first year students on adjusting to college life, selecting courses, building connections, and finding their academic paths.

MISCELLANEOUS

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| Programming Languages | Python, Java, Matlab, SQL, Scala, Javascript, PHP, Perl, LaTeX, SQL |
| Technologies | Hadoop, Spark, Git, Tensorflow |
| Spoken Languages | English (native), Spanish (intermediate proficiency) |
| Other Interests | Backpacking, Running, Climbing, Cooking, New York, Public Transportation |