Samuel Deng

samdeng@cs.columbia.edu   (626)-363-5118

samuel-deng.github.io   Last updated: 03/31/2025

EDUCATION	**Columbia University**	2021 – Present

Ph.D Candidate, Computer Science

- Expected Graduation: May 2026.

- Advisors: Daniel Hsu and Jeannette Wing

Columbia University   2019 – 2021

M.S., Computer Science (Track: Theoretical Computer Science)   *GPA: 4.0*

Columbia University   2015 - 2019

B.A., Philosophy and Computer Science (Magna Cum Laude)   *GPA: 3.97*

- Thesis (Philosophy): "Methodological Blind Spots in Machine Learning Fairness: Lessons from the Philosophy of Science and Computer Science."

- Thesis Advisor: Achille Varzi.

AWARDS & HONORS

SEAS Doctoral Teaching Fellowship. School-wide, faculty-nominated fellowship awarded for PhD students who have demonstrated "excellence in teaching" to gain experience as a full instructor. Awarded 2024.

Avanessians Doctoral Fellowship for Thought Leaders and Innovators in Data Science. School-wide award for exceptional PhD students whose research focuses on or intersects with data science. Awarded 2024.

Computer Science Department Service Award. Award for PhD students agreed to be in the top 10% in department service contributions. Awarded 2023.

Dean's Fellowship. Award for small number of admitted Columbia PhD students, granting financial support for the first semester of PhD. Awarded 2021.

Andrew P. Kosoresow Award for Excellence in Teaching and Service. Award for outstanding contributions to teaching and service in the Columbia Computer Science Department. Awarded 2021.

Teaching Assistant Fellowship. Award for "exceptional" teaching assistants in the Columbia Computer Science Department. Awarded 2019.

Computer Science Award for Academic Excellence. Award for top seniors in the graduating class of the Columbia Computer Science Department. Awarded 2019.

Adam Leroy Jones Prize. Award for the best senior thesis in Philosophy of Science or Logic. Awarded 2019.

Phi Beta Kappa Honor Society. Award for top 10% of graduating class by "academic achievement," broadly defined. Awarded 2019.

TEACHING EXPERIENCE

Course Designer & Instructor, Columbia University   2024 – Present

Mathematics for Machine Learning (Summer 2024, Expected: Summer 2025)

- Created from scratch and taught a brand-new course designed to strengthen students' mathematical foundations for taking advanced machine learning coursework (link).

- Shared course with other educators in poster presentation at SIGCSE 2025.

- Drove adoption of the course with other computer science department faculty as an official offering of computer science department curriculum: COMS 3770.

- Evaluations: *Course (Overall Quality)* 4.86/5, *Instructor (Overall Quality)* 4.86/5, and 8 nominations for "SEAS Distinguished Faculty Award." Enrollment: 30 students.

Course Co-Designer & Co-Instructor, Columbia University   2022
Natural and Artificial Neural Networks Lab (Spring 2022)
- Co-created from scratch and co-taught *Natural and Artificial Neural Networks Lab,* a 14-week companion course on Python programming, introductory machine learning, and neural networks in the context of natural (human) neural networks (link).
- Evaluations: *Instructor (Overall Quality)* 5/5. Enrollment: 30 students.

Head Teaching Assistant, Columbia University   2022
Computational Linear Algebra (Fall 2022)
- Prepared original course materials (homework, lecture notes, Python notebook labs) for new iteration of *Computational Linear Algebra* course for Prof. Daniel Hsu.
- Designed and delivered weekly one-hour recitations (link) with interactive Colab notebooks to deepen understanding of course material.
- Designed and delivered substitute lecture on eigenvectors and eigenvalues as part of Columbia's Center for Teaching and Learning Teaching Observation.
- Led team of eight teaching assistants, coordinating grading, office hours, running review sessions, and fielding student questions.
- Evaluations: *Instructor (Overall Quality)* 4.63/5. Enrollment: 130 students.

Teaching Development Program, Columbia University   2022 – Present
Advanced Track
- Multiyear teaching certification program for graduate students with a focus on improving pedagogy with Columbia's Center for Teaching and Learning.
- Participated in teaching seminars, teaching observations, and pedagogy-focused reflection to improve teaching practices.

Head Teaching Assistant & TA Fellow, Columbia University   2020
Machine Learning (Summer 2020)
- Held office hours, graded homework, designed homework problems, and held recitations for Prof. Alexandre Lamy's iteration of *Machine Learning.*
- Evaluations: N/A (COVID-19 Semester).

Head Teaching Assistant & TA Fellow, Columbia University   2019 – 2020
Discrete Mathematics (Spring 2020, Fall 2019)
- Led staff of fifteen undergraduate teaching assistants, coordinating grading, review sessions, and office hours for large undergraduate core course.
- Worked closely with Prof. Ansaf Salleb-Aouissi to write homework and test problems, lecture notes, and develop a new course textbook.
- Taught recitation sessions and introduced Python programming to the course syllabus, creating new programming material and assignments.
- Evaluations (Fall 2019): *Instructor (Overall Quality)* 4.21/5. Enrollment (Fall 2019): 287 students. No official evaluations for Spring 2020 (COVID-19 Semester).

Teaching Assistant, Columbia University   2019
Machine Learning (Spring 2019)
- Graded, held office hours, and held recitations for Prof. Nakul Verma's graduate-level *Machine Learning* course.
- Evaluations: *Instructor (Overall Quality)* 4.83/5. Enrollment: 259 students.

Teaching Assistant, Columbia University	2018

Discrete Mathematics (Fall 2018)
- Graded, held office hours, and held recitations for Prof. Ansaf Salleb-Aouissi's undergraduate *Discrete Mathematics* course.

RESEARCH

Ssamuel Deng. "Mathematics for Machine Learning: A Bridge Course." 2024. Poster in: *Technical Symposium on Computer Science Education (SIGCSE TS) 2025.*

Samuel Deng, Jingwen Liu, and Daniel Hsu. "Group-wise oracle-efficient algorithms for online multi-group learning." 2024. arXiv:2406.05287. In: *Advances in Neural Information Processing Systems (NeurIPS) 2024.*

Samuel Deng and Daniel Hsu. "Multi-group Learning for Hierarchical Groups." 2024. arXiv:2402.00258. In: *International Conference on Machine Learning (ICML) 2024.*

Samuel Deng, Yilin Guo, Daniel Hsu, Debmalya Mandal. "Learning Tensor Representations for Meta-Learning." 2022. arXiv:2201.07348. In: *25th International Conference on Artificial Intelligence and Statistics (AISTATS) 2022.*

Samuel Deng, Sanjam Garg, Somesh Jha, Saeed Mahloujifar, Mohammad Mahmoody, Abhradeep Thakurta, Florian Tramèr. "A Separation Result Between Data-oblivious and Data-aware Poisoning Attacks." 2021. arXiv:2003.12020. In: *Advances in Neural Information Processing Systems (NeurIPS) 2021.*

Nicholas Carlini, Samuel Deng, Sanjam Garg, Somesh Jha, Saeed Mahloujifar, Mohammad Mahmoody, Shuang Song, Abhradeep Thakurta. "An Attack on *InstaHide*: Is Private Learning Possible with Instance Encoding?" 2021. arXiv:2011.05315. In: *IEEE Symposium on Security and Privacy (Oakland) 2021.*

Debmalya Mandal, Samuel Deng, Suman Jana, Jeannette Wing, Daniel Hsu. "Ensuring Fairness Beyond the Training Data." 2020. arXiv:2007.06029. In: *Advances in Neural Information Processing Systems (NeurIPS) 2020.*

Bo Cowgill, Fabrizio Dell'Acqua, Samuel Deng, Nakul Verma, Daniel Hsu, Augustin Chaintreau. "Biased Programmers? Or Biased Data? A Field Experiment in Operationalizing AI Ethics." 2020. arXiv:2012.02394. In: *21st ACM Conference on Economics and Computation.*

Samuel Deng, Achille Varzi. "Methodological Blind Spots in Machine Learning Fairness: Lessons from the Philosophy of Science and Computer Science." 2019. arXiv:1910.14210. In: *NeurIPS 2019 Workshop on Human-Centric Machine Learning.*

SERVICE

PhD Coordinator	2023 – Present

Columbia University Emerging Scholars Program (ESP)
- Organized and coordinated ESP, a peer-taught, discussion-based undergraduate seminar focused on group problem-solving, personalized mentorship, and exposing students to the breadth of computer science.
- Hired and led a staff of fifteen undergraduate instructors, preparing course material for weekly seminars for 100+ undergraduates.
- Coordinated end-of-semester ESP Research Symposium, a day-long program of research talks to motivate undergraduates to pursue research in computer science.

Conference Reviewer	2024 – Present

NeurIPS 2024 (Top Reviewer), ICLR 2025, ICML 2025

TALKS & POSTERS

"Mathematics for Machine Learning: A Bridge Course." *Technical Symposium on Computer Science Education (SIGCSE TS), 2025.* Poster. February 28, 2025.

"Group-wise oracle-efficient algorithms for online multi-group learning." *Neural Information Processing Systems (NeurIPS) 2024.* Poster. December 11, 2024.

"Multi-group Learning for Hierarchical Groups." *International Conference on Machine Learning (ICML), 2024.* Poster. July 25, 2024.

"Trustworthy Machine Learning: An Overview." *Emerging Scholars Program Research Symposium.* April 21, 2023.

"A Separation Result Between Data-oblivious and Data-aware Poisoning Attacks." *Neural Information Processing Systems (NeurIPS) 2021.* October 27, 2021.

"Blind Spots in Machine Learning Fairness: Lessons from the Philosophy of Science and Computer Science." *Symposium on the Engineering of Machine Learning Applications (SEMLA).* June 22, 2020. (Invited Talk)

"Blind Spots in Machine Learning Fairness: Lessons from the Philosophy of Science and Computer Science." *NeurIPS 2019 Workshop on Human-Centric Machine Learning.* December 13, 2019. (Invited Talk)

OTHER WORK EXPERIENCE	**ML Security Research Intern** *HRL Laboratories*	2020
	Data Science Research Intern *INCITE at Columbia University*	2019
	Software Engineering Intern *Amazon*	2018, 2019
	Software Engineering Intern *Fundera*	2016 – 2017
	QA Software Engineering Intern *Nomad Health*	2016

SELECTED COURSEWORK

General Computer Science: Analysis of Algorithms, Advanced Programming (C/C++), Data Structures and Algorithms (Java), Computer Security, Operating Systems

Theoretical Computer Science: Computational Complexity, Intro to Cryptography, Advanced (Information-Theoretic) Cryptography, Theory of Computation

AI/ML: Machine Learning, Artificial Intelligence, Applied Deep Learning, Natural Language Processing, Machine Learning Theory, Reliable Statistical Learning

Pure Mathematics: Honors Mathematics, Modern Algebra, Modern Analysis, Multivariable Calculus, Linear Algebra, Intermediate/Computational Linear Algebra, Discrete Mathematics, Optimization, Symbolic Logic, Nonclassical Logic

Probability and Statistics: Probability Theory, High-dimensional Probability, Theoretical Statistics

SKILLS

Programming: Python, C, C++, Java, Bash, SQL, JavaScript, LaTeX

Technologies: Tensorflow, PyTorch, Git, AWS, Linux, UNIX, Keras, Scikit-Learn

Human Languages: English (Native), Cantonese (Fluent), Mandarin (Basic), Korean (Very Basic)

REFERENCES

Daniel Hsu
Associate Professor of Computer Science, Columbia University
djhsu@cs.columbia.edu   +1 (212) 853-8473

Ansaf Salleb-Aouissi
Senior Lecturer of Computer Science, Columbia University
as2933@columbia.edu   +1 (212) 853-8462

Adam Cannon
Senior Lecturer of Computer Science, Columbia University
cannon@cs.columbia.edu   +1 (212) 853-8431