Samuel Deng

samdeng@cs.columbia.edu (626)-363-5118
samuel-deng.github.io Last updated: 08/29/2023

EDUCATION

Columbia University 2021 – Present
Ph.D Student, Computer Science
- 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.

PUBLICATIONS

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.*

TEACHING EXPERIENCE

Head Teaching Assistant 2022
Columbia University
- Designed and delivered weekly one-hour recitations with interactive Colab notebooks to deepen understanding of course material.
- 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 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.

Instructor 2022
Columbia University
- Created and co-taught *Natural and Artificial Neural Networks Lab,* a 1-credit, 14-week lab course on Python programming, introductory machine learning, and neural networks in the context of natural (human) neural networks for Professors John Morrison and Christos Papadimitriou.
- Designed syllabus from the ground up, delivered weekly lectures, and created all course materials from scratch (publicly available here).

Teaching Development Program (Advanced Track) 2022 – Present
Columbia University
- 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.

Teaching Assistant Fellowship 2019 – 2021
Columbia University
- Fellowship awarded to exceptional graduate teaching assistants in the Masters of Computer Science program at Columbia University to fund coursework.
- Served as head teaching assistant for *Discrete Mathematics* (undergraduate) and teaching assistant for *Machine Learning* (graduate).

Head Teaching Assistant 2019 – 2020
Columbia University
- Led staff of fifteen undergraduate teaching assistants, coordinating grading, review sessions, and office hours for 300+ undergraduate core course, *Discrete Mathematics.*
- Worked closely with Professor Ansaf Salleb-Aouissi to write homework and test problems, lecture notes, and new course textbook.
- Designed from scratch and delivered regular recitation sessions to reinforce course material and mathematics fundamentals.

Graduate Teaching Assistant 2020
Columbia University
- Held office hours, graded homework, designed homework problems, and held review sessions for Professor Alexandre Lamy's iteration of *Machine Learning.*

Undergraduate Teaching Assistant 2017 – 2019
Columbia University
- Served as undergraduate teaching assistant for *Discrete Mathematics* (undergraduate) and *Machine Learning* (graduate).

Tutor 2014 – Present
Various Institutions
- One-on-one tutored and mentored elementary, middle, and high school students in writing and math at various programs (including: The Coding School, Path Mentors, and Alpha Science Educational Institute).

WORK EXPERIENCE

ML Security Research Intern 2020
HRL Laboratories
- Investigated the effectiveness of pruning methods on adversarial robustness for deep neural networks (VGG, ResNet50, etc.).
- Implemented experiments in PyTorch to measure effectiveness of lottery ticket hypothesis for adversarial defense in deep neural networks.

Data Science Research Intern 2019
INCITE at Columbia University
- Worked on "Measuring Liberal Arts," a project focused on quantifying, through NLP and machine learning, the extent to which universities effectively offer a liberal arts education to students and its effects on students after graduation.
- Applied NLP, clustering, and statistical analysis to extensive corpus of text data to find multi-dimensional patterns in higher education programs and syllabi.

Software Engineering Intern 2018, 2019
Amazon
- Designed and implemented distributed systems APIs with service-oriented architecture principles for Tier 1 Amazon Advertising account management goals.

Software Engineering Intern 2016 – 2017
Fundera
- Built backend automation tools in Ruby/Rails to boost team efficiency and designed and implemented Styleguide in ReactJS to unify frontend webapp design.

QA Software Engineering Intern 2016
Nomad Health
- Built and implemented entire test suite for new webapp in Python and tested edge cases before the first official release of the webapp.

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 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 CS.

AWARDS

Phi Beta Kappa Honor Society Awarded to top ninety-two seniors in the graduating class of Columbia College.

Adam Leroy Jones Prize Awarded to best thesis in Philosophy of Science or Logic.

CS@CU Award for Academic Excellence Awarded to the top seniors in the graduating class of the Columbia Department of Computer Science.

Teaching Assistant Fellowship Awarded to "exceptional" teaching assistants in the Columbia University Computer Science department.

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

Dean's Fellowship. Awarded to small number of admitted Columbia PhD students, giving financial support for first semester of PhD.

Computer Science Service Award. Awarded to doctoral students agreed to be in the top 10% in service contributions.

TALKS

"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)

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)