ASHOK CUTKOSKY

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EDUCATION

Stanford University, Stanford, CA
Ph.D Computer Science, 2018.
Thesis: Algorithms and Lower-Bounds for Parameter-free Online Learning. Advised by Kwabena Boahen.
M.S. Medicine 2016.
M.S. Computer Science 2016.
Harvard University, Cambridge, MA
A.B. Mathematics Magna cum Laude, Secondary in Computer Science, 2013.

AWARDS

2017 Best Student Paper Award at Conference on Learning Theory (COLT)
2013-2018 NSF Graduate Research Fellowship
2013-2018 Stanford Graduate Fellowship - Benchmark Fellow
2013 Hertz Foundation Finalist
2013 Captain Jonathan Fay Prize - most imaginative and original undergraduate thesis
2013 Hoopes Prize - outstanding undergraduate thesis
2008 Siemens Competition in Math Science and Technology: 5th Place National Winner

PUBLICATIONS

Ashok Cutkosky and Francesco Orabona, *Momentum-Based Variance Reduction in Non-Convex SGD*, Neural Information Processing Systems (NeurIPS), 2019.

Kwang-Sung Jun, Ashok Cutkosky, and Francesco Orabona, *Kernel Truncated Randomized Ridge Regression: Optimal Rates and Low Noise Acceleration*, Neural Information Processing Systems (NeurIPS), 2019.

Ashok Cutkosky, *Combining Online Learning Guarantees*, Conference on Learning Theory (COLT), 2019.

Ashok Cutkosky, *Artificial Constraints and Lipschitz Hints for Unconstrained Online Learning*, Conference on Learning Theory (COLT), 2019.

Ashok Cutkosky, *Anytime Online-to-Batch, Optimism, and Acceleration*, International Conference on Machine Learning (ICML), 2019.

Ashok Cutkosky and Tamas Sarlos, *Matrix-Free Preconditioning in Online Learning*, International Conference on Machine Learning (ICML), 2019.

Zhenxun Zhuang, Ashok Cutkosky, and Francesco Orabona, *Surrogate Losses for Online Learning of Stepsizes in Stochastic Non-Convex Optimization*, International Conference on Machine Learning (ICML), 2019.

Ashok Cutkosky and Robert Busa-Fekete, *Distributed Stochastic Optimixation via Adaptive SGD*, Advances in Neural Information Processing Systems (NeurIPS), 2018.

Ashok Cutkosky and Francesco Orabona, *Black-Box Reductions for Parameter-free Online Learning in Banach Spaces*, Conference on Learning Theory (COLT), 2018.

Ashok Cutkosky and Kwabena Boahen, *Stochastic and Adversial Online Learning Without Hyperparameters*, Advances in Neural Information Processing Systems (NeurIPS), 2017.

Ashok Cutkosky and Kwabena Boahen, *Online Learning Without Prior Information*, Conference on Learning Theory (COLT), 2017.

Ashok Cutkosky and Kwabena Boahen, *Online Convex Optimization with Unconstrained Domains and Losses*, Advances in Neural Information Processing Systems (NeurIPS), 2016.

Ashok Cutkosky and Kwabena Boahen, *Bloom Features*, IEEE International Conference on Computation Science and Computational Intelligence, 2015.

Sanborn et.al *Chromatin extrusion explains key features of loop and domain formation in wild-type and engineered genomes*, Proceedings of the National Academy of Sciences (PNAS), 2015.

PRESENTATIONS AND OTHER MEDIA

Invited talk at "AI Rising Stars Symposium" at USC, *Making the Last Iterate Matter in Stochastic Optimization*, Dec 6th, 2019.

Ashok Cutkosky, *Algorithms and Lower-Bounds for Parameter-free Online Learning*, PhD Dissertation at Stanford University, 2018.

Ashok Cutkosky, *Polymer Simulations and DNA Topology*, Undergraduate Thesis at Harvard University, 2013.

Ashok Cutkosky and Erez Lieberman Aiden. *Simulated Fractal Globule Formation*, Poster at 2012 Topological Dynamics in Biology conference, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK.

Leon Furchtgott, Ashok Cutkosky, Najeeb Tarazi and Erez Lieberman Aiden, Presentation at 2012 APS March Meeting: In silico simulations of polymer condensation: the fractal globule as a metastable state.

Ashok Cutkosky, *Associated Primes of the Square of the Alexander Dual of Hypergraphs*, www.arXiv.org e-print, arXiv:0901.1678 [math.AC], 2009

EXPERIENCE

Google Research July 2018 - Present
Research Scientist *Mountain View, CA*
My research interests focus on machine learning theory. I am specifically interested in finding ways to build learning systems that require minimal human intuition and tuning. Much of my current work addresses this through building adaptive stochastic optimization algorithms that reduce or eliminate the need for tuning learning rates or other optimizer-specific hyperparameters when training models.

Boahen Lab June 2014 - July 2018
PhD Student - Machine Learning and Optimization Algorithms Research *Stanford, CA*
My PhD research focused primarily on optimization algorithms, particularly on online learning algorithms and hyperparameter free optimization. As part of my research I have proved a full characterization of the worst-case complexity of hyperparameter-free online convex optimization and designed algorithms that exhibit good theoretical and practical performance without hyperparameter tuning.

Yahoo! Research June 2017 - September 2017
Research Intern *New York City, NY*
I designed and implemented a communication-efficient distributed stochastic optimization algorithm for large-scale machine learning. I created a novel reduction allowing for parallelization of any serial stochastic gradient descent algorithm while achieving the optimal communication complexity. I then implemented this algorithm in the Spark framework, and achieved significant improvements in both final loss and runtime over prior methods on large-scale ad-click prediction datasets.

Heap Analytics June 2016 - August 2016
Software Engineering Intern *San Francisco, CA*
I built internal tooling to manage customer information, rearchitected part of the backend to remove a single point of failure and significantly reduce disk space usage. I worked in Node, client-side JS and Scala.

Aiden Lab Summer 2010 - Spring 2013
Undergraduate Research on DNA Topology *Cambridge, MA*
I wrote my senior thesis on DNA topology and double-strand breaks, which won Harvard's Hoopes Prize for outstanding undergraduate theses, and Captain Jonathan Fay Prize for most imaginative and original

undergraduate thesis. I also developed a package to create 3d movies of polymer simulations and wrote GPU-accelerated molecular dynamics software to simulate polymer collapses in bad solvents. I created a number of images and movies and gave presentations on molecular dynamics results at two conferences.

TEACHING EXPERIENCE

Course Assistant for Math 25a and 25b (honors linear algebra and analysis) at Harvard University, 2010-2011.
Course Assistant for CS 161 (algorithms and data structures) at Stanford University, 2017.
Course Assistant for CS 140 (operating systems) at Stanford University, 2018.

PROFESSIONAL SERVICE

COLT senior PC member, 2020.
NeurIPS reviewer 2016-2019.
ICML reviewer, 2018-2019.
AISTATS reviewer 2018-2020.
COLT reviewer 2017, 2019.

PROGRAMMING LANGUAGES: Python, C, C++, Javascript, Java, CUDA
MISCELLANEOUS SKILLS: Astonishing Card Magic