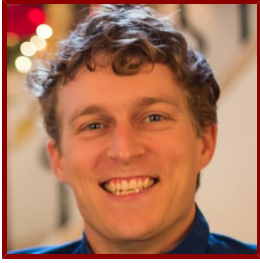


Stanford



John Duchi

Assistant Professor of Statistics, of Electrical Engineering and, by courtesy, of Computer Science

Bio

BIO

John Duchi (<http://web.stanford.edu/~jduchi/>) is an assistant professor of Statistics and Electrical Engineering and (by courtesy) Computer Science at Stanford University. His work spans statistical learning, optimization, information theory, and computation, with a few driving goals. (1) To discover statistical learning procedures that optimally trade between resources--computation, communication, privacy provided to study participants--while maintaining good statistical performance. (2) To build efficient large-scale optimization methods that address the spectrum of optimization, machine learning, and data analysis problems we face, allowing us to move beyond bespoke solutions to methods that robustly work. (3) To develop tools to assess and guarantee the validity of--and confidence we should have in--machine-learned systems.

ACADEMIC APPOINTMENTS

- Associate Professor, Statistics
- Associate Professor, Electrical Engineering
- Associate Professor (By courtesy), Computer Science
- Member, Bio-X

HONORS AND AWARDS

- SIAM/OPT Early Career Prize, Society for Industrial and Applied Mathematics, Optimization Group (2020)
- Young Investigator Award, Office of Naval Research (2019)
- Best Paper Award, Neural Information Processing Systems (2017)
- Sloan Foundation Fellow in Mathematics, Sloan Foundation (2016)
- Doctoral Dissertation Award (Honorable Mention), Association for Computing Machinery (2015)
- Okawa Foundation Award, Okawa Foundation (2015)
- C.V. Ramamoorthy Distinguished Research Award, University of California, Berkeley (2014)
- Best Student Paper Award, International Conference on Machine Learning (2010)

PROFESSIONAL EDUCATION

- BS, Stanford University , Computer Science (2007)
- MS, Stanford University , Computer Science (2008)
- MA, University of California, Berkeley , Statistics (2012)
- PhD, University of California, Berkeley , EECS (2014)

LINKS

- Homepage: <http://web.stanford.edu/~jduchi/>
- Google Scholar Page: <https://scholar.google.com/citations?hl=en&user=i5srt20AAAAJ>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My work spans statistical learning, optimization, information theory, and computation, with a few driving goals: 1. To discover statistical learning procedures that optimally trade between real-world resources while maintaining statistical efficiency. 2. To build efficient large-scale optimization methods that move beyond bespoke solutions to methods that robustly work. 3. To develop tools to assess and guarantee the validity of---and confidence we should have in---machine-learned systems.

Teaching

COURSES

2021-22

- Applied Statistics I: STATS 305A (Aut)
- Information Theory and Statistics: EE 377, STATS 311 (Aut)
- Theory of Probability: STATS 116 (Spr)

2020-21

- Convex Optimization I: CME 364A, EE 364A (Win)
- Theory of Statistics II: STATS 300B (Win)

2019-20

- Convex Optimization I: CME 364A, CS 334A, EE 364A (Win)

2018-19

- Data Science 101: STATS 101 (Aut)
- Information Theory and Statistics: EE 377, STATS 311 (Win)
- Theory of Statistics II: STATS 300B (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Kabir Chandrasekher, Ismael Lemhadri, Blaine Rister, Marius Tirllea, Matthew Tsao

Orals Chair

Steve Mussmann

Postdoctoral Faculty Sponsor

Alnur Ali

Doctoral Dissertation Advisor (AC)

Hilal Asi, Maxime Cauchois, Karan Chadha, Gary Cheng, Suyash Gupta, Daniel Levy

Doctoral Dissertation Co-Advisor (AC)

Chen Cheng

Master's Program Advisor

Collin Kwon, Kevin Lee, Arden Ma, Tianyi Zhang

Doctoral (Program)

Rohith Kudithipudi, Daniel Levy, Ajay Mandlekar, Mark Nishimura, Pratik Rathore, Matthew Tsao, Alan Yang, Fangzhao Zhang

Publications

PUBLICATIONS

- **Lower bounds for finding stationary points I** *MATHEMATICAL PROGRAMMING*
Carmon, Y., Duchi, J. C., Hinder, O., Sidford, A.
2020; 184 (1-2): 71–120
- **First-Order Methods for Nonconvex Quadratic Minimization** *SIAM REVIEW*
Carmon, Y., Duchi, J. C.
2020; 62 (2): 395–436
- **Solving (most) of a set of quadratic equalities: composite optimization for robust phase retrieval** *INFORMATION AND INFERENCE-A JOURNAL OF THE IMA*
Duchi, J. C., Ruan, F.
2019; 8 (3): 471–529
- **GRADIENT DESCENT FINDS THE CUBIC-REGULARIZED NONCONVEX NEWTON STEP** *SIAM JOURNAL ON OPTIMIZATION*
Carmon, Y., Duchi, J.
2019; 29 (3): 2146–78
- **The importance of better models in stochastic optimization.** *Proceedings of the National Academy of Sciences of the United States of America*
Asi, H. n., Duchi, J. C.
2019
- **Modeling simple structures and geometry for better stochastic optimization algorithms**
Asi, H., Duchi, J. C., Chaudhuri, K., Sugiyama, M.
MICROTOME PUBLISHING.2019
- **Necessary and Sufficient Geometries for Gradient Methods**
Levy, D., Duchi, J. C., Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019
- **Unlabeled Data Improves Adversarial Robustness**
Carmon, Y., Ragunathan, A., Schmidt, L., Liang, P., Duchi, J. C., Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019
- **Variance-based Regularization with Convex Objectives** *JOURNAL OF MACHINE LEARNING RESEARCH*
Duchi, J., Namkoong, H.
2019; 20
- **STOCHASTIC (APPROXIMATE) PROXIMAL POINT METHODS: CONVERGENCE, OPTIMALITY, AND ADAPTIVITY** *SIAM JOURNAL ON OPTIMIZATION*
Asi, H., Duchi, J. C.
2019; 29 (3): 2257–90
- **ACCELERATED METHODS FOR NONCONVEX OPTIMIZATION** *SIAM JOURNAL ON OPTIMIZATION*
Carmon, Y., Duchi, J. C., Hinder, O., Sidford, A.
2018; 28 (2): 1751–72
- **STOCHASTIC METHODS FOR COMPOSITE AND WEAKLY CONVEX OPTIMIZATION PROBLEMS** *SIAM JOURNAL ON OPTIMIZATION*
Duchi, J. C., Ruan, F.
2018; 28 (4): 3229–59
- **Scalable End-to-End Autonomous Vehicle Testing via Rare-event Simulation**

O'Kelly, M., Sinha, A., Namkoong, H., Duchi, J., Tedrake, R., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018

- **Generalizing to Unseen Domains via Adversarial Data Augmentation**

Volpi, R., Namkoong, H., Sener, O., Duchi, J., Murino, V., Savarese, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018

- **Analysis of Krylov Subspace Solutions of Regularized Nonconvex Quadratic Problems**

Carmon, Y., Duchi, J. C., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018

- **Minimax Optimal Procedures for Locally Private Estimation** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*

Duchi, J. C., Jordan, M. I., Wainwright, M. J.
2018; 113 (521): 182–201

- **Minimax Optimal Procedures for Locally Private Estimation Rejoinder** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*

Duchi, J. C., Jordan, M. I., Wainwright, M. J.
2018; 113 (521): 212–15

- **Mean Estimation from Adaptive One-bit Measurements**

Kipnis, A., Duchi, J. C., IEEE
IEEE.2017: 1000–1007

- **Variance-based Regularization with Convex Objectives**

Namkoong, H., Duchi, J. C., Guyon, Luxburg, U. V., Bengio, S., Wallach, H., Fergus, R., Vishwanathan, S., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2017

- **Unsupervised Transformation Learning via Convex Relaxations**

Hashimoto, T. B., Duchi, J. C., Liang, P., Guyon, Luxburg, U. V., Bengio, S., Wallach, H., Fergus, R., Vishwanathan, S., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2017

- **Simultaneous dimension reduction and adjustment for confounding variation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*

Lin, Z., Yang, C., Zhu, Y., Duchi, J., Fu, Y., Wang, Y., Jiang, B., Zamanighomi, M., Xu, X., Li, M., Sestan, N., Zhao, H., Wong, et al
2016; 113 (51): 14662-14667

- **Divide and Conquer Kernel Ridge Regression: A Distributed Algorithm with Minimax Optimal Rates** *JOURNAL OF MACHINE LEARNING RESEARCH*

Zhang, Y., Duchi, J., Wainwright, M.
2015; 16: 3299-3340

- **Optimal Rates for Zero-Order Convex Optimization: The Power of Two Function Evaluations** *IEEE TRANSACTIONS ON INFORMATION THEORY*

Duchi, J. C., Jordan, M. I., Wainwright, M. J., Wibisono, A.
2015; 61 (5): 2788-2806

- **Privacy Aware Learning** *JOURNAL OF THE ACM*

Duchi, J. C., Jordan, M. I., Wainwright, M. J.
2014; 61 (6)

- **Privacy: a few definitional aspects and consequences for minimax mean-squared error**

Barber, R., Duchi, J., IEEE
IEEE.2014: 1365–69

- **THE ASYMPTOTICS OF RANKING ALGORITHMS** *ANNALS OF STATISTICS*

Duchi, J. C., Mackey, L., Jordan, M. I.
2013; 41 (5): 2292-2323