Stanford

Gregory Valiant

Assistant Professor of Computer Science

Bio

ACADEMIC APPOINTMENTS

- Assistant Professor, Computer Science

PROFESSIONAL EDUCATION

- PhD, UC Berkeley , Computer Science (2012)
- BA, Harvard University , Mathematics (2006)

LINKS

- My academic website: http://theory.stanford.edu/~valiant/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My primary research interests lie at the intersection of algorithms, learning, applied probability, and statistics. I am particularly interested in understanding the algorithmic and information theoretic possibilities and limitations for many fundamental information extraction tasks that underly real-world machine learning and data-centric applications.

Teaching

COURSES

2018-19

- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Aut)
- The Modern Algorithmic Toolbox: CS 168 (Spr)

2017-18

- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Aut)
- The Modern Algorithmic Toolbox: CS 168 (Spr)

2016-17

- Design and Analysis of Algorithms: CS 161 (Win)
- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Aut)
- The Modern Algorithmic Toolbox: CS 168 (Spr)

2015-16

- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Aut)
- The Modern Algorithmic Toolbox: CS 168 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Jay Mardia

Master's Program Advisor

Luke Miller

Doctoral (Program)

Shivam Garg

Publications

PUBLICATIONS

- **Learning from Untrusted Data** *Proceedings of the 49th Annual ACM SIGACT Symposium on Theory of Computing (STOC)*
  Charikar, M., Steinhardt, J., Valiant, G.
- **Estimating the Unseen: Improved Estimators for Entropy and Other Properties** *JOURNAL OF THE ACM*
  Valiant, G., Valiant, P.
  2017; 64 (6)
- **SPECTRUM ESTIMATION FROM SAMPLES** *ANNALS OF STATISTICS*
  Kong, W., Valiant, G.
  2017; 45 (5): 2218–47
- **AN AUTOMATIC INEQUALITY PROVER AND INSTANCE OPTIMAL IDENTITY TESTING** *SIAM JOURNAL ON COMPUTING*
  Valiant, G., Valiant, P.
  2017; 46 (1): 429-455
- **Learning Overcomplete HMMs**
  Sharan, V., Kakade, S., Liang, P., Valiant, G., Guyon, Luxburg, U. V., Bengio, S., Wallach, H., Fergus, R., Vishwanathan, S., Garnett, R.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2017
- **Quantifying unobserved protein-coding variants in human populations provides a roadmap for large-scale sequencing projects.** *Nature communications*
  Zou, J., Valiant, G., Valiant, P., Karczewski, K., Chan, S. O., Samocha, K., Lek, M., Sunyaev, S., Daly, M., MacArthur, D. G.
  2016; 7: 13293-?
- **Finding Correlations in Subquadratic Time, with Applications to Learning Parities and the Closest Pair Problem** *JOURNAL OF THE ACM*
  Valiant, G.
  2015; 62 (2)
- **Learning Sparse Polynomial Functions.**
  Andoni, A., Panigrahy, R., Valiant, G., Zhang, L.
  2014
- **Optimal Algorithms for Testing Closeness of Discrete Distributions.**
  Chan, S., Diakonikolas, I., Valiant, P., Valiant, G.
  2014
- **Computation in anonymous networks.** *CoRR abs/1306.4151*
  Mossel, E., Prakash, A., Valiant, G.
  2013
- **Instance-by-instance optimal identity testing.** *Electronic Colloquium on Computational Complexity (ECCC)*

Valiant, G., Valiant, P.
2013; 20: 111

- **Testing k-Modal Distributions: Optimal Algorithms via Reductions.**
Daskalakis, C., Diakonikolas, I., Servedio, Rocco, A., Valiant, G., Valiant, P.
2013

- **Optimal Algorithms for Testing Closeness of Discrete Distributions.** *CoRR abs/1308.3946*
Chan, S., Diakonikolas, I., Valiant, G., Valiant, P.
2013

- **Estimating the Unseen: Improved Estimators for Entropy and other Properties.**
Valiant, P., Valiant, G.
2013

- **Least Squares Revisited: Scalable Approaches for Multi-class Prediction.** *CoRR abs/1310.1949*
Agarwal, A., Kakade, Sham, M., Karampatziakis, N., Song, L., Valiant, G.
2013

- **Size and Treewidth Bounds for Conjunctive Queries.** *J. ACM*
Gottlob, G., Lee, S. T., Valiant, G., Valiant, P.
2012; 3 (59): 16

- **Finding Correlations in Subquadratic Time, with Applications to Learning Parities and Juntas.**
Valiant, G.
2012

- **Finding Correlations in Subquadratic Time, with Applications to Learning Parities and Juntas with Noise.** *Electronic Colloquium on Computational Complexity (ECCC)*
Valiant, G.
2012; 19: 6

- **Disentangling Gaussians.** *Commun. ACM*
Kalai, A. T., Moitra, A., Valiant, G.
2012; 2 (55): 113-120

- **Beating brute-force: Improved algorithms for finding correlations, and related problems.** *TinyToCS*
Valiant, G.
2012; 1

- **Testing k-Modal Distributions: Optimal Algorithms via Reductions.** *CoRR abs/1112.5659*
Daskalakis, C., Diakonikolas, I., Servedio, Rocco, A., Valiant, G., Valiant, P.
2011

- **Best-Response Mechanisms.**
Nisan, N., Schapira, M., Valiant, G., Zohar, A.
2011

- **The Power of Linear Estimators.**
Valiant, G., Valiant, P.
2011

- **Best-response auctions.**
Nisan, N., Schapira, M., Valiant, G., Zohar, A.
2011

- **When is it best to best-respond?** *SIGecom Exchanges*
Nisan, N., Schapira, M., Valiant, G., Zohar, A.
2011; 2 (10): 16-18

- **Estimating the unseen: an n/log(n)-sample estimator for entropy and support size, shown optimal via new CLTs.**
  Valiant, G., Valiant, P.
  2011

- **Incentive-compatible distributed greedy protocols.**
  Nisan, N., Schapira, M., Valiant, G., Zohar, A.
  2011

- **Braess's Paradox in Large Random Graphs** *RANDOM STRUCTURES & ALGORITHMS*
  Valiant, G., Roughgarden, T.
  2010; 37 (4): 495-515

- **DESIGNING NETWORK PROTOCOLS FOR GOOD EQUILIBRIA** *SIAM JOURNAL ON COMPUTING*
  Chen, H., Roughgarden, T., Valiant, G.
  2010; 39 (5): 1799-1832

- **Efficiently learning mixtures of two Gaussians.**
  Kalai, A. T., Moitra, A., Valiant, G.
  2010

- **A New Look at Selfish Routing.**
  Papadimitriou, Christos, H., Valiant, G.
  2010

- **Estimating the unseen: A sublinear-sample canonical estimator of distributions.** *Electronic Colloquium on Computational Complexity (ECCC)*
  Valiant, G., Valiant, P.
  2010; 17: 180

- **Settling the Polynomial Learnability of Mixtures of Gaussians.** *CoRR abs/1004.4223*
  Moitra, A., Valiant, G.
  2010

- **Settling the Polynomial Learnability of Mixtures of Gaussians.**
  Moitra, A., Valiant, G.
  2010

- **A CLT and tight lower bounds for estimating entropy.** *Electronic Colloquium on Computational Complexity (ECCC)*
  Valiant, G., Valiant, P.
  2010; 17: 183

- **On Learning Algorithms for Nash Equilibria.**
  Daskalakis, C., Frongillo, Rafael, M., Papadimitriou, Christos, H., Pierrakos, G., Valiant, G.
  2010

- **Size Bounds for Conjunctive Queries with General Functional Dependencies.** *CoRR abs/0909.2030*
  Valiant, G., Valiant, P.
  2009

- **On the complexity of Nash equilibria of action-graph games.**
  Daskalakis, C., Schoenebeck, G., Valiant, G., Valiant, P.
  2009

- **Size and treewidth bounds for conjunctive queries.**
  Gottlob, G., Lee, S. T., Valiant, G.
  2009

- **Designing Networks with Good Equilibria** *19th ACM-SIAM Symposium on Discrete Algorithms*
  Chen, H., Roughgarden, T., Valiant, G.
  SIAM.2008: 854–863

- **On the Complexity of Nash Equilibria of Action-Graph Games.** *CoRR abs/0802.1604*
  Daskalakis, C., Schoenebeck, G., Valiant, G., Valiant, P.
  2008

- **Braess's paradox in large random graphs.**
  Valiant, G., Roughgarden, T.
  2006