

Steven Diamond

Curriculum Vitae

Education

- 9/15 – Present **PhD in Computer Science**, *Stanford University*.
- 9/13 – Present **MS in Computer Science**, *Stanford University*, GPA 4.150.
- 9/10 – 6/14 **BS in Computer Science**, *Stanford University*, GPA 4.126.

Research and projects

Stanford University, Stanford, CA.

Matrix-Free Optimization, Domain Specific Languages, Computational Imaging.

- Proposed an end-to-end optimization framework for designing imaging systems based on wave optics.
- Developed CVXPY, a Python-embedded modeling language for convex optimization.
 - Used by Fortune 500 companies.
 - Used to teach classes at Stanford and other universities.
 - Used in dozens of research projects.
- Developed a novel approach to combining optimization based and deep approaches to image reconstruction.
- Developed ProxImaL, a domain-specific language for image optimization.
- Created a GPU accelerated framework for efficiently solving general convex optimization problems involving fast linear transforms.
- Created `dcp.stanford.edu`, an online visualization tool for disciplined convex programming.

Work

- 6/18 – 9/18 **Google**, Computational Photography Researcher, Mountain View, CA.
 - Explored frameworks for recovering depth and color from a monochrome camera.
- 6/16 – 8/16 **BlackRock**, Quantitative Researcher, San Francisco, CA.
 - Helped develop a novel method for attributing returns to individual predictors.
 - Compiled a general framework for state-of-the-art optimization based quantitative trading.
 - Built a software package for state-of-the-art optimization based quantitative trading.
- 6/14 – 8/14 **Qadium**, DARPA Plan X Intern, Palo Alto, CA.
 - Developed a Docker based network simulator.
 - Created an experimentation framework for the simulator and used it to analyze methods for inferring network structure.
- 6/12 – 8/12 **Marin Software**, Big Data Engineering Intern, San Francisco, CA.
 - Developed a Hadoop system to collect advertising and revenue data from the internet's largest retailers.
 - Used Mahout to cluster retailers with similar users and to analyze conversions by classifying user histories.

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🌐 www.stanford.edu/~stevend2/ • 🌐 [SteveDiamond](https://github.com/SteveDiamond)

Publications

- A. Agrawal, R. Verschueren, **S. Diamond**, and S. Boyd. A rewriting system for convex optimization problems. *Journal of Control and Decision*, 5(1):42–60, 2018.
- A. Ali, Z. Kolter, **S. Diamond**, and S. Boyd. Disciplined convex stochastic programming: A new framework for stochastic optimization. In *Proceedings of the Conference on Uncertainty in Artificial Intelligence*, pages 62–71, 2015.
- S. Boyd, E. Busseti, **S. Diamond**, R. Kahn, K. Koh, P. Nystrup, and J. Speth. Multi-period trading via convex optimization. *Foundations and Trends in Optimization*, 3(1):1–76, 2017.
- D. Hallac, C. Wong, **S. Diamond**, R. Sasic, S. Boyd, and J. Leskovec. SnapVX: A network-based convex optimization solver. *Journal of Machine Learning Research*, 18(4):1–5, 2017.
- F. Heide, **S. Diamond**, D. Hallac, and G. Wetzstein. Sub-picosecond photon-efficient 3d imaging using single-photon sensors. *In Submission*, 2018.
- F. Heide, **S. Diamond**, M. Niessner, J. Ragan-Kelley, W. Heidrich, and G. Wetzstein. ProxImaL: Efficient image optimization using proximal algorithms. In *Proceedings of ACM SIGGRAPH*, volume 35, pages 1–15, 2016.
- M. O’Toole, F. Heide, D. Lindell, K. Zang, **S. Diamond**, and G. Wetzstein. Reconstructing transient images from single-photon sensors. In *Proceedings of IEEE CVPR*, 2017.
- X. Shen, **S. Diamond**, Y. Gu, and S. Boyd. Disciplined convex-concave programming. In *Proceedings of the IEEE Conference on Decision and Control*, 2016.
- X. Shen, **S. Diamond**, M. Udell, Y. Gu, and S. Boyd. Disciplined multi-convex programming. In *Proceedings of the Chinese Conference on Decision and Control*, 2016. Best student paper.
- V. Sitzmann, **S. Diamond**, Y. Peng, X. Dun, S. Boyd, W. Heidrich, F. Heide, and G. Wetzstein. End-to-end optimization of optics and image processing for achromatic extended depth of field and super-resolution imaging. *ACM SIGGRAPH*, 2018.
- S. Diamond** and S. Boyd. Convex optimization with abstract linear operators. In *Proceedings of the IEEE International Conference on Computer Vision*, pages 675–683, 2015.
- S. Diamond** and S. Boyd. CVXPY: A Python-embedded modeling language for convex optimization. *Journal of Machine Learning Research*, 17(83):1–5, 2016.
- S. Diamond** and S. Boyd. Matrix-free convex optimization modeling. In B. Golden, editor, *Optimization and Its Applications in Control and Data Sciences*, volume 115 of *Springer Optimization and Its Applications*, pages 221–264. Springer, 2016.

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S. Diamond and S. Boyd. Stochastic matrix-free equilibration. *Journal of Optimization Theory and Applications*, 172(2):436–454, 2016.

S. Diamond, V. Sitzmann, S. Boyd, G. Wetzstein, and F. Heide. Dirty pixels: Optimizing image classification architectures for raw sensor data. *Preprint*, 2017. <https://arxiv.org/abs/1701.06487>.

S. Diamond, V. Sitzmann, F. Heide, and G. Wetzstein. Unrolled optimization with deep priors. *Preprint*, 2017. <https://arxiv.org/abs/1705.08041>.

S. Diamond, R. Takapoui, and S. Boyd. A general system for heuristic solution of convex problems over nonconvex sets. *Optimization Methods and Software*, 33(1):165–193, 2018.

M. Udell, K. Mohan, D. Zeng, J. Hong, **S. Diamond**, and S. Boyd. Convex optimization in Julia. In *Proceedings of the 1st Workshop for High Performance Technical Computing in Dynamic Languages*, pages 18–28, 2014.

M. Wytock, **S. Diamond**, F. Heide, and S. Boyd. A new architecture for optimization modeling frameworks. In *Proceedings of the Workshop on Python for High-Performance and Scientific Computing*, pages 36–44, 2016.

P. Yin, **S. Diamond**, B. Lin, and S. Boyd. Network optimization for unified packet and circuit switched networks. *Preprint*, 2018. <https://arxiv.org/abs/1808.00586>.

Teaching

- 5/16 Convex Optimization Short Course, IMT, Lucca.
- 3/16 Convex Optimization Short Course, ShanghaiTech, Shanghai.
- 3/16 Convex Optimization Short Course, CUHKSZ, Shenzhen.
- 9/14 – 12/14 EE 103, Teaching Assistant, Stanford University.
- 4/14 – 6/14 EE 364B, Teaching Assistant, Stanford University.
- 9/12 – 12/12 CS 106A, Section Leader, Stanford University.

Talks and Tutorials

- 10/18 Convex Optimization in Python with CVXPY, Two Sigma, New York.
- 5/18 Convex Optimization in Python with CVXPY, SciPy 2018, Austin.
- 5/18 Convex Optimization in Python with CVXPY, Intuit, Mountain View.
- 6/17 A Graph-Based Architecture for Optimization Modeling Frameworks, JuMP workshop, Boston.
- 4/17 Matrix-Free Convex Optimization and Modeling (poster), Optimization and Statistical Learning, Les Houches, France.
- 2/17 Keynote: Convex Optimization with Abstract Linear Operators, AAAI, San Francisco
- 11/16 Disciplined Convex-Concave Programming, INFORMS, Nashville.
- 8/16 Convex Optimization in Python with CVXPY, BlackRock, San Francisco.

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- 7/16 ProxImaL: Efficient Image Optimization using Proximal Algorithms, SIGGRAPH, Anaheim.
- 3/16 Stochastic Matrix-Free Equilibration, CUHKSZ, Shenzhen.
- 2/15 Convex Optimization in Python with CVXPY, Twitter, San Francisco.
- 9/14 Convex Optimization in Python with CVXPY, ETH Zürich, Switzerland.
- 9/14 Convex Optimization in Python with CVXPY, TCMM 2014, Leuven, Belgium.
- 9/14 Convex Optimization in Python with CVXPY, TEMPO Course on Robust Optimal Control, Freiburg, Germany.

Awards

- 2014 Terman Award, Stanford University.
- 2013 Tau Beta Pi, Stanford University.
- 2011 President's Award for Academic Excellence in the Freshman Year, Stanford University.