Parth Nobel

✉ ptnobel@stanford.edu ptnobel.github.io

Education

Stanford University Sep 2021–Present
PhD Candidate, Electrical Engineering
National Science Foundation Graduate Research Fellow (NSF GRFP)
Advisors: Stephen Boyd and Emmanuel Candès
Qualifying Exam Completed: February 23, 2022

University of California, Berkeley Aug 2017–May 2021
Bachelors of Science, Electrical Engineering and Computer Science (EECS) GPA: 3.97/4.00
High Honors; *Regents' and Chancellor's Scholar*; *IEEE-HKN (EECS Honor Society)*
Advisor: Jaijeet Roychowdhury

Academic Appointments

University of California, Berkeley Jun 2022–Present
Visiting Scholar, Electrical Engineering and Computer Science (EECS)
Advisors: Michael Mahoney and Jim Demmel

Publications

J. Sun, Y Jiang, J Qiu, **P. Nobel**, M. Kochenderfer, M. Schwager, Conformal Prediction for Uncertainty-Aware Planning with Diffusion Dynamics Model. *NeurIPS 2023*. https://neurips.cc/virtual/2023/poster/71449

P. Nobel, E. Candès, S. Boyd, Tractable Evaluation of Stein's Unbiased Risk Estimate for Convex Regularizers. *IEEE Transactions on Signal Processing*. https://doi.org/10.1109/TSP.2023.3323046

P. Nobel, A. Agrawal, S. Boyd, Computing Tighter Bounds on the n-Queens Constant via Newton's Method. *Optimization Letters* **17** 1229–1240, 2023. https://doi.org/10.1007/s11590-022-01933-2

T. Marcucci, **P. Nobel**, R. Tedrake, S. Boyd, Fast Path Planning Through Large Collections of Safe Boxes. arXiv:2305.01072 [cs.RO].

T. Wang, L. Wu, **P. Nobel**, and J. Roychowdhury, Solving Combinatorial Optimisation Problems Using Oscillator Based Ising Machines. *Natural Computing* **20**, 287–306, May 2021. https://doi.org/10.1007/s11047-021-09845-3

[Invited Paper] T. Wang, L. Wu, **P. Nobel**, and J. Roychowdhury, Solving Combinatorial Optimisation Problems Using Oscillator Based Ising Machines. Unconventional Computation and Natural Computation (UCNC), August 2020.

P. Nobel, `auto_diff`: An Automatic Differentiation Package for Python, SpringSim'20, May 2020. https://dl.acm.org/doi/10.5555/3408207.3408219

Talks and Posters

"CVXPY: Convex Optimization for Everyone", SystemX Design Productivty Seminar, Nov 2023.

"CVXPY: A Modeling Language for Convex Optimization, From Prototyping to Production", NASA Langley, Nov 2023. [Joint with Philipp Schiele, Steven Diamond, Eric Luxenberg]

"GPUs for Numerical Programming: a Computer Architecture Approach", Blackrock AI Labs, Aug 2023.

"Computing Tighter Bounds on the n-Queens Constant via Newton's Method", SIAMOP 2023, Jun 2023.

"Solving Linear Systems", GISMo Seminar, SLAC National Accelerator Laboratory, Apr 2023.

"Explainable ML and Sequential Decision Making with CVXPYlayers", ICCOPT 2022, Jul 2022.

"Demonstrating pyMAPP and `auto_diff`: Simulating a Ring Oscillator", SpringSim'20, May 2020.

"Numerical Scaling Study of Ising Machines", Spring 2019 Undergraduate Research Fair, UC Berkeley College of Engineering, May 2019.

Research

Stanford University, Electrical Engineering with Stephen Boyd — Aug 2021–Present
- Large-scale distributed optimization [collaboration with Amazon Supply Chain Optimization Technologies]
- GPU-accelerated interior point methods [collaboration with Paul Goulart of Oxford University]
- Robot path planning [collaboration with Russ Tedrake of MIT]
- n-queens constant

Stanford University, Statistics with Emmanuel Candès — Aug 2021–Present
- Risk estimation for convex regularized least squares

UC Berkeley, EECS with Michael Mahoney and Jim Demmel — Jun 2022–Present
- GPU-accelerated matrix inversion and randomized numerical linear algebra

UC Berkeley, EECS with Jaijeet Roychowdhury — Aug 2018–May 2021
- Oscillator-Based Ising Machines (OIMs)
- AutoDiff, Automatic Differentiation for Python
- pyMAPP, Python Model and Algorithm Prototyping Platform
- ABCD-NL, Accurate Booleanization of Continuous Dynamics for Non-Linear Systems

Teaching

Stanford University, EE Department
- EE 364a (Convex Optimization) *Principal Instructor* — Jun 2023–Aug 2023
- EE 364a (Convex Optimization) *Head Course Assistant* — Jan 2023–Mar 2023

UC Berkeley, EECS Department
- EECS 219a (Numerical Simulation and Modeling) *Undergraduate Student Instructor* — Jan 2021–May 2021

Industry Experience

Apple Inc. Hardware Technology Software Intern — May–Aug 2019

HP Inc. Full Stack Engineering Intern — May–Aug 2018

Open Source Experience

CVXPY Core Developer — Feb 2022–Present

AutoDiff Primary Author and Maintainer — Jan 2020–May 2021

rust-numpy Contributor — Jun 2020–Aug 2020

Advising

Stanford University, Electrical Engineering Department — Apr 2022–Present
- Advising and mentoring coterminal (masters) student Danny Tse's research on high performance convex optimization

Stanford University, Math Department — Sep 2022–July 2023
- Advised and mentored an undergrad honors thesis by 4th-year-undergrad Dmitri Saberi titled "Detecting Miscalibration of Deep Learning Models through Gambling"

Service and Activities

UC Berkeley, EECS Department Disabled Students Accommodation Taskforce — May 2021–Aug 2021

UC Berkeley, Academic Senate Student Representative — Aug 2020–May 2021

IEEE-HKN, UC Berkeley Chapter Member — Sep 2019–May 2021

UC Berkeley Model United Nations — Sep 2017–May 2021
- Secretary — May 2019–May 2020

- Speech Coach — May 2019–May 2020
- Inaugural Member, Diversity and Inclusion Committee — Feb 2019–May 2019
- Conference Head Chair — May 2018–Mar 2021