Niladri S. Chatterji

CONTACT INFORMATION

Department of Computer Science
Stanford University

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RESEARCH INTERESTS

I am interested in theoretically understanding why current machine learning systems perform well, with an eye on improving them further.

Generalization and Optimization of Overparameterized Models. Many state-of-the-art models generalize well despite perfectly fitting noisy data. I am interested in understanding what aspects of training allow for this generalization, and how we make them more efficient and robust.

Sample and Model Size Tradeoffs. Large-scale models are trained on internet-scale data and need to tradeoff between the model size and the number of samples under a compute budget. My focus is to develop a theory to characterize these tradeoffs and to help make training more efficient.

CURRENT POSITION

SAIL Postdoctoral Fellow, Stanford University (June 2021 – Present)
Advisors: Tatsunori Hashimoto & Percy Liang

EDUCATION

University of California Berkeley (September 2015 – May 2021)
Ph.D. in Physics
Advisor: Peter Bartlett
Thesis: Why do gradient methods work in optimization and sampling?

Indian Institute of Technology Bombay (August 2010 – May 2015)
B.Tech. & M.Tech. in Engineering Physics.

HONORS AND AWARDS

Stanford SAIL Postdoctoral Fellowship, 2020
Institute Silver Medal, IIT Bombay, 2015
Institute Academic Prize, IIT Bombay, 2012–2014

WORK EXPERIENCE

Research Intern, Google Brain (Summer 2019)
Advisors: Behnam Neyshabur & Hanie Sedghi

Research Intern, National Research Institute Japan (Summer 2013)
Advisor: Hisao Nakamura

JOURNAL PAPERS

Niladri Chatterji, Philip Long, Peter Bartlett. The interplay between implicit bias and benign overfitting in two-layer linear networks. *Journal of Machine Learning Research (JMLR)*, 2022.

Niladri Chatterji, Philip Long. Foolish crowds support benign overfitting. *Journal of Machine Learning Research (JMLR)*, 2022.

Niladri Chatterji, Peter Bartlett, Philip Long. Oracle lower bounds for sampling algorithms. *Bernoulli*, 2022.

Yi-An Ma, **Niladri Chatterji**, Xiang Cheng, Nicolas Flammarion, Peter Bartlett, Michael Jordan. Is there an analog of Nesterov acceleration for gradient-based MCMC? *Bernoulli*, 2021.

Niladri Chatterji, Philip Long, Peter Bartlett. When does gradient descent with logistic loss find interpolating two-layer networks? *Journal of Machine Learning Research (JMLR)*, 2021.

Niladri Chatterji, Philip Long. Finite-sample analysis of interpolating linear classifiers in the overparameterized regime. *Journal of Machine Learning Research (JMLR)*, 2021.

Niladri Chatterji, Ashwin Tulapurkar, Bhaskaran Muralidharan. Enhancement of spin-transfer torque switching via resonant tunneling *Applied Physics Letters*, 2014.

CONFERENCE PAPERS

Spencer Frei, **Niladri Chatterji**, Peter Bartlett. Benign overfitting without linearity: Neural network classifiers trained by gradient descent for noisy linear data. *Conference on Learning Theory (COLT)*, 2022.

Ke Alexander Wang*, **Niladri Chatterji***, Saminul Haque, Tatsunori Hashimoto. Is importance weighting incompatible with interpolating classifiers? *International Conference on Learning Representations (ICLR)*, 2022.

Niladri Chatterji*, Aldo Pacchiano*, Peter Bartlett, Michael Jordan. On the theory of reinforcement learning with once-per-episode feedback. *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

Niladri Chatterji, Philip Long, Peter Bartlett. When does gradient descent with logistic loss interpolate using deep networks with smoothed ReLU activations? *Conference on Learning Theory (COLT)*, 2021.

Niladri Chatterji, Vidya Muthukumar, Peter Bartlett. OSOM: A simultaneously optimal algorithm for multi-armed and linear contextual bandits. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2020.

Niladri Chatterji*, Jelena Diakonikolas*, Michael Jordan, Peter Bartlett. Langevin Monte Carlo without smoothness. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2020.

Niladri Chatterji, Behnam Neyshabur, Hanie Sedghi. The intriguing role of module criticality in the generalization of deep networks. *International Conference on Learning Representations (ICLR)*, 2020. **(Spotlight Talk)**

Niladri Chatterji*, Aldo Pacchiano*, Peter Bartlett. Online learning with kernel losses. *International Conference on Machine Learning (ICML)*, 2019. **(Long Talk)**

Xiang Cheng*, **Niladri Chatterji***, Peter Bartlett, Michael Jordan. Underdamped Langevin MCMC: A non-asymptotic analysis. *Conference on Learning Theory (COLT)*, 2018.

Niladri Chatterji, Nicolas Flammarion, Yi-An Ma, Peter Bartlett, Michael Jordan. On the theory of variance reduction for stochastic gradient Monte Carlo. *International Conference on Machine Learning (ICML)*, 2018.

Niladri Chatterji, Peter Bartlett. Alternating minimization for dictionary learning: Local convergence guarantees. *Advances in Neural Information Processing Systems (NeurIPS)*, 2017.

PREPRINTS

Niladri Chatterji, Philip Long. Deep linear networks can benignly overfit when shallow ones do. 2022. **Under Review**.

Niladri Chatterji*, Saminul Haque*, Tatsunori Hashimoto. Undersampling is a minimax optimal

robustness intervention in nonparametric classification. 2022. **Under Review**.

Spencer Frei, **Niladri Chatterji**, Peter Bartlett. Random feature amplification: Feature learning and generalization in neural networks. 2022. **Under Review**.

Rishi Bommasani, . . . , **Niladri Chatterji**, ... On the opportunities and risks of foundation models. 2022. **Under Review**.

Xiang Cheng, **Niladri Chatterji**, Yasin Abbasi Yadkori, Peter Bartlett, Michael Jordan. Sharp convergence rates for Langevin dynamics in the nonconvex setting. 2018.

THESIS

Niladri Chatterji. *Why do gradient methods work in optimization and sampling?*. Ph.D. Thesis, University of California Berkeley, 2021.

TEACHING EXPERIENCE

Linear Models (Statistics, UC Berkeley) Spring 2020
Graduate Student Instructor

Electricity and Magnetism (Physics, UC Berkeley) Fall 2016, Spring 2017
Graduate Student Instructor

Undergraduate Physics (Physics, UC Berkeley) Summer 2016, Spring 2016, Fall 2015
Graduate Student Instructor

Basic Electronics Laboratory (Physics, IIT Bombay) Fall 2014
Teaching Assistant

Electricity and Magnetism (Physics, IIT Bombay) Spring 2014
Teaching Assistant

Quantum Mechanics (Physics, IIT Bombay) Fall 2013
Teaching Assistant

Introduction to Numerical Analysis (Mathematics, IIT Bombay) Summer 2012
Teaching Assistant

REVIEWING

Journals
Journal of Machine Learning Research (JMLR), Bernoulli, Annals of Applied Probability, Annales de lÍnstitut Henri Poincaré (B) Probabilités et Statistiques, SIAM Journal on the Mathematics of Data Science.

Conferences
NeurIPS (2018–), ICML (2020–), COLT (2018–), AISTATS (2019, 2020), ALT (2018, 2021), ICLR (2021), L4DC (2020, 2021).

LAST UPDATED

September 25, 2022