Niladri S. Chatterji

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Research Interests

Statistical learning theory, Markov chain Monte Carlo methods & Online learning.

Education

PhD in Physics August 2015 - Present
Advisors - Peter L. Bartlett (EECS/Statistics) and Michael DeWeese (Physics)
University of California Berkeley

Dual Degree (B.Tech + M.Tech) in Engineering Physics June 2010 - July 2015
Minor in Electrical Engineering
Indian Institute of Technology Bombay
GPA: 9.40/10.00, Department Rank 1

Publications and Pre-Prints

In Computer Science and Statistics

- Oracle lower bounds for stochastic gradient sampling algorithms
  Niladri S. Chatterji, Peter L. Bartlett, Philip M. Long; *preprint, under review*
- The intriguing role of module criticality in the generalization of deep networks
  Niladri S. Chatterji, Behnam Neyshabur, Hanie Sedghi; *ICLR 2020.*
- OSOM: A Simultaneously optimal algorithm for multi-armed and linear contextual bandits
  Niladri S. Chatterji, Vidya Muthukumar and Peter L. Bartlett; *AISTATS 2020.*
- Langevin Monte Carlo without smoothness
  Niladri S. Chatterji*, Jelena Diakonikolas*, Michael I. Jordan and Peter L. Bartlett; *AISTATS 2020.*
- Is there an analog of Nesterov Acceleration for MCMC?
  Yi-An Ma, Niladri S. Chatterji, Xiang Cheng, Nicolas Flammarion, Peter L. Bartlett and Michael Jordan; *preprint, under review.*
- Sharp convergence rates for Langevin Dynamics in the nonconvex setting
  Xiang Cheng, Niladri S. Chatterji, Yasin Abbasi-Yadkori, Peter L. Bartlett and Michael I. Jordan; *preprint, under review.*
- Online learning with kernel losses
  Aldo Pacchiano*, Niladri S. Chatterji*, Peter Bartlett; *Long Talk at ICML 2019.*
- On the theory of variance reduction for stochastic gradient Monte Carlo
  Niladri S. Chatterji, Nicolas Flammarion, Yi-An Ma, Peter L. Bartlett, Michael I. Jordan; *ICML 2018.*
- Underdamped Langevin MCMC: A non-asymptotic analysis
  Xiang Cheng*, Niladri S. Chatterji*, Peter L. Bartlett, Michael I. Jordan; *COLT 2018.*
- Alternating minimization for dictionary learning: Local convergence guarantees
  Niladri S. Chatterji, Peter L. Bartlett; *NIPS 2017.*

In Physics

- Proposal for a spin-transfer torque device based on resonant tunneling
  Niladri S. Chatterji, A. Tulapurkar and B. Muralidharan (APS March Meeting, 2015)
- Nanoscale-Magneto-resistance sensors with enhanced sensitivity using resonant tunneling magnetic junctions - Niladri S. Chatterji, A. Sharma, A. Tulapurkar and B. Muralidharan, Proceedings of SSDM, Sapporo, Japan, (2015).
- Enhancement of Spin-transfer torque switching via resonant tunneling
  Niladri S. Chatterji, A. Tulapurkar and B. Muralidharan. Applied Physics Letters Vol 105 Issue 25, 232410 (2014).

- N. Chatterji, A. Tulapurkar, B. Muralidharan. Resonant tunneling magnetic tunnel junction device. Indian Patent Application No. 3717/MUM/2014, filed November 2014. Patent Pending.

Advanced Courses Completed

Statistics: Theoretical Statistics (Michael Jordan), High dimensional Statistics (Martin Wainwright), Statistical Learning Theory (Peter L. Bartlett), Probability Theory (Jim Pitman and Steven Evans)

EECS: Randomness and computation (Alistair Sinclair), Deep reinforcement learning (Sergey Levine), Machine learning in social dynamics (Moritz Hardt), Beyond worst case analysis (Luca Trevisan), Convex optimization (Ben Recht), Game theory (Ankur Kulkarni), Complexity theory (Prasad Raghavendra), Information theory (Thomas Courtrade)

Talks

1. The intriguing role of module criticality in the generalization of deep networks – Google Brain 2019.
2. Analysis of Markov Chain Monte Carlo Algorithms – Berkeley AI Retreat 2019.
3. Underdamped Langevin Markov Chain Monte Carlo – Simons Industry Day 2019.
4. Underdamped Langevin Markov Chain Monte Carlo – Simons Program on Foundations of Data Science Fall 2018.
5. Underdamped Langevin Markov Chain Monte Carlo – Midwest Machine Learning Symposium 2018.
6. Alternating minimization for dictionary learning: Local Convergence Guarantees – Berkeley AI Seminar 2017.

Academic Achievements

- *Ranked* 1^{st} among the students in the dual degree programme in Engineering Physics at IIT Bombay.
- Institute Academic Prizes: Awarded scholarships for Ranking 1^{st} in my second, third and fourth year at IIT Bombay.

Teaching Experience

I thoroughly enjoy teaching and have been a tutor for over 400 students. My duties included solving doubts in the subject matter, helping students develop problem solving skills and grading examination papers.

- TA for graduate course on Linear models Spring 2020
- TA for undergraduate course on Electricity and Magnetism at UC Berkeley Spring 2017 & Fall 2016
- TA for Physics 7B at UC Berkeley Fall 2015, Spring & Summer 2016
- TA for UG laboratory, Basic Electronics at IIT Bombay Autumn 2014
- TA for UG course, Electricity and Magnetism at IIT Bombay Spring 2013
- TA for UG course, Quantum Physics at IIT Bombay Autumn 2013
- TA for UG course, Intro to Numerical Analysis at IIT Bombay Summer 2012

Skill Set

Coding Skills : Comfortable working with Python, PyTorch, Tensorflow, MATLAB and C++.

Languages : Fluent in English, Hindi and Bengali. Beginner level knowledge of Marathi.

References

1. **Peter L. Bartlett**, UC Berkeley – Graduate advisor, email: peter@berkeley.edu
2. **Michael I. Jordan**, UC Berkeley – Graduate advisor, email: jordan@cs.berkeley.edu
3. **Philip M. Long**, Google – Research collaborator, email: plong@google.com