

Pritish Kamath

Post-doctoral Scholar
Toyota Technological Institute at Chicago

✉ pritch@alum.mit.edu
📁 prishkamath.github.io

Current Position

Oct 2019 - **Post-doctoral Scholar**
(ongoing) **Toyota Technological Institute at Chicago**
Advisor: **Nathan Srebro**

Education

- 2019 **PhD.** in Electrical Engineering & Computer Sciences
Massachusetts Institute of Technology
Advisors: **Madhu Sudan** (Harvard) & **Ronitt Rubinfeld** (MIT)
Ph.D. Thesis: Some Hardness Escalation Results in Computational Complexity
- 2015 **S.M.** in Electrical Engineering & Computer Sciences
Massachusetts Institute of Technology
Advisor: **Madhu Sudan** (Microsoft Research New England, MIT)
S.M. Thesis: Communication Complexity of Permutation-Invariant Functions
- 2012 **B.Tech.** in Computer Science and Engineering
Indian Institute of Technology, Bombay
Advisor: **Supratik Chakraborty**
B.Tech. Thesis: Studies on Preservation Theorems and Weaker Ehrenfeucht-Fraïssé games
▷ **President of India Gold Medal** for best academic performance in the graduating batch across all disciplines of B.Tech, and
▷ **Institute Silver Medal** for best academic performance in the graduating batch of B.Tech in Computer Science and Engineering.

Other Positions

- ▷ **Visiting Postdoc, Simons Institute, Berkeley, CA**
Program on **Theory of Reinforcement Learning** [Sep 2020 - Dec 2020]
- ▷ **Research Fellow, Simons Institute, Berkeley, CA**
Program on **Foundations of Deep Learning** [May 2019 - Aug 2019]
- ▷ **Research Intern, Google DeepMind, London, UK** Advisor: **Csaba Szepesvári**
Generalization theory for neural networks [May 2018 - Sep 2018]
- ▷ **Research Fellow, Microsoft Research India, Bangalore, India** Advisor: **Neeraj Kayal**
Lower Bounds in Arithmetic Complexity Theory [Jun. 2012 - July 2013]

Awards and Honors

- 2019 **Simons Research Fellowship** for Summer 2019 program on *Foundations of Deep Learning*
- 2013-14 **Akamai Presidential Fellowship**, MIT
- 2013 **Best Paper Award**, Conference on Computational Complexity (CCC)
- 2008 **All India Rank of 21** in IIT Joint Entrance Examination (among 375,000 students)
- 2008 **Gold Medal and Certificate of Merit (top 35)** in *Indian National Physics Olympiad 2008*
- 2008 **Certificate of Merit (top 30)** in *Indian National Mathematics Olympiad 2008*

Publications

Note: Authors are in alphabetical order of last name unless marked with (*)

Journal Papers

- ToC 2020 *Optimality of Correlated Sampling Strategies* [pdf]
Mohammad Bavarian, Badih Ghazi, Elad Haramaty,
Pritish Kamath, Madhu Sudan, Ronald Rivest
- ToC 2020 *Monotone Circuit Lower Bounds from Resolution*
Ankit Garg, Mika Göös, Pritish Kamath, Dmitry Sokolov
- CC 2019 *Query-to-Communication Lifting for P^{NP}*
Mika Göös, Pritish Kamath, Toniann Pitassi, Thomas Watson
- SICOMP 2016 *Arithmetic circuits: A chasm at depth three*
- CACM 2017 Ankit Gupta, Pritish Kamath, Neeraj Kayal, Ramprasad Saptharishi
- J. ACM 2014 *Approaching the chasm at depth four*
Ankit Gupta, Pritish Kamath, Neeraj Kayal, Ramprasad Saptharishi

Conference Papers / Manuscripts

- AISTATS 2021 *Does Invariant Risk Minimization Capture Invariance?* [pdf]
(*) Pritish Kamath, Akilesh Tangella, Danica J. Sutherland, Nathan Srebro
- COLT 2020 *Approximate is Good Enough: Probabilistic Variants of Dimension and Margin Complexity* [pdf]
Pritish Kamath, Omar Montasser, Nathan Srebro
- CCC 2020 *On the Complexity of Modulo- q Arguments and the Chevalley-Waring Theorem* [pdf]
Mika Göös, Pritish Kamath, Katerina Sotiraki, Manolis Zampetakis
- PKC 2020 *Limits on the Efficiency of (Ring) LWE based Non-Interactive Key Exchange* [pdf]
(invited to J. Cryptology)
Siyao Guo, Pritish Kamath, Alon Rosen, Katerina Sotiraki
- ITCS 2019 *Adventures in Monotone Complexity and TFNP* [pdf]
Mika Göös, Pritish Kamath, Robert Robere, Dmitry Sokolov
- NeurIPS 2018 *Bayesian Inference of Temporal Task Specifications from Demonstrations* [pdf]
(*) Ankit Shah, Pritish Kamath, Shen Li, Julie Shah
- STOC 2018 *Monotone Circuit Lower Bounds from Resolution* [pdf]
Ankit Garg, Mika Göös, Pritish Kamath, Dmitry Sokolov
- CCC 2018 *Dimension Reduction for Polynomials over Gaussian Space and Applications* [pdf]
Badih Ghazi, Pritish Kamath, Prasad Raghavendra
- CCC 2017 *Query-to-Communication Lifting for P^{NP}* [pdf]
Mika Göös, Pritish Kamath, Toniann Pitassi, Thomas Watson
- ISIT 2017 *Improved bounds for universal 1-bit compressed sensing* [pdf]
Jayadev Acharya, Arnab Bhattacharyya, Pritish Kamath
- ITCS 2017 *Compression in a Distributed Setting* [pdf]
Badih Ghazi, Elad Haramaty, Pritish Kamath, Madhu Sudan
- FOCS 2016 *Decidability of non-interactive simulation of joint distributions* [pdf]
Badih Ghazi, Pritish Kamath, Madhu Sudan
- SODA 2016 *Communication complexity of permutation-invariant functions* [pdf]
Badih Ghazi, Pritish Kamath, Madhu Sudan
- RANDOM 2015 *Communication with partial noiseless feedback* [pdf]
Bernhard Haeupler, Pritish Kamath, Ameya Velingker

- FOCS 2013 *Arithmetic circuits: A chasm at depth three* [pdf] (invited to SICOMP)
Ankit Gupta, Pritish Kamath, Neeraj Kayal, Ramprasad Satharishi
- CCC 2013 *Approaching the chasm at depth four* [pdf] (**Best Paper Award**)
Ankit Gupta, Pritish Kamath, Neeraj Kayal, Ramprasad Satharishi
- WoLLIC 2012 *Preservation under substructures modulo bounded cores* [pdf]
(*) Abhisekh Sankaran, Bharat Adsul, Vivek Madan, Pritish Kamath, Supratik Chakraborty
- CSL 2012 *Faster algorithms for alternating refinement relations* [pdf]
Krishnendu Chatterjee, Siddhesh Chaubal, Pritish Kamath
- WABI 2011 *Using dominances for solving the protein family identification problem* [pdf]
(*) Noël Malod-Dognin, Mathilde Le Boudic-Jamin, Pritish Kamath, Rumen Andonov

Invited Talks

- Sep 2020 Machine Learning Seminar at Johns Hopkins University
- Apr 2020 Machine Learning Seminar at University of Chicago
- Dec 2019 FSTTCS Workshop on **Extension Complexity and Lifting Theorems**
- Oct 2018 FOCS Workshop on **Total Search Problems in Computation, Communication and Cryptography**
- Aug 2016 Theory Seminar at UC Berkeley
- Feb 2016 Theory Seminar at Tel Aviv University

Professional Service

- ▷ Program Committees: COLT 2021, FOCS 2021
- ▷ Reviewed papers for major journals and conferences such as SIAM J. Comp., IEEE Transactions, NeurIPS, ICML, ICLR, COLT, ALT, STOC, FOCS, SODA, CCC, ICALP, ITCS.

Programming Languages

- Proficient C++, Python (+ Tensorflow/PyTorch)
- Familiar Go, Java, Matlab, WebPPL, Scheme

Teaching Experience

- Fall 2018 **Teaching Assistant, MIT**
6.UAR : Undergraduate Research Opportunities Program (SuperUROP)
Instructors: Profs. Dina Katabi, Piotr Indyk, Michael Watts
- Spring 2017 **Teaching Assistant, MIT**
6.856 : Randomized Algorithms
Instructor: Prof. David Karger
- Spring 2015 **Teaching Assistant, MIT**
6.841 : Advanced Complexity Theory
Instructor: Prof. Dana Moshkovitz
- Spring 2012 **Teaching Assistant, IIT Bombay**
CS 208 : Automata Theory and Logic
Instructor: Prof. Supratik Chakraborty