Pritish Kamath

Post-doctoral Scholar
Toyota Technological Institute at Chicago

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Current Position

Oct 2019 - (ongoing) **Post-doctoral Scholar**
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
CACM 2017 *Arithmetic circuits: A chasm at depth three*
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

arXiv 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-Warning 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 Saptharishi

CCC 2013 *Approaching the chasm at depth four* [pdf] **(Best Paper Award)**
Ankit Gupta, Pritish Kamath, Neeraj Kayal, Ramprasad Saptharishi

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
- Revieweed 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