Yogesh Dahiya

CONTACT INFORMATION

School of Technology and Computer Science
Tata Institute of Fundamental Research
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RESEARCH INTERESTS

Query and Communication Complexity, Proof Complexity, Sketching Algorithms, Learning Theory

CURRENT POSITION

Postdoctoral Researcher
STCS, Tata Institute of Fundamental Research, Mumbai, India.

EDUCATION

Institute of Mathematical Sciences, Chennai, India. **08/2018 - 01/2024**
Ph.D. Theoretical Computer Science
Advisor: Prof. Meena Mahajan
Thesis Title: Exploring Size Complexity and Randomness in the Query Model

Indian Institute of Technology Kanpur, UP, India. **CGPA: 9.60/10** **2016 - 2018**
MS(Research) Computer Science and Engineering
Advisor: Prof. Surender Baswana
Thesis Title: Sketching-based Preconditioning for Numerical Linear Algebra

Indian Institute of Technology BHU, Varanasi, India. **CGPA: 8.02/10** **2009 - 2013**
B.Tech, Electronics and Communication Engineering

PUBLICATIONS

New lower bounds for Polynomial Calculus over non-Boolean bases.
With Meena Mahajan and Sasank Mouli.
To appear in Proceedings of the 27th International Conference on Theory and Applications of Satisfiability Testing (**SAT 2024**).
ECCC Report.

Linear threshold functions in decision lists, decision trees, and depth-2 circuits.
With Vignesh K, Meena Mahajan and Karteek Sreenivasaiah.
Information Processing Letters, Vol. 183 (106418) (**IPL 24**).
ECCC Report.

Query Complexity of Search Problems.
With Arkadev Chattopadhyay and Meena Mahajan.
In Proceedings of 48th International Symposium on Mathematical Foundations of Computer Science (**MFCS 2023**).
ECCC Report.

Randomized Versus Deterministic Decision Tree Size.
With Arkadev Chattopadhyay, Nikhil Mande, Jaikumar Radhakrishnan and Swagato Sanyal.
In Proceedings of the 55th ACM Symposium on Theory of Computing (**STOC 23**).
ECCC Report.

On (simple) decision tree rank. With Meena Mahajan.
In Proceedings of the 41st IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (**FSTTCS 2021**).
Full version in Theoretical Computer Science.
ECCC Report.

Fixed-Parameter and Approximation Algorithms for PCA with Outliers.
With Fedor Fomin, Fahad Panolan, Kirill Simonov.
In Proceedings of the 38th International Conference on Machine Learning (**ICML 2021**).

An Empirical Evaluation of Sketching for Numerical Linear Algebra.
With Dimitris Konomis, and David P. Woodruff.
In Proceedings of 24th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD-18**).

Discovering Response-Eliciting Factors in Social Question Answering.
With Danish and Partha Talukdar.
In Proceedings of the 10th International AAAI Conference on Web and Social Medial (**ICWSM-16**).

Academic Experience

Tata Institute of Fundamental Research, Mumbai, India

Visitor (Host: Arkadev Chattopadhyay) 01/2023 - 04/2023
Worked on problems in Query Complexity. 18/9/22 - 30/9/22

University of Bergen, Norway

Visitor (Host: Saket Saurabh) 05/2019 - 07/2019
Developed approximation schemes for PCA in the presence of outliers.

Indian Institute of Science, Bangalore, India

Research Assistant (Advisor: Partha Talukdar) 2015 - 2016
Worked broadly on representation learning and question answering, utilizing techniques from compressed sensing, optimization, and topic modeling.

Indian Institute of Science, Bangalore, India

Research Intern (Advisor: Chandra R. Murthy) 05/2013 - 07/2013
Designed a modular test bed for Cognitive Radio networks to analyze the impact of non-licensed users on licensed users' throughput and bit error rate.

Industry Experience

Flipkart Internet Pvt. Ltd. , Bangalore, India

Software Development Engineer 2013 - 2014
Contributed to the development of the core payment platform, enabling users to pay for transactions, save cards, and use them across websites. Additionally, contributed to the creation of Aesop, an open-source data change propagation system that replicates primary databases to secondary databases online, while maintaining timeline consistency and transactional boundaries.

VizExpert India Pvt. Ltd., Bangalore, India

Member of Technical Staff, Research Intern 05/2012- 07/2012
Worked on building a pre-processing toolkit for geospatial data using GPU-accelerated computing methods. The project required understanding and programming on GPUs.

Talks

Talk titled **New lower bounds for Polynomial Calculus over non-Boolean bases** at STCS Annual Symposium, based on our paper in **SAT 24**, TIFR, Mumbai, Aug 2024.

Talk titled **Randomness gives little advantage for decision tree size** at MIAO seminar based on our paper in **STOC 23**, Copenhagen, Denmark, Oct 2023.

Presented our paper on **Query Complexity of Search Problems** at **MFCS 23**, Aug 2023.

Talk on **Time and Space Complexity of Query Algorithms** at **IMSc 60** event celebrating the 60th foundation year of the Institute of Mathematical Science, Jan 2023.

Talk on **On (Simple) Decision Tree Rank** at **IMSc TCS Seminar**, Chennai, India, Nov 2021.

Talk on **Sketching for Numerical Linear Algebra** at the summer school on **Algorithmic Tractability via Sparsifiers**, Leh, India, Oct 2019.

Teaching

Teaching Assistant for Randomized Algorithms and Algorithms for Big Data at IMSc, Fall 2019
My responsibilities included sharing lecture duties, holding office hours and creating assignments.

Teaching Assistant for Randomized Algorithms at IIT Kanpur, Spring 2018
My responsibilities included holding office hours and grading assignments. The course was taught by Prof. Surender Baswana

Teaching Assistant for Algorithms 2 at IIT Kanpur, Fall 2017
My responsibilities included holding office hours, and creating and grading assignments. The course was taught by Prof. Surender Baswana

Achievements & Activities

- Awarded the Professor R. Narasimhan Postdoctoral Fellowship.
- Ranked 2nd in the Joint Entrance Screening Test (**JEST**)-2018 in theoretical computer science.
- Received the **Academic Excellence Award** for academic performance in the year 2017.
- Finished in the top 20 in the **Inter IIT Programming Contest** 2013 and in the top 30 in **Codesprint 4**, an international programming contest organized by HackerRank.
- Took part in the **AI Science Challenge** hosted on Kaggle, tasked with creating an AI system to answer 8th-grade multiple-choice science questions. Secured 10th place out of 170 competing teams.
- Ranked in the top 0.8% among 400,000 students in the prestigious **IIT-JEE** Examination 2009 and in the top 0.6% in the All India Engineering Entrance Examination

References

Meena Mahajan
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e-mail: meena@imsc.res.in

Arkadev Chattopadhyay
Professor
School of Technology and Computer Science
Tata Institute of Fundamental Research
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e-mail: arkadev.c@tifr.res.in

Fedor Fomin
Professor
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University of Bergen
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