

Arjun Ramachandra

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Curriculum Vitae

Current Position

Oct,2023– current Assistant Professor, Decision Sciences Area, Indian Institute of Management, Bangalore

Education

Sept,2017– Aug,2021 Joint PhD, Operations Research, National University of Singapore and Singapore University of Technology and Design
Dissertation Title:"Towards Tightness with Pairwise Independence, Extremal Dependence and Robust Satisficing Using Linear and Conic Duality"
-My dissertation addresses two classes of problems at the interface of optimization and uncertainty which harness the power of linear and conic duality.

Aug,2003– July,2008 Integrated Master of Science, Maths and Computing, Indian Institute of Technology, Kharagpur

Research Articles

Journal Publications

- 2023 Arjun Ramachandra and Karthik Natarajan. Tight Probability Bounds with Pairwise Independence. *SIAM Journal on Discrete Mathematics*, 37(2), 516-555, 2023.
- 2023 Karthik Natarajan, Arjun Ramachandra, and Tan Colin. Probability bounds for n random events under $(n-1)$ -wise independence. *Operations Research Letters*, 51(1), 116-122, 2023.
- 2022 Divya Padmanabhan, Selin Damla Ahipasaoglu, Arjun Ramachandra, and Karthik Natarajan. Extremal Probability Bounds in Combinatorial Optimization. *SIAM Journal on Optimization*, 32(4), 2828-2858, 2022.

Preprints

- 2022 Arjun Ramachandra and Karthik Natarajan. Submodularity and pairwise independence, preprint available on *arXiv* (2209.08563). 2022.
- 2021 Arjun Ramachandra, Napat Rujeerapaiboon, and Melvyn Sim. Robust Conic Satisficing, preprint available on *arXiv* (2107.06714). 2021.

PhD Thesis

- 2021 Arjun Ramachandra. *Towards Tightness with Pairwise Independence, Extremal Dependence and Robust Satisficing Using Linear and Conic Duality*. PhD thesis, 10635/204937, National University of Singapore, 2021.

Fellowships

- 2017 Recipient of *Presidents Graduate Fellowship (PGF)* awarded by the Ministry of Education (MoE), Govt.of Singapore to pursue my doctoral degree at the National University of Singapore and Singapore University of Technology and Design.

- 2011 Recipient of *Junior Research Fellowship (JRF)* awarded by the Council of Scientific and Industrial Research (CSIR), Govt. of India to undertake advanced studies and research in fundamental sciences.
- 2003 Recipient of *Kishore Vaigyanik Protsahan Yojana (KVPY)* young scientist merit scholarship awarded by the Indian Institute of Science to pursue my undergraduate degree at the Indian Institute of Technology, Kharagpur.

Teaching Awards

- 2023 Outstanding Teaching Assistant award from Engineering Systems and Design pillar at the Singapore University of Technology and Design for my role in Game Theory course, Summer, 2022.

Recognition

- 2017 One of the projects I supervised during my stint at Vishwakarma Institute of Technology, Pune, was entitled "Data-driven sensitivity analysis of waste transport parameters leading to node relocations and cost optimization" and executed in collaboration with the Pune Municipal corporation (PMC). The work was featured in the local edition of Times of India (10th Oct, 2017).

Teaching Assistantship

- Summer,2023: 40.220 The Analytics Edge, Singapore University of Technology and Design.
Winter,2023: 40.011 Data and Business Analytics, Singapore University of Technology and Design.
Summer,2022: 40.316 Game Theory, Singapore University of Technology and Design.
Fall,2020: 40.001 Probability, Singapore University of Technology and Design.
Fall,2018: 40.015 Simulation Modelling and Analysis, Singapore University of Technology and Design.

Past Work Experience

Postdoctoral Experience

- Nov,2021– Postdoctoral Research Fellow, Singapore University of Technology and Design
Oct,2023 Worked on integrating data-driven structured non-parametric tail risk estimation and optimization using statistical tools. The work involves novel theoretical advances and extensive numerical experiments to substantiate the theory.

Teaching Experience

- July,2011 – Assistant Professor, Dept. of Computer Science, Vishwakarma Institute of Technology, Pune, India where I taught courses such as Discrete Structures and Graph Theory, Mathematical Transforms, Linear Algebra, Applied Probability and Statistics, Multivariate Calculus to engineering students.
Dec,2009– Instructor, Dept. of Mathematics, Trinity College of Engineering and Research, Pune, India, where I taught Engineering Mathematics to engineering students.
May,2009– Instructor, Yukti Educational Services, Pune, where I trained IIT aspirants in the subject of Mathematics.
Dec,2009

Industry Experience

- July,2008– Associate System Engineer, IBM India Pvt Ltd, Kolkata, India, where I worked in HR module for SWA (Southwest Airlines) SAP Implementation project, involving new and emerging technologies.
April,2009

Project Supervision

- Jan,2023– Apr,2023 Singapore University of Technology and Design, where, as a TA for 40.011 Data and Business Analytics course, I supervised four live consulting project groups sponsored by two companies, on topics related to data-driven route and space buy optimization, sales and warehouse analytics.
- May,2022– Aug,2022 Singapore University of Technology and Design, where, as a TA for 40.001 Probability course, I supervised my cohort students in their common research project entitled "Group testing for efficient detection of covid-19" which involved probabilistic modelling of pooled covid testing procedures to determine optimal group sizes that minimize useful metrics such as the expected relative cost of the protocols.

Invited Talks

- 2023 "When submodularity meets uncertainty", Indian Institute of Technology, Bombay, April 2023.
- 2023 "Submodularity and pairwise independence", Indian Institute of Technology, Dharwad, Jan 2023.
- 2022 "Tight Probability Bounds with Pairwise Independence" in *The 7th International Conference on Continuous Optimization (ICCOPT)*, Bethlehem, Pennsylvania, July 2022.
- 2021 "Robust Conic Satisficing" in *Analytics for X*, National University of Singapore, July 2021.
- 2021 "Insights into bounds on the Union Probability" in *Global Young Scientists Summit*, online, Jan 2021.
- 2020 "Correlation gap and pairwise independence" in *Robust Optimization Webinar (ROW)*, online, Oct 2020.
- 2019 "New Bounds for Pairwise Independent Bernoulli Random Variables : An Analytical Approach" in *INFORMS*, Seattle, Oct 2019.
- 2019 "Robust Probability Bounds: A Linear Optimization Approach" in *The Tenth POMS-HK International Conference*, Hong Kong, Jan 2019.

Referee services

I have reviewed papers for the following journals:

- Manufacturing and Service Operations Management
- European Journal of Operational Research
- Journal of Optimization Theory and Applications

Programming skills

Programming Languages	Python, Matlab, R
Optimization Solvers	Gurobi, Mosek, CPLEX
Modeling Languages	YALMIP, RSome