V. Arvind Rameshwar

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Education

- **Indian Institute of Science** — Bengaluru, India
  PhD in Electrical Communication Engineering; GPA: 9.4/10 — *Aug. 2018 – Jul. 2023*
- **Birla Institute of Technology and Science, Pilani - Hyderabad Campus** — Hyderabad, India
  B.E. (Hons.) in Electronics and Communication; GPA: 9.93/10 — *Aug. 2014 – Jul. 2018*
- **Padma Seshadri Bala Bhavan Senior Secondary School** — Chennai, India
  High School; CBSE Class XII: 97.6% — *2012 – 2014*

Experience

- **Research Fellow, Indian Urban Data Exchange** — Bengaluru, India
  Differential Privacy Research Team — *Nov. 2023 – present*
  - **Differential Privacy for IoT Data**: Working on the design of algorithms for ensuring user-level differential privacy (DP) in the context of real-world traffic data from smart city sensors.
- **Research Associate, Indian Institute of Science** — Bengaluru, India
  Advisor: Prof. Navin Kashyap — *Jul. 2023 – Nov. 2023*
  - **Weight Enumerators of Reed-Muller Codes**: Worked on the design of sampling-based approximation algorithms for computing the weight distribution and the weight spectrum of Reed-Muller codes. Obtained good estimates of weight enumerators for RM$(11, 5)$, contributing to the state-of-the-art. Work accepted to the National Conference on Communications, 2024. Long version of manuscript in progress.
- **Graduate Teaching Assistant, Intl. Institute of Information Technology** — Hyderabad, India
  Faculty: Dr. Lalitha Vadlamani, Dr. Praful Mankar — *Jan. 2021 – Jul. 2022*
  - **PMRF Teaching Obligations**: Conducted tutorial sessions, designed homework assignments and examinations for the following courses: "**Introduction to Coding Theory**" (Jan. 2021–Mar. 2021), "**Probability and Random Processes**" (May 2021–Jul. 2021), "**Signal Detection and Estimation Theory**" (Aug. 2021–Dec. 2021), "**Information and Communication**" (Mar. 2022–Jul. 2022)
- **Research Intern, Indian Institute of Science** — Bengaluru, India
  Advisor: Prof. Navin Kashyap — *Jan. 2018 – June 2018*
  - **Secure Regenerating Codes**: Final-year undergraduate thesis. In collaboration with Prof. Kashyap, came up with an explicit code construction for achieving secrecy capacity at the Minimum Storage Regeneration (MSR) point, for all values of system parameters. Work accepted to the National Conference on Communications, 2019.
- **Summer Research Intern, IIIT Hyderabad** — Hyderabad, India
  Advisor: Dr. V. Lalitha — *May 2017 – July 2017*
  - **Maximally Recoverable Codes for Product Topologies**: Studied literature on Maximally Recoverable Codes, and worked on the sufficiency of the *regularity* condition, for restricted cases, for a grid-like erasure pattern to be recoverable.
- **Summer Research Intern, Chennai Mathematical Institute** — Chennai, India
  Advisor: Dr. Prajakta Nimbhorkar — *May 2016 – June 2016*
  - **Optimal Matchings in Bipartite Graphs**: Studied algorithms for matchings on bipartite graphs that meet optimality criteria such as *fairness, popularity*, and *rank-maximality*. In collaboration with Prof. Nimbhorkar, came up with a linear-time algorithm for dynamic rank-maximal matchings. Work accepted to COCOON, 2017, Hong Kong.

Projects

- **COVID-19 Infection Rate Estimator**: Part of a project involving graduate students and Professors Navin Kashyap and Manjunath Krishnapur at IISc, which involved building an estimator of the actual daily number of new COVID-19 infections in states across India.

Honors and Awards

- Recepient of a Jack Keil Wolf ISIT Student Paper Award 2023
- Recipient of a Best Presentation Award at the EECS Research Students Symposium - 2023, IISc
- Recipient of a Best Student Paper Award at the IEEE 2022 International Conference on Signal Processing and Communications (SPCOM)
- Part of a team that won a Qualcomm Innovation Fellowship India 2022 and was a Superwinner (with a fellowship extension) in 2023
- Recipient of a Best Paper Award at the National Conference on Communications (NCC) 2021
- Recient of a Prime Minister's Research Fellowship (PMRF) 2020, awarded by the Ministry of Education, Govt. of India
- Part of a team that won a Qualcomm Innovation Fellowship India 2020
- Gold medallist, BITS Pilani, Hyderabad Campus, for being ranked first across streams
- Recipient of a KVPY fellowship (under the Mentorship scheme), in 2013, awarded by the Department of Science and Technology (DST), Govt. of India
- Recipient of an NTSE scholarship, in 2010, awarded by the National Council of Educational Research and Training (NCERT), Govt. of India

Research Skills

Error-Control Coding, Information Theory, Differential Privacy, Markov Decision Processes (Dynamic Programming), Boolean Functions, Algorithm Design

Computer Skills

MATLAB, LaTeX

Soft Skills

Communication, Teamwork, Technical Writing

Publications

Journal

[1] V. Arvind Rameshwar and Navin Kashyap, "Estimating the sizes of binary error-correcting constrained codes," in IEEE Journal on Selected Areas in Information Theory, vol. 4, pp. 144-158, 2023, doi: 10.1109/JSAIT.2023.3279113.

[2] V. Arvind Rameshwar and Navin Kashyap, "Coding schemes based on Reed-Muller codes for (d, ∞)-RLL input-constrained channels," in IEEE Transactions on Information Theory, vol. 69, no. 11, pp. 7003-7024, Nov. 2023, doi: 10.1109/TIT.2023.3296207.

[3] Prajakta Nimbhorkar and V. Arvind Rameshwar, "Dynamic rank-maximal and popular matchings," Journal of Combinatorial Optimization, vol. 37, no. 2, pp. 523–545, 2019.

Conference

[1] V. Arvind Rameshwar and Navin Kashyap, "Sampling-based estimates of the sizes of constrained subcodes of Reed-Muller codes," accepted to the 2024 National Conference on Communications (NCC).

[2] V. Arvind Rameshwar and Navin Kashyap, "A version of Delsarte's linear program for constrained systems," 2023 IEEE International Symposium on Information Theory (ISIT), Taipei, Taiwan, Jul. 2023. **Recepient of a Jack Keil Wolf ISIT Student Paper Award**.

[3] V. Arvind Rameshwar and Navin Kashyap, "Counting constrained codewords in binary linear codes via Fourier expansions," 2023 IEEE International Symposium on Information Theory (ISIT), Taipei, Taiwan, Jul. 2023.

[4] V. Arvind Rameshwar and Navin Kashyap, "Linear runlength-limited subcodes of Reed-Muller codes and coding schemes for input-constrained BMS channels," 2022 IEEE Information Theory Workshop (ITW), Mumbai, Nov. 2022.

[5] V. Arvind Rameshwar and Navin Kashyap, "A feedback capacity-achieving coding scheme for the (d, ∞)-RLL input-constrained binary erasure channel," 2022 IEEE International Conference on Signal Processing and Communications (SPCOM), IISc, Bengaluru, Jul. 2022. **Recipient of a Best Student Paper Award**.

[6] V. Arvind Rameshwar and Navin Kashyap, "On the performance of Reed-Muller codes Over (d, ∞)-RLL input-constrained BMS channels," 2022 IEEE International Symposium on Information Theory (ISIT), Espoo, Finland, Jun. 2022.

[7] V. Arvind Rameshwar and Navin Kashyap, "Numerically computable lower bounds on the capacity of the $(1, \infty)$-RLL input-constrained binary erasure channel," 2021 National Conference on Communications (NCC), IIT Kanpur, Jul. 2021. **Recipient of a Best Paper Award**.

[8] V. Arvind Rameshwar and Navin Kashyap, "Bounds on the feedback capacity of the (d, ∞)-RLL input constrained binary erasure channel," in 2021 IEEE International Symposium on Information Theory (ISIT), Melbourne, Australia, Jul. 2021.

[9] V. Arvind Rameshwar, Aryabhatt M. Reghu, and Navin Kashyap, "On the capacity of the flash memory channel with feedback," in 2020 International Symposium on Information Theory and its Applications (ISITA2020), Kapolei, USA, Oct. 2020.

[10] V. Arvind Rameshwar and Navin Kashyap, "Computable lower bounds for capacities of input-driven finite-state channels," in 2020 IEEE International Symposium on Information Theory (ISIT 2020), Los Angeles, California, USA, Jun. 2020.

[11] V. Arvind Rameshwar and Navin Kashyap, "Achieving secrecy capacity of minimum storage regenerating codes for all feasible (n, k, d) parameter values," in 2019 National Conference on Communications (NCC), IISc, Bengaluru, Feb. 2019. **Finalist for a Best Paper Award**.

[12] V. Arvind Rameshwar, Dusi Aditya, M. Balasubramanian, U. Poorna Lakshmi, and Prasant Kumar Pattnaik, "Effect of longitudinal and shear stress on photonic crystal-based ring resonator," in 2018 3rd International Conference on Microwave and Photonics (ICMAP), Dhanbad, Feb. 2018.

[13] D. Shivakrishna, V. Arvind Rameshwar, Vadlamani Lalitha, and Birenjith Sasidharan, "On maximally recoverable codes for product topologies," in 2018 Twenty Fourth National Conference on Communications (NCC), IIT Hyderabad, Feb. 2018.

[14] Prajakta Nimbhorkar and V. Arvind Rameshwar, "Dynamic rank-maximal matchings," in Computing and Combinatorics – 23rd International Conference, COCOON 2017, Hong Kong, China, August 3–5, 2017, Proceedings (Y. Cao and J. Chen, eds.), vol. 10392 of Lecture Notes in Computer Science, pp. 433–444, Springer, 2017.