Manideep MAMINDLAPALLY

IEEE student member
Student, Indian Institute of Technology Kharagpur

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RESEARCH INTERESTS

QUANTUM INFORMATION THEORY | QUANTUM COMPLEXITY | COMPLEXITY THEORY | GAME THEORY

EDUCATION

CURRENT	Dual-Degree (BTech+MTech)	INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR MAJOR: Electronics & Electrical Communication Engineering MINOR: Computer Science Engineering	9.23/10 (CGPA) 9.09/10 (ACGPA)
APRIL 2017	TSBIE	FIITJEE JUNIOR COLLEGE, HYDERABAD	97.0%
APRIL 2015	ICSE	JOHNSON GRAMMAR SCHOOL(ICSE), HYDERABAD	95.7%

ACADEMIC ACHIEVEMENTS

- Received the **Best Paper** Award at the IEEE Conference on Communication Systems and Networks (COMSNETS) 2022 for the Graduate Forum event.

- Received the Nilanjan Ganguly Memorial Award and an Endowment prize of Rs 10,000 for the **best Bachelor thesis** in my cohort at E&EC Department, IIT Kharagpur for the session 2020-21.

- Received FIITJEE Gold Medal and a reward of Rs 2,00,000 for securing All India Ranks 1479 and 884 in the JEE Mains and Advanced 2017 exams where over one million students applied.

- Received a state top hundred certificate for the INPhO(Indian National Physics Olympiad) 2016 and INChO(Indian National Chemistry Olympiad) 2016.

- Secured second at the city level of the Zonal Informatics Olympiad 2017 and qualified for the National Informatics Olympiad 2017.

PUBLICATIONS

THESES:

- M. Mamindlapally. Unconditionally secure Commitment Problem. *Bachelor Thesis under guidance of Prof. A. J. Budkuley* [Thesis]
🏆 Best Bachelor thesis in my cohort of E&EC students for Academic session 2020-21

CONFERENCES:

- Mamindlapally M, Winter A. Singleton bounds for entanglement assisted classical quantum error correcting codes. *2022 IEEE International Symposium on Information Theory (ISIT) 2022.* IEEE. [*Submitted*]

- Yadav AK, Mamindlapally M, Joshi P, Budkuley AJ. On Commitment over General Comound Channels. *In 2022 IEEE Conference on Communication Systems and Networks (COMSNETS) 2022 Jan 4.* IEEE. [IEEE Xplore]

- (∗) Budkuley AJ, Joshi P, Mamindlapally M, Yadav AK. On the Commitment Capacity of Reverse Elastic Channels. *In 2021 IEEE Information Theory Workshop (ITW) 2021 Oct 17* (pp. 1-6). IEEE. [IEEE Xplore]

- Yadav AK, Mamindlapally M, Budkuley AJ, Mishra M. Commitment over compound binary symmetric channels. *In 2021 National Conference on Communications (NCC) 2021 Jul 27* (pp. 1-6). IEEE. [IEEE Xplore]

- Mamindlapally M, Yadav AK, Mishra M, Budkuley AJ. Commitment capacity under cost constraints. *In 2021 IEEE International Symposium on Information Theory (ISIT) 2021 Jul 12* (pp. 3208-3213). IEEE. [IEEE Xplore]

JOURNALS:

- (∗) Budkuley AJ, Joshi P, Mamindlapally M, Yadav AK. On reverse elastic channels and the asymmetry of commitment capacity under channel elasticity. *2021 IEEE Journal for Selected Areas in Communication(JSAC) 2021.* IEEE. [IEEE Xplore] [Pre-print arXiv:2111.08477]

MANUSCRIPTS:

- Mamindlapally M, Winter A. Singleton bounds for entanglement assisted classical quantum error correcting codes. [arXiv:2202.02184]

(∗) - author names in alphabetical order.

Feel free to contact me if you are interested in looking at the work still to be published or the extended versions of the already published ones.

Professional Service

- Reviewer for the Quantum Science and Technology journal by IOPscience since March 2022.

Research Experience

May 2021 - Oct 2021	**Singleton Bounds for EACQ Error Correcting Codes** *Guide: Prof. Andreas Winter* | Universitat Autònoma de Barcelona, Spain Designed a generalised communication model for Entanglement-Assisted Classical and Quantum Information, allowing catalysis(recycling) of *qbits*, *cbits* and *ebits*. Using information theoretic deductions, found a converse system of inequalities for these resources. By specialising the converse to erasure channels we got a triple-trade-off Singleton bound region, that supersedes all the previously known Singleton bounds.
Dec 2020 - Now	**Covert Communication over Quantum channels** *Guide: Prof. Ligong Wang* | CNRS, France Looked at a communication problem (communication without detection)covert communication. Studied its implementation and performance over classical channels and classical quantum channels. Currently, investigating the throughput over pure quantum channels.
May 2020 - Now	**Security and Privacy - Commitment Problem** *Guide: Prof. Amitalok J Budkeley* | IIT Kharagpur, India Studied information theoretic security primitives **Bit-Commitment** and **Oblivious Transfer**. Information theoretically derived the communication capacity limits for commitment over general discrete memoryless channels with certain cost constraints. Further developed a dual formulation of the same capacity limit. Studied different unreliable noise models *Compound Binary Symmetric Channels, Unfair Noisy Channels, Elastic Channels* and *Reverse Elastic Channels*. Found the commitment capacity and observed the interplay between different forms of unreliability. Studying commitment over quantum channels in a post quantum setting
Jan 2020 - Jun 2020	**Optimizing codes for Peak Age of Information** *Guide: Prof. Amitalok J Budkeley* | IIT Kharagpur, India Employed the Random arrival process theory to get a probabilistic expression for the metrics 'Peak age of Information' and 'Age of Information'. For **Markov sources**, obtained a closed form expression using matrix manipulations. Designing a source code to optimise that metric. Comparing this with other standard source coding schemes.

Talks and Posters

- Talked about our published work "Commitment Capacity under Cost Constraints" at *IEEE International Symposium on Information Theory (ISIT) 2021* Conference. [*short, long* videos]

- Presented a poster on "Commitment over Unreliable channels" with Pranav Joshi and Anuj K Yadav at *IEEE International Symposium on Information Theory (ISIT) 2021* conference.

- Presented a poster on "Role of Costs in Commitment over Noisy Channels" at *IEEE North American School of Information Theory (NASIT) 2021*. [*poster*]

- Submitted a poster abstract on "Singleton bounds for EACQ Error Correcting Codes" [*Poster*]

- Talked at Graduate Forum IEEE Conference for Communications and Network Systems (COMSNETS) 2022 about my masters thesis "On Unconditionally secure commitment over unreliable noisy channels."
 🏆 Received the **Best Paper Award**

- Presented a poster on "Singleton bounds for entanglement assisted classical quantum error correcting codes" at *Quantum Information Processing (QIP) 2022* conference.

Teaching

- Teaching Assistant for the laboratory course, EC39006 *Digital Signal Processing Lab*, Spring 2022, IIT Kharagpur.

- Teaching Assistant for the theory course, EC60083 *Information Theory and Coding Techniques*, Autumn 2021, IIT Kharagpur.

Technical Skills

Programming Languages:	C, C++, C#,Javascript, Python, Verilog
Libraries/Frameworks:	PyTorch, Flask, Qiskit
Software:	MATLAB, Xilinx, Unity Game Egnine, EasyEDA, EdSim51

Relevant Coursework

Mathematics:	Matrix Algebra, Probability & Stochastic Processes, Operations Research
Computer Science:	Algorithms, Algorithmic Game Theory, Computational Number Theory, Foundations of Computer Science, Computational Complexity, Approximation & Online Algorithms†, Computer Architecture & Operating Systems†, Neural Networks & Applications
Electronics & Communication:	Information Theory & Coding Techniques, Linear Algebra & Error Control Techniques, Modern Digital Communication Techniques, Mobile Communication and Fading, Digital Voice & Picture communication, Telecommunication Switching Networks, Machine Intelligence & Expert Systems, Digital Signal Processing
Physics:	Quantum Mechanics & Quantum Computing

Extra curricular activities

- Executive Editor at The Scholars' Avenue, a campus media body at IIT Kharagpur.

- Secured BRONZE in the Cartooning event of the Inter Hall General Championship 2020, IIT Kharagpur

- Volunteer at the National Service Scheme (NSS) between 2017-19. We taught in primary schools and helped construct public toilets in rural India.