

# Manideep MAMINDLAPALLY

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## RESEARCH INTERESTS

QUANTUM INFORMATION THEORY | QUANTUM COMPUTATION | INFORMATION THEORY | CRYPTOGRAPHY

## EDUCATION

CURRENT	Dual-Degree (BTech+MTech)	INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR MAJOR: Electronics & Electrical Communication Engineering MASTERS SPECIALISATION: Telecommunication System Engg. MINOR: Computer Science Engineering	9.16/10 (CGPA) 9.09/10 (ACGPA)
APRIL 2017	TSBIE	FIITJEE JUNIOR COLLEGE, HYDERABAD	97.0%
APRIL 2015	ICSE	JOHNSON GRAMMAR SCHOOL(ICSE), HYDERABAD	95.7%

## RESEARCH EXPERIENCE

MAY 2021 - OCT 2021	<b>SINGLETON BOUNDS FOR EACQ ERROR CORRECTING CODES</b> <i>Guide: Prof. Andreas Winter</i>   UNIVERSITAT AUTÒNOMA DE BARCELONA, SPAIN Designed and presented a communication model for Entanglement-Assisted Classical and Quantum Information in the form of hybrid codes. Using information theoretic deductions, found a bounded rate region for the number of (entangled)ebits, (classical)cbits, (quantum)qbits for general quantum channels. Worked out the rate region for erasure channels to get Singleton bounds for <b>Entanglement-Assisted Classical &amp; Quantum Error Correcting Codes(EAQECC)</b> .
DEC 2020 - NOW	<b>COVERT COMMUNICATION OVER QUANTUM CHANNELS</b> <i>Guide: Prof. Ligong Wang</i>   CNRS, FRANCE Looked at a communication problem (transmission without detection)covert communication. Studied its implementation and performance over Classical and Classical quantum channels. Currently exploring an extension of this problem to a fully quantum channel.
MAY 2020 - NOW	<b>SECURITY AND PRIVACY - COMMITMENT PROBLEM</b> <i>Guide: Prof. Amitalok J Budkeley</i>   IIT KHARAGPUR, INDIA Studied information theoretic security primitives <b>Bit-Commitment</b> and <b>Oblivious Transfer</b> . 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 noisy channel models <i>Compound Binary Symmetric Channels, Unifair Noisy Channels, Elastic Channels and Reverse Elastic Channels</i> . Studied commitment problem over such channels. Derived Converse rate bounds using information theoretic methods. Presented maximum rate-achieving computationally efficient protocols for different channels.
JAN 2020 - JUN 2020	<b>OPTIMIZING CODES FOR PEAK AGE OF INFORMATION</b> <i>Guide: Prof. Amitalok J Budkeley</i>   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 <b>Markov sources</b> , obtained a closed form expression using linear algebra. Designing a source code to optimise that metric. Comparing this with other standard source coding schemes.

## PUBLICATIONS

- M. Mamindlapally, A. Winter, "Singleton bounds for entanglement-assisted classical and quantum error correcting codes." [\[Under Preperation\]](#)
- A. K. Yadav, M. Mamindlapally, P. Joshi, A. K. Yadav, "On Commitment over General Compound Channels" *Conference on Communication Systems and Networks (COMSNETS)*, 2022. [\[Under Review\]](#)
- A. J. Budkuley, P. Joshi, M. Mamindlapally, A. K. Yadav, "On Reverse Elastic Channels and the Asymmetry of Commitment Capacity under Channel Elasticity" *IEEE Journal on Selected Areas in Communication (JSAC)*, 2021. [\[Under Review\]](#)
- A. J. Budkuley, P. Joshi, M. Mamindlapally, A. K. Yadav, "On the Commitment Capacity of Reverse Elastic Channels" *2021 IEEE Information Theory Workshop (ITW)*, 2021. [\[Accepted\]](#)
- A. K. Yadav, M. Mamindlapally, A. J. Budkuley and M. Mishra, "Commitment over Compound Binary Symmetric Channels," *2021 National Conference on Communications (NCC)*, 2021, pp. 1-6, doi: 10.1109/NCC52529.2021.9530060. [\[Published\]](#)

- M. Mamindlapally, A. K. Yadav, M. Mishra and A. J. Budkuley, "Commitment Capacity under Cost Constraints," *2021 IEEE International Symposium on Information Theory (ISIT)*, 2021, pp. 3208-3213, doi: 10.1109/ISIT45174.2021.9518204. [[Published](#)]
- M. Mamindlapally "Unconditionally secure Commitment Problem," [[Bachelor Thesis](#) under guidance of Prof. A. J. Budkuley]

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.

## OTHER ACADEMIC EXPERIENCE

- Talked on 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 "Role of Costs in Commitment over Noisy Channels" at *IEEE North American School of Information Theory (NASIT)* 2021. [[poster](#)]
- Attended *IBM Qiskit Global Summer School* 2021.
- Teaching Assistant for the theory course, *Information Theory*, Autumn 2021, IIT Kharagpur.

## ACADEMIC PROJECTS

OCT 2020	TRANSMISSION PACKETS FOR MULTIMEDIA COMMUNICATION <i>Guide: Prof. Chetna Singhal</i>   DIGITAL VOICE AND PICTURE COMMUNICATION Used Wireshark tool to capture transmission packets of a skype video call. Obtained the trace of network traffic and analysed QoS characteristics.
APRIL 2020	VOICE MODULATION OF SPEECH SIGNALS <i>Guide: Prof. Gautam Saha</i>   DIGITAL SIGNAL PROCESSING Applied a sequence of Hilbert Transform and few other filter operations to extract envelopes of speech signals. Paired these envelopes with different frequencies(voices) while keeping the words unaltered.
JAN 2020	PROLATE SPHEROIDAL WAVE FUNCTIONS <i>Guide: Prof. Ritwik Layek</i>   DIGITAL COMMUNICATION Studied the literature of the Prolate Spheroidal Wave functions and their significance as encoders for communication systems. Simulated the function on MATLAB software and analysed the characteristics for variations in its parameters.
OCT 2019	PHASE LOCKED LOOP <i>Guide: Prof. Arijit De</i>   ANALOG COMMUNICATION Coded an implementation of Phased Locked Loop and the carrier frequency synchronisation for a noisy FM signal. Studied the resulting signals and plotted them for different orders of transfer function of the PLL.

## TECHNICAL SKILLS

Programming Languages:	C, C++, C#, JAVASCRIPT, PYTHON, VERILOG
Libraries/Frameworks:	PYTORCH, FLASK, QISKIT
Software:	MATLAB, XILINX, UNITY GAME ENGINE, EASYEDA, EDSIM51

## RELEVANT COURSEWORK

ALGORITHMS*	DIGITAL ELECTRONIC CIRCUITS*	MATRIX ALGEBRA	NEURAL NETWORKS & APPLICATIONS
ANALOG COMMUNICATION*	DIGITAL SIGNAL PROCESSING*	NETWORK THEORY*	COMPUTATIONAL COMPLEXITY
ANALOG ELECTRONIC CIRCUITS*	ERROR CONTROL TECHNIQUES	OPERATIONS RESEARCH	FOUNDATIONS OF COMPUTER SCIENCE
CONTROL SYSTEMS ENGINEERING	ALGORITHMIC GAME THEORY	PROBABILITY & STOCHASTIC PROCESSES	MODERN DIGITAL COMMUNICATION
DIGITAL VOICE & PICTURE COMM*	INFORMATION THEORY	SIGNALS AND SYSTEMS	ELECTROMAGNETIC ENGINEERING
DIGITAL COMMUNICATION*	MACHINE LEARNING	PHYSICS*	SEMICONDUCTOR DEVICES*
COMPUTATIONAL NUMBER THEORY	MOBILE COMMUNICATION AND FADING	QUANTUM MECHANICS & QUANTUM INFORMATION THEORY	MACHINE INTELLIGENCE & EXPERT SYSTEMS

\* includes laboratory component

## ACADEMIC ACHIEVEMENTS

- Secured All India Ranks 1479 and 884 in the JEE Mains and Advanced 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.

## 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
- ASSISTANT HEAD BOY at Johnson Grammar School(ICSE), Hyderabad for the academic session 2014-15.