

# SAMRAT MUKHOPADHYAY

## CONTACT ADDRESS

---

Department of Electronics Engineering, IIT(ISM) Dhanbad  
Office: Room no. 206/F, Academic Complex, IIT(ISM) Dhanbad  
Police Line Road, Dhanbad, Jharkhand-826 004  
India

samrat@iitism.ac.in  
samratphysics@gmail.com  
<https://sites.google.com/view/samratspace>

## TITLE

---

Assistant Professor July, 2021-Present  
Department of Electronics Engineering  
**Indian Institute of Technology (Indian School of Mines) Dhanbad**

## EDUCATION

---

- **PH.D.** July, 2014-December, 2020  
E&ECE Dept., **IIT Kharagpur**, India  
Thesis title: **New Greedy Algorithms With Efficient Recovery for Compressed Sensing**  
Advisor: **Prof. Mrityunjoy Chakraborty**  
Doctoral Scrutiny Committee: **Mrityunjoy Chakraborty, Anindya Sundar Dhar, Rajarshi Roy, Pranab Kumar Dutta**  
Cumulative GPA: **9.5** out of **10.0**
- **M.E. (TELECOMMUNICATION)** July, 2012-June, 2014  
ECE Dept., **IISc Bangalore**, India  
Thesis title: **Topics in the Performance Modeling and Control of Signalized Road Intersections**  
Advisor: **Prof. Anurag Kumar**  
Cumulative GPA: **7.1** out of **8.0**
- **B.E.** July 2008-June, 2012  
ETC Dept., **BESU, Shibpur**, India  
(now **IEST, Shibpur**, India)  
Thesis Advisor: **Prof. Tamaghna Acharya**  
Overall Percentage: **90.09%**  
Equivalent Cumulative GPA: **9.76** out of **10.0**
- **HIGHER SECONDARY (CLASS XII)** July 2006-April, 2008  
**West Bengal Council of Higher Secondary Education**,  
Marks in Science Group: 94.33% (Projected Rank: 40)  
(Mathematics: 94/100, Physics: 92/100, Chemistry: 97/100)
- **MADHYAMIK (CLASS X)** July 2000-April, 2006  
**West Bengal Board of Secondary Education**,  
Marks obtained: 92.75% (Projected Rank: 43)  
(Mathematics: 95/100, Physical Science: 94/100, Life Science: 95/100)

## WORK EXPERIENCE

---

- **Assistant Professor**, ECE Dept., IIT (ISM) Dhanbad July, 2021-Present
- **Institute Post Doctoral Fellow**, IIT Madras (Mentor: Dr. Abhishek Sinha) March, 2021-July, 2021

- **Project Officer**, IIT Madras
- **Research Assistant-III**, IIT Kharagpur

August, 2020-March, 2021

October, 2019-June, 2020

## RESEARCH INTERESTS

---

- **SPARSE SIGNAL PROCESSING, STATISTICAL LEARNING AND NONCONVEX OPTIMIZATION:** Compressed sensing, Sparse Adaptive filtering, Distributed sparse learning, High dimensional probability, Online convex optimization, Multi-armed bandits.
- **STATISTICAL SIGNAL PROCESSING:** Detection and estimation theory, Constrained Cramer Rao bound.
- **STOCHASTICS:** Queueing theory, Stochastic optimization, Random geometrical networks.
- **QUANTUM ALGORITHMS AND QUANTUM MACHINE LEARNING:** Quantum linear regression, quantum convex optimization, HHL algorithm.

## PUBLICATIONS

---

### Journal Papers

#### Published

1. R.K. Yadav, H.B. Mishra, **S. Mukhopadhyay**, R. Mishra, “IRS-OTFS Systems: Design of Reflection Coefficients for Low-Complexity ZF Equalizer”, accepted for publication in *IEEE Transactions on Vehicular Technology*.
2. **S. Mukhopadhyay**, H.B.Mishra, “Multiple Choice Hard Thresholding Pursuit (MCHTP) for Simultaneous Sparse Recovery and Sparsity Order Estimation”, accepted for publication in *Elsevier, Signal Processing*.
3. R.K.Ranjan, A. Bhattacharya, **S. Mukhopadhyay**, and H. B. Mishra, “A GRADIENT ASCENT BASED LOW COMPLEXITY RATE MAXIMIZATION ALGORITHM FOR INTELLIGENT REFLECTING SURFACE-AIDED OFDM SYSTEMS”, *IEEE Communication Letters*, June, 2023.[[Impact Factor: 4.1, 2023](#)]
4. S. Kumari, M. Kumar Dikkala, **S. Mukhopadhyay**, and H. B. Mishra, “TWO CHOICE HARD THRESHOLDING PURSUIT (TCHTP) FOR DELAY-DOPPLER CHANNEL ESTIMATION IN OTFS”, *IEEE Wireless Communications Letters*, Early Access, March 2023.[[Impact Factor: 5.281, 2023](#)]
5. **S. Mukhopadhyay**, and M. Chakraborty, “DETERMINISTIC AND RANDOMIZED DIFFUSION BASED ITERATIVE GENERALIZED HARD THRESHOLDING (DiFIGHT) FOR DISTRIBUTED SPARSE SIGNAL RECOVERY”, *IEEE Transactions on Signal and Information Processing over Networks*, vol 8, November [[Impact factor: 3.664, 2021](#)]
6. **S. Mukhopadhyay**, and M. Chakraborty, “A TWO STAGE GENERALIZED BLOCK ORTHOGONAL MATCHING PURSUIT (TSGBOMP) ALGORITHM”, *Transactions on Signal Processing, IEEE*, vol 69, September 2021, pp 5846-5858.[[Impact factor: 4.931 \(2021\)](#)]
7. **S. Mukhopadhyay**, “SPARSE RECOVERY ANALYSIS OF GENERALIZED  $J$ -MINIMIZATION WITH RESULTS FOR SPARSITY PROMOTING FUNCTIONS WITH MONOTONIC ELASTICITY”, *Signal Processing, Elsevier*, vol 180, No. 107853, March, 2021, <https://doi.org/10.1016/j.sigpro.2020.107853>. [[Impact factor: 4.384 \(2020\)](#)]
8. **S. Mukhopadhyay**, “ON THE MMSE ESTIMATION OF NORM OF A GAUSSIAN VECTOR UNDER ADDITIVE WHITE GAUSSIAN NOISE WITH RANDOMLY MISSING INPUT ENTRIES”, *Signal Processing, Elsevier*, vol 179, No. 107848, February, 2021, <https://doi.org/10.1016/j.sigpro.2020.107848>. [[Impact factor: 4.384 \(2020\)](#)]

9. **S. Mukhopadhyay** and A. Mukherjee, "IMDLMS: AN IMPUTATION BASED LMS ALGORITHM FOR LINEAR SYSTEM IDENTIFICATION WITH MISSING INPUT DATA", *Transactions on Signal Processing, IEEE*, vol 68, issue 1, December 2020, pp 2370-2385.[Impact factor: 5.028 (2020)]
10. **S. Mukhopadhyay**, "STOCHASTIC GRADIENT DESCENT FOR LINEAR SYSTEMS WITH SEQUENTIAL MATRIX ENTRY ACCUMULATION", *Signal Processing, Elsevier*, vol 171, No. 107494, June 2020, <https://doi.org/10.1016/j.sigpro.2020.107494>. [Impact factor: 4.384 (2020)]
11. **S. Mukhopadhyay**, S. Satpathi, and M. Chakraborty, "A MODIFIED MULTIPLE OLS ( $m^2$ OLS) ALGORITHM FOR SIGNAL RECOVERY IN COMPRESSIVE SENSING", *Signal Processing, Elsevier*, vol 168, no. 107337, March 2020, <https://doi.org/10.1016/j.sigpro.2019.107337>. [Impact factor: 4.384 (2020)]
12. **S. Mukhopadhyay**, M.J. Pramod, and A. Kumar, "APPROXIMATE MEAN DELAY ANALYSIS FOR A SIGNALIZED INTERSECTION WITH INDISCIPLINED TRAFFIC", *Transactions on Intelligent Transportation Systems, IEEE*, vol 18, issue 10, October, 2017, pp 2750-2762.[Impact factor: 6.319 (2020)]

## Referred Conference Papers

### Published

1. R. Ranjan, A. Bhattacharya, H.B. Mishra, **S. Mukhopadhyay**, "A LOW-COMPLEXITY IRS PHASE SHIFT OPTIMIZATION TO ACHIEVE SECURITY IN IRS-ASSISTED MISO SYSTEMS", *National Conference on Communications (NCC)*, March, 2024.
2. S. Kumari, H.B. Mishra, **S. Mukhopadhyay**, "GREEDY SPARSE CHANNEL ESTIMATION FRAMEWORK FOR MULTI-USER OTFS SYSTEMS", *National Conference on Communications (NCC)*, March, 2024.
3. A. K. Shrivastava, S. Kumar, K. Sahu, B. Sonwani, D. Sharma, D. S. Srivastava, N. Garg, A. Kherani, V. Bhatia, S. Mukherjee, **S. Mukhopadhyay**, P. Das, R. Mahapatra, D. Das and B. Lall, "TSDSI STANDARDS DRIVEN IMPLEMENTATION OF SMART RADIO ENVIRONMENT", *IEEE International Conference on Advanced Networks and Telecommunications Systems, ANTS*, December, 2023.
4. S. Kumari, H. B. Mishra, and **S. Mukhopadhyay**, "PEAK-TO-AVERAGE POWER RATIO ANALYSIS FOR EMBEDDED PILOT AND SUPERIMPOSED PILOT AIDED OTFS WAVEFORM", accepted in *IEEE Guwahati Sub-section Conference, GCON*, June, 2023.
5. **S. Mukhopadhyay**, "ON THE EFFECTIVE SAMPLE COMPLEXITY FOR EXACT SPARSE RECOVERY FROM SEQUENTIAL LINEAR MEASUREMENTS", *International Conference on Signal Processing and Communications (SPCOM)*, July 2022, Bangalore, India[SJR 2019: 0.23, h-index: 7].
6. **S. Mukhopadhyay**, S. Sahoo, and A. Sinha, " $k$ -EXPERTS- ONLINE POLICIES AND FUNDAMENTAL LIMITS", *Artificial Intelligence and Statistics Conference (AISTATS)*, March 2022 (Held virtually due to COVID 19 Pandemic) Preprint at <https://arxiv.org/abs/2110.07881>[SJR 2020: 0.44, h-index: 25].
7. **S. Mukhopadhyay**, and A. Sinha, "ONLINE CACHING WITH OPTIMAL SWITCHING REGRET", *2021 International Symposium on Information Theory (ISIT)*, Melbourne, Australia, July, 2021. (Held virtually) Preprint at <https://arxiv.org/abs/2101.07043>. [SJR 2019: 0.91, h-index: 82]

8. **S. Mukhopadhyay**, and M. Chakraborty, "REGULARIZED HARD THRESHOLDING PURSUIT (RHTP) FOR SPARSE SIGNAL RECOVERY", *2020 International Conference on Signal Processing and Communications (SPCOM)*, July 2020, Bangalore, India, pp. 1-5, doi: 10.1109/SPCOM50965.2020.9179515. [SJR 2019: 0.23, h-index: 7].
9. **S. Mukhopadhyay**, S. Satpathi, and M. Chakraborty, "A LOW COMPLEXITY ORTHOGONAL LEAST SQUARES ALGORITHM FOR SPARSE SIGNAL RECOVERY", *2018 International Conference on Signal Processing and Communications (SPCOM)*, July 2018, Bangalore, India, pp. 75-79, doi: 10.1109/SPCOM.2018.8724462. [SJR 2019: 0.23, h-index: 7].
10. B.K. Das, **S. Mukhopadhyay**, and M. Chakraborty; "ROBUST ADAPTIVE FILTERING VIA CONVEX COMBINATION OF L0-RLS ADAPTIVE FILTERS", *2018 IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2018, Florence, Italy, pp. 1-5, doi: 10.1109/ISCAS.2018.8351617. [SJR 2019: 0.29, h-index: 69].
11. **S. Mukhopadhyay**, M.J. Pramod, and A. Kumar, "AN APPROACH FOR ANALYSIS OF MEAN DELAY AT A SIGNALIZED INTERSECTION WITH INDISCIPLINED TRAFFIC", *2015 7th International Conference on Communication Systems and Networks (COMSNETS)*, Jan 2015, Bangalore, India, pp. 1-6, doi: 10.1109/COMSNETS.2015.7098702 [SJR 2016: 0.15, h-index: 8].

## AWARDS AND HONORS

---

- Recipient of the **President's Gold Medal** from Bengal Engineering and Science University, Shibpur (now **IIST**, Shibpur), received from the honorable **President of India, Sri Pranab Mukhopadhyay** in the year 2012 for securing highest aggregate percentage of marks across all the departments.
- Recipient of **Silver Medal** from Bengal Engineering and Science University, Shibpur (now **IIST**, Shibpur) in the year 2012 for securing highest marks in the Electronics and Telecommunication Engineering (ETCE) department.
- Recipient of the **Best Student Award and Medal** from Tata Consultancy Services in the year 2011.
- Recipient of **Merit Scholarship** for four years of study in Bengal Engineering and Science University, Shibpur (2008-2012) (now **IIST**, Shibpur).

## MAJOR ACADEMIC ACHIEVEMENTS

---

- Secured **All India rank 22**(out of approximately 1,77,000 students)(**score 975/1000**) in *Graduate Aptitude Test in Engineering(GATE, 2012)* in Electronics and Communication Engineering.
- Secured **All India rank 80** in **WBJEE 2008** in the Engineering entrance test (out of approximately 90,000 students).
- Ranked 3<sup>rd</sup> in the masters class of ECE Telecommunication of IISC, Bangalore in 2014.
- Ranked 1<sup>st</sup> in the department ETCE of Bengal Engineering and Science University, Shibpur (now **IIST**, Shibpur) in 2012.

## GRANTS

---

## TEACHING EXPERIENCE

---

**IIT(ISM) Dhanbad**

- **Winter 2024**, Digital Communication

Sl. No	Title	Role	Cost of Project (in Lakhs)	Funding Agency	Duration in Months	Sanction Date
1	Compressed Spectrum Sensing for MIMO-FBMC Based Cognitive Radio in Advanced 5G Communications	PI	13.5L	IIT (ISM) Dhanbad, FRS	36	23.02.2022
2	Smart Radio Environments: Implementation and Deployment for Targeted Use-Cases	PI	50.8L	IIITB COMET, TIH under NM-ICPS, DST	48	08.12.2022
3	Advanced Greedy Algorithms for Sparsity-Aided Generalized Online Caching	PI	15.2L	DST(SERB)(349), SRG	24	27.10.2022
4	Multi-Carrier Waveforms for Intelligent Reflecting (IRS) assisted Next-Generation Wireless Communication Systems	Co-PI	36L	DST(SERB)(370), CRG	36	22.12.2022
5	Capacity building for human resource development in Unmanned Aircraft System (Drone and related Technology)	Co-PI	150.9L	MeitY	60	01.08.2022
6	Development of Channel Estimation and Phase Optimization Algorithms for Implementation of Intelligent Reflecting Surface (IRS) Assisted Wireless Systems in Underground Mines.	Co-PI	~15L	TEXMIN	24	--

- **Monsoon 2023**, Mathematical and Simulation Techniques
- **Monsoon 2023**, Numerical Methods and Optimization Techniques
- **Monsoon 2022**, Machine Learning and Artificial Intelligence (ECD411)
- **Winter 2022, 2023**, Internet of Things (ECO501)
- **Monsoon 2021**, Machine Learning (ECE17105)

#### IIT Madras

- **Spring 2021**, Topics in Random Processes and Concentrations (EE6112)(TA)
- **Fall 2020**, Advanced Topics in Artificial Intelligence (EE6180)(TA)

#### IIT Kharagpur

- **Spring 2017,'18,'19**, Adaptive Systems and Signal Processing (EC61066)(TA)
- **Fall 2018,'19**, VLSI for Telecommunication (EC61405) (TA)
- Received consistently good feedback for teaching (~ 9/10).

### STUDENT ADVISING & MENTORING

#### Ph.D.

1. Mrityunjay Sarkar (Sole Guide)
2. Bidisha Dobe (Sole Guide)

3. Preeti Topno (Principle Guide) (Viswesvaraya PhD Candidate)
4. Prakash Ratna Gautam (Sole Guide)
5. Rakesh Ranjan (Co-guide)
6. Sweta Kumari (Co-guide) (Graduated)
7. Shweta Bharti (Co-guide)

**M.Tech.**

1. Sushmoy Datta
2. Sanskar
3. Trisha Paul
4. Shipra (Graduated)
5. Ashok Kumar (Graduated)
6. Akshat Sharma (Graduated)

---

**PROFESSIONAL ACTIVITIES**

**Memberships:**

1. Member, IEEE Signal Processing Society

**Reviewer:**

1. IEEE Transactions on Signal Processing
2. IEEE Transactions on Signal and Information Processing over Networks
3. IEEE/ACM Transactions on Networking
4. Signal Processing, Elsevier
5. IET Signal Processing
6. Science China Mathematics, Springer
7. Applied Intelligence, Springer
8. International Conference on Computer Communications (INFOCOM)
9. IEEE International Symposium on Circuits and Systems (ISCAS)
10. International Conference on Communication Systems and Networks (COMSNETS)

---

**ADMINISTRATIVE ACTIVITIES**

1. Proposed Courses on “Optimization Theory and Techniques”, “Mathematics for Communication Theory” and “Online Prediction and Learning Algorithms” for the ECE Dept.
2. Acted as judge for Smart India Hackathon 2022 from IIT (ISM) Dhanbad
3. Departmental Post Graduate Committee (DPGC) member. In charge of issues related to PG, PhD students. – Nov, 2022 - present
4. Member of Institute Quantum Computing Initiative (IQCI) – June, 2023 - present
5. Prepared vision and roadmap presentation for the Electronics Engineering Department for the BOG meeting. – May 2022