

Shuvam Chakraborty

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Electrical & Computer Engineering
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RESEARCH INTEREST

Machine Learning for Wireless Communication ■ Signal Processing ■ THz and sub-THz Band Communication ■
Spectrum Sharing and Coexistence ■ Distributed Learning for Wireless Systems

EDUCATION

PhD - Electrical & Computer Engineering, August 2019 - Present
State University of New York, Albany, NY, USA

Advisor: Dr. Dola Saha

Thesis: Advances in Spectrum Utilization for Active and Passive Users

GPA: 3.86/4.00

MS - Electrical & Computer Engineering, August 2019 - May 2021
State University of New York, Albany, NY, USA

Advisor: Dr. Dola Saha

Thesis: Domain Aware Deep Learning for Wireless Physical Layer

GPA: 3.88/4.00

Bachelor of Engineering - Electronics & Telecommunication August 2014 - June 2018
Jadavpur University, Kolkata, India

Advisor: Dr. Ananda S. Chowdhury

Thesis: Active Contours for Artery Image Segmentation

GPA: 9.28/10.00

PROFESSIONAL EXPERIENCE

SUNY Albany - Graduate Research Assistant August 2019 - Present
Albany, NY, USA

Distributed Learning for Wireless communication:

■ Proposed a fully decentralized channel allocation approach deploying federated learning in a heterogeneous network scenario for unlicensed shared spectra.

Theory Guided Deep Learning for Wireless Receiver Design:

■ Developed a neural network model for channel estimation empowered by theory of wireless channel and signal that outperforms most practical methods in terms of accuracy with limited computation cost.

■ Developed knowledge aided neural network model for physical layer of wireless receiver for THz band communication.

Thz Band Communication:

■ Proposed candidate waveform for THz band communication with analytical derivation of signal parameters, performed over the air experiment for performance analysis.

■ Proposed Link distance improvement (budget) for THz band communication with ML methods and validated with over-the-air experiment for performance analysis.

■ Proposed generative channel models for sub-THz bands adaptive to frequencies and bandwidth that capture both channel and hardware effects.

Spectrum Sharing and Coexistence:

■ Proposed collaborative spectrum sharing regime using signal processing and machine learning tools for active and passive usage of radio frequency band.

■ Provided comprehensive analysis overhead and computation cost in true bi-directional collaboration for RFI cancellation.

■ Proposed aggregation and optimization methods for simultaneous mitigation from diverse RFI sources.

■ 2 Patents filed.

Qualcomm Technologies - Internship

Bridgewater, NJ, USA May 2024 - August 2024

System Level Studies for Network Energy Saving Strategies:

■ Performed system-level resource optimization studies for Network energy savings for 5G and beyond.

■ Submitted research for publication in IEEE flagship conference ICC 2025.

■ Patent filed.

Nokia Standards - Internship

Naperville, IL, USA June 2023 - August 2023

Complexity and Generalizability Study for AI/ML based CSI Compression:

- Worked on feasibility study and complexity analysis and proposed model compressions in AI/ML solution for downlink CSI feedback in Massive MIMO systems.
- Performed generalizability analysis for AI/ML-based solutions for CSI feedback in Massive MIMO.

Nokia Standards - Internship

Naperville, IL, USA

June 2022 - August 2022

AI/ML based CSI-RS Compression and Quantization:

- Worked on AI/ML solution for compression and quantization for CSI-RS feedback in Massive MIMO systems. Developed ML based designs with jointly optimized compression and quantization module.
- Integrated the ML module in system level simulator for user end performance verification. Contributions are integrated in 3GPP contribution doc for August 2022.

Virginia Tech - Visiting Student

Blacksburg, VA, USA

June 2017 - August 2017

Energy Efficient Distribution of Low Power Systems:

Worked on a distributed clustering algorithm for adaptive energy optimization in remote IoT network

PUBLICATIONS

Journals

TWIRLD: Transformer-based Terahertz Waveform for Improved Radio Link Distance | IEEE Transactions on Machine Learning in Communications and Networking

*Shuvam Chakraborty**, Claire Parisi, Dola Saha, Ngwe Thawdar

Collaboration with Cellular Networks for RFI Cancellation at Radio Telescope | IEEE TCCN

*Shuvam Chakraborty**, Gregory Hellbourg, Maqsood Careem, Dola Saha, Aveek Dutta

AI Empowered Low Overhead Collaborative RFI Cancellation | IEEE TCCN (In Preparation)

*Shuvam Chakraborty**, Gregory Hellbourg, Dola Saha, Aveek Dutta

DART: Domain Aware OFDM Receiver for Sub-THz Band | IEEE TWC (In Preparation)

*Shuvam Chakraborty**, Claire Parisi, Dola Saha, Ngwe Thawdar

Conferences

WAFER: Waveform based Feature Extraction for RFI Cancellation from Multiple Sources | IEEE DySPAN 2025 (submitted), Sirajum Munira, *Shuvam Chakraborty**, Dola Saha, Aveek Dutta and Greg Hellbourg

Energy-efficient Network Operation During Low-traffic Hours | IEEE ICC 2025 (submitted), *Shuvam Chakraborty**, Ahmed Bedewy, Wenjun Li and Navid Abedini

XPRT - Extracting Priors for Signal Reconstruction | IEEE ICC 2025 (submitted), *Shuvam Chakraborty**, Dola Saha, Aveek Dutta and Greg Hellbourg

WIT - Waveform Independent Tunable Channel Model for Terahertz Communication | IEEE INFOCOMM 2025, *Shuvam Chakraborty**, Dola Saha, Steven Arbogast, Claire Parisi and Ngwe Thawdar

Low Overhead Multi-Source RFI Cancellation | IEEE DySPAN 2024, *Shuvam Chakraborty**, Dola Saha, Aveek Dutta, Gregory Hellbourg

LOCI: Learning Low Overhead Collaborative Interference Cancellation for Radio Astronomy | IEEE ICC 2022, *Shuvam Chakraborty**, Dola Saha, Aveek Dutta, Gregory Hellbourg

Collaborative RFI Cancellation for Radio Astronomy |RFI Workshop, ECMWF - abstract 2022, Maqsood Careem, *Shuvam Chakraborty**, Aveek Dutta, Dola Saha, Gregory Hellbourg

Spectrum Sharing via Collaborative RFI Cancellation for Radio Astronomy | IEEE DYSPAN (Awarded Best Paper) 2021, Maqsood Careem, *Shuvam Chakraborty**, Aveek Dutta, Dola Saha, Gregory Hellbourg

Communication Knowledge Aided Neural Network for OFDM Receiver in Terahertz Band | IEEE ICC 2021, *Shuvam Chakraborty**, Dola Saha, Ngwe Thawdar

Domain Knowledge aided Neural Network for Wireless Channel Estimation | IEEE GLOBECOMM 2021 *Shuvam Chakraborty**, Dola Saha

Workshops

A Case for OFDM in Ultra-broadband Terahertz Communication: An Experimental Approach | ACM MOBICOMM (MMNETS Workshop) 2021 *Shuvam Chakraborty**, Claire Parisi, Dola Saha, Ngwe Thawdar

Learning from Peers at the Wireless Edge | IEEE COMSNETS (The Last Mile Workshop) 2020 *Shuvam Chakraborty**, Hesham Mohammed, Dola Saha

TEACHING EXPERIENCE

IECE 233 - Hardware Software Interface, Teaching Assistant

Fall 2020, Spring 2021

Responsibilities: Graded, Conducted Laboratory Classes

IECE 141 - Introduction to Programming, Teaching Assistant

Spring 2021

Responsibilities: Graded Coursework, Developed Assignments, Conducted Laboratory Classes.

IECE 111 - Introduction to ECE, Teaching Assistant

Fall 2020

Responsibilities: Graded Coursework, Conducted Laboratory Classes

COURSEWORK

■ Probability and Random Processes ■ Information Theory ■ Cyber-Physical Systems ■ Advanced Digital Communication ■ Modern Wireless Networks ■ Statistical Pattern Recognition ■ Machine Learning
■ Convex Optimization

HONORS AND AWARDS

NSF Student Travel Grant, IEEE DySPAN, 2024

NSF Student Travel Grant, IEEE ICC, 2023

Best Paper Award, IEEE DySPAN, 2021

Presidential Fellowship Award, University at Albany, 2019

SIGCOMM International Travel Grant, 2020

‘INSPIRE’ Scholarship, MHRD Department, Govt. of India, 2014

SKILLS SUMMARY

Communication Protocol: LTE/LTE-A, WiFi - IEEE 802.11.

Programming Languages: C, C++, MATLAB, Python

Algorithms: Transmitter/Receiver structures for OFDM/Single Carrier Wireless systems, Linear/Non-Linear programming, Convex Optimization

Scripting Languages: HTML, \LaTeX

Platforms: Tensorflow, Pytorch

REFERENCES

Dola Saha, Associate Professor, State University of New York, Albany

Aveek Dutta, Associate Professor, State University of New York, Albany

Amitabha Ghosh, Radio Interface Group at Nokia Bell Labs