

# Rittwik Sood

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🐙 [rittwiksood.github.io](https://github.com/rittwiksood)

## EDUCATION

### Purdue University

*PhD in Electrical Engineering | GPA - 4.0/4.0*

Relevant Coursework: Random Variables and Signals, Wireless Communication Systems  
Linear Algebra, Digital Communication

West Lafayette, Indiana

*Jan 2024 – Now*

### National Institute of Technology Hamirpur

*B.Tech in Electronics & Communication Engineering | GPA - 9.72/10.0*

Hamirpur, India

*Aug 2014 – May 2018*

- The President of India Gold Medal (**Rank 1** in the institute)
- Director's Gold Medal for Best All Rounder Performer 2018

## WORK EXPERIENCE

### Qualcomm Inc.

*Senior Software Engineer - Modem NR5G*

Hyderabad, India

*Sep 2018 - Aug 2023*

- 5 years in Modem NR5G RF Software team. Primary task included analysing and reading 3GPP spec documents, and programming HW RF components like Antennas, PAs, LNAs, ASMs.
- Worked on **Physical layer** programming of RF front end Digital and Analog components.
- Created critical features and their SW frameworks, like ENDC (LTE + NR5G), NRDC (FR1+FR2, NR Dual Connectivity), MPE (Maximum Polarisation Exposure) on mmw.
- Worked with various OEMs on 40+ product lines. Assisted teams across geographies in USA, CHN, Israel and EMEA in day-to-day critical activities and Modem Bring ups.
- Got 2 promotions in 3 years. Was awarded with Orion-Insta and Qualstar Awards in the company for excellent performance and work-ethic (Highest Awards).
- Worked with cross-functional teams like Firmware, Modem Hardware, MAC, System Design, to design new features, test functionalities and enable data communication between various layers.
- NRDC framework created by me from scratch, was presented as a highlight (one of the five features) by Qualcomm CEO at the Mobile World Congress (MWC 2021), Barcelona. Download speed of **10 GBps** was achieved for the first time.

## RESEARCH EXPERIENCE

### Purdue University

*PhD Student | Advisor: Prof. Kim Kwang*

West Lafayette

*Jan 2024 - Ongoing*

- Quantifying disparities in internet coverage (availability and speed, including uplink and downlink) across Midwest states by comparing FCC Broadband Data Collection (BDC) with the Ookla speed database and ISP-provided coverage data in Midwest states to reduce Digital Divide.
- Analyzed correlations between these coverage discrepancies and various demographic factors (such as income, education levels, urban/rural divide, and race) using data from the American Community Survey (ACS) and the U.S. Census Bureau.
- Developing a predictive model to estimate the state of the digital divide in the Midwest for 2025, identifying key deficiencies in internet access based on demographic variable
- Extending the model's applicability to other U.S. states to assist in forecasting future digital divides and optimizing the allocation of digital resources to effectively reduce disparities.

### IBT, Karlsruhe Institute of Technology (KIT)

*DAAD-WISE Scholar | Advisor: Prof. Olaf Dossel, Dr. Nicolas Pilia*

Karlsruhe, Germany

*May 2017 - Jul 2017*

- Instantaneous phase estimation and analysis of bio-signals including ECG and EEG signals to predict heart and brain disorders well in time [\[LINK\]](#).
- In a period of 3 months, formulated a novel method to predict heart and brain diseases timely, amalgamating benefits of conventional algorithms like Hilbert transform, Sinusoidal decomposition, Mattner method, Short-time Fourier transform etc.
- Performed mathematical analysis and took a comparative study of the novel method against the conventional methods available using various well-known Signal Processing algorithms. A 16% of efficiency improvement was observed by the novel method.

## Indian Institute of Technology (IIT) Delhi

Delhi, India

Indian Academy of Sciences Research Fellow | Advisor: Prof. Subrat Kar

May 2016 - Aug 2016

- Tourist Assistance System to help geo-locate the tourists and assist them in the remote areas, devoid of any Mobile communication [\[LINK\]](#).
- Made a prototype with a bluetooth enabled system and a Mobile App interface to evaluate the last available coordinates of the user and through data-analysis, find the most probable radius, where the user may be found.
- Awarded with 'The Best Intern Project' award in the internship.

## ACADEMIC PROJECTS

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### Real Time Smart Honking System

June 2016 – Apr 2018

- Created a prototype for a disincentive measure to control unnecessary honking on roads. Realised a system to produce a low beep sound in front treading vehicles in a span of 120°. Priority RF signals intimation for emergency vehicles.
- Conducted a study on Delhi roads which found the system to reduce the effective noise pollution by 65%
- Integrated with traffic control system, permitting the emergency to reach the desired destination without wasting time in the traffic.
- Got awarded as Most Innovative Project HP 2016 from Himachal Pradesh Government and received funding to file patent [\[Patent\]](#).

### SISO and MIMO System Model Reduction using heuristic algorithms

May 2018 – May 2020

- Applied various heuristic algorithms like Genetic Algorithm, PSO and Luus Jakola to reduce complexities of MIMO and SISO Models. [\[LINK\]](#).
- Implemented AGTM (Approximate Generalised Time Moments) method wherein the responses were matched at different time instants to achieve the reduced system.
- Devised a new method, Ensemble Framework for Optimized System (EFOS), resulting into a reduced system with better performance as compared to conventional techniques
- Designed a Digital controller with reduced complexity using EFOS method

### IoT Enabled Smart Wearable Device

Apr 2016 – Mar 2017

- Smart Wearable assisting in daily activities and in emergency situations [\[LINK\]](#).
- Employed Sensors, cloud infrastructure, Mobile app and worked on ARM architecture

## TECHNICAL SKILLS

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**Languages:** C, C++, MATLAB, Python, Embedded C, SQL, Latex

**Concepts:** Data Structure and Algorithms, Wireless Communication Systems, Cellular Communication, NR5G, Modem Communication

**Frameworks:** PyTorch, Perforce, Node.js, Jenkins, Qualcomm Tools

**Developer Tools:** Git, Docker, Visual Studio, JIRA, PyCharm, Eclipse

**Libraries:** NumPy, Matplotlib, Pandas, React

## LEADERSHIP AND AWARDS

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- Secured 2nd rank Nationwide at ADCOM ARM Design Contest 2015: Competed with 650+ teams from universities and industry across India. Got appreciation from the Governor of Himachal Pradesh [\[AWARD\]](#).
- DAAD-WISE Fellowship 2017: Given to top-100 meritorious students across India, accorded by the German government and EU to undertake research internship in Germany.
- Indian Academy of Sciences Research Fellowship 2016: Amongst Top 200 students to undertake research internship in premier institutes in India. Got selected at IIT Delhi (Only 4 applicants)
- SJVN Merit Scholarship 2014-2018: Accorded to 35 students who have topped in Senior Secondary examination across 5 Indian states. Received a full four-year scholarship for undergraduate studies.
- Founder and First President, Innovative Research Incubation Club (IRIC), NIT Hamirpur: Launched and led the official incubation center of NIT Hamirpur, securing sponsorship from the Government of India and DST. Achieved funding for 3 projects from the Chief Minister Startup Fund within the first 6 months.
- First Student Chair, IEEE Student Branch NIT Hamirpur
- Student Representative: ECE Departmental Under-Graduate Committee (DUGC): Acted as a key liaison for the 2014 ECE batch, effectively mediating and resolving critical issues between students and the administration.
- President, Society of Promotions of Electronics Culture (SPEC): Led the technical team of the ECE department at college level, organizing and executing SPECfest, and earning recognition as the best team for three consecutive years.