

Sarvendranath Rimalapudi

OBJECTIVE	To provide an effective learning environment and do best in class research in an academic community. And to mentor young minds to achieve their goals.	
ACADEMIC PROFILE	Indian Institute of Science (IISc), Bangalore Ph.D., ECE dept. Adviser: Prof. Neelesh B. Mehta	2016 - 2020 CGPA: 10/10
	Indian Institute of Science (IISc), Bangalore M.E. Telecommunications, ECE dept.	2010 - 2012 CGPA: 7.2/8
	National Institute of Technology Karnataka (NITK), Surathkal B.Tech., Electrical and Electronics Engineering	2005 - 2009 CGPA: 8.15/10
RESEARCH INTERESTS	Practical devices <ul style="list-style-type: none">• Mixed reality based devices to help people with low vision• Devices for virtual reality (VR) 360 video multicast systems Next-generation wireless communication systems <ul style="list-style-type: none">• Distributed massive MIMO with cell-free networking• Intelligent reflecting surfaces and Symbiotic radio• Machine learning for wireless communication• Spectrum sharing techniques that efficiently address spectrum shortage• Low complexity multiple antenna diversity techniques	
ACHIEVEMENTS	<ul style="list-style-type: none">• Finalist of Qualcomm Innovation Fellowship 2019 India.• Recipient of Kaikini PhD grant 2017 awarded to one student among all the engineering departments in IISc.• Secured 99.98th percentile in GATE 2010 attended by 1,04,000 candidates.• Secured 99.40th percentile in AIEEE 2005 attended by 4,36,048 candidates.• Secured 1st place in international online MATLAB contest during ENGINEER 2009, a techfest at NITK, Surathkal.• Secured 9th place in national level online MATLAB contest during SHAASTRA 2007 conducted by IIT Madras.	
TEACHING EXPERIENCE	Supervisor for TSKS23 Signal Processing, Communication and Networking project course in 2021 Teaching assistant for TSBB08 Digital image processing course in 2021 Teaching assistant for the Foundations of Machine Learning course in 2019. Teaching assistant for the Digital Communications course in 2017. Worked as a tutor for special classes of 1st year SC/ST students in 2007.	

RESEARCH
EXPERIENCE

Linköping University, Linköping, Sweden

Postdoc with Prof. Erik G. Larsson

Jan. 2021 - Present

Operational lead for REsiliEnt INteractive applications through hyper Diversity in Energy Efficient RadioWeaves technology (**REINDEER**) project. Currently working on emerging technology, RadioWeaves, in which a fabric of distributed radio devices and computing resources offer consistent service and scalable network capacity taking advantage of distributed architectures and cell-free networking. It improves coverage and reduces power consumption.

Samsung R & D Institute India – Bangalore (SRI-B)

Research intern

May 2020 - Nov. 2020

- Worked on machine learning algorithms for communication systems.
- Developed optimal antenna selection algorithm for an intelligent reflecting surface aided communication system.
- Developed low-complexity selection algorithms that significantly reduce the number of pilot transmissions with near-optimal performance.

Indian Institute of Science (IISc), Bangalore

Ph.D. candidate

Aug. 2016 - Jul. 2020

Thesis title: **Transmit Antenna Selection in Underlay Spectrum Sharing: Role of Power Adaptation, Interference Constraint, and Channel State Information**

In this thesis, we study the role of power adaptation, interference constraint, and channel state information on the optimal antenna selection at an underlay secondary transmitter.

1. With binary on-off power adaptation:
 - We first developed a novel and symbol error probability optimal antenna selection rule in the presence of a single primary receiver.
 - We then extended it to the multiple primary receivers scenario with partial channel state information.
2. With continuous power adaptation:
 - We first developed a new optimal joint antenna selection and power adaptation rule with instantaneous channel information.
 - We then developed an optimal antenna selection rule with statistical channel information. Here, we showed that the optimal antenna to select is independent of the interference constraint.

In all the above cases, we achieved a one to two orders of magnitude reduction in the symbol error probability over existing ad hoc selection algorithms.

Indian Institute of Science (IISc), Bangalore

Research assistant, Instrumentation dept

Aug. 2009 to Mar. 2010

- Implemented image processing algorithms that process the captured images to measure the angular and binocular deviation of a transparent medium.
- Developed a fully automated system to measure the optical parameters.
- Developed a graphical user interface in Matlab that controls the system (Light source, camera) and generates a detailed report.

INDUSTRIAL EXPERIENCE

BROADCOM Communications, Bangalore

Engineer staff II - Systems design

Mar. 2014 - Jul. 2016

- Designed power efficient transmitter chain for [IEEE 802.11n Wi-Fi](#) systems.
- Achieved 80% reduction in power compared to Bluetooth systems.

Engineer staff I - IC design

Jul. 2012 - Feb. 2014

- Implemented filtering algorithms for 2G/3G/4G multimode cellular radio frequency integrated circuit.
- Implemented envelope tracking algorithm that controls power amplifier supply voltage to improve its efficiency.
- Optimized closed-loop power control algorithm of the 4G modem by reducing hardware multipliers to decrease chip area by 12% and power by 18%.

PROGRAMMING SKILLS

C/C++, MATLAB, Python, Keras, TensorFlow, VHDL, Verilog, System Verilog, L^AT_EX.

APPLICATION SOFTWARE

XILINX, NI Multisim, NI Labview, Code Composer Studio (TI DSP processors), Code Warrior (Motorola DSP Processors).

COURSES DONE AT IISC

Random Processes

Matrix Theory

Digital Communications

Information Theory

Communication Networks

Wireless Networks

Wireless Communications

Next Generation Wireless Systems

Detection and Estimation Theory

Computational Methods of Optimization

Foundations of Machine learning

Machine Learning for Signal Processing

TALKS

- Delivered a talk on “Limited MIMO Feedback in LTE”: A literature survey on limited feedback techniques employed in 4G wireless standard.
- Delivered a talk on “[Intelligent reflecting surfaces for 6G wireless systems](#)” on the occasion of IEEE IISc HKN Founder’s day 2020.

PROFESSIONAL SERVICES

- Reviewed manuscripts in premier journals such as the IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Signal Processing Letters, and IEEE Communications Letters.
- Reviewed several papers in premier international conferences such as ICC, WCNC, VTC, and national conferences such as NCC and SPCOM.

CONFERENCES
ATTENDED

- IEEE International Conference on Communications (ICC) 2021.
- IEEE Global Communications Conference (Globecom) 2017, 2019.
- Wireless Communications and Networking Conference (WCNC) 2020, 2021.
- National Conference on Communications (NCC) 2011, 2018, 2019, 2021.
- Signal Processing and Communications Conference (SPCOM) 2012, 2018.

OTHER
ACTIVITIES

- Involved in organizing NCC 2011, NCC 2019, and SPCOM 2018 conferences.
- Worked as a placement coordinator and interacted with HR representatives during ME in IISc.
- Volunteered in setting up experiments for a children's science exhibition held in Mangalore during BTech.
- An active member of NITK, Surathkal photography club.

PUBLICATIONS Journals:

1. **R. Sarvendranath** and N. B. Mehta, "Antenna selection in interference-constrained underlay cognitive radios: SEP-optimal rule and performance benchmarking," *IEEE Trans. Commun.*, vol. 61, no. 2, pp. 496–506, Feb. 2013.
2. **R. Sarvendranath** and N. B. Mehta, "Antenna selection with power adaptation in interference-constrained cognitive radios," *IEEE Trans. Commun.*, vol. 62, no. 3, pp. 786–796, Mar. 2014.
3. **R. Sarvendranath** and N. B. Mehta, "Transmit antenna selection for interference-outage constrained underlay CR," *IEEE Trans. Commun.*, vol. 66, no. 9, pp. 3772–3783, Sep. 2018.
4. **R. Sarvendranath** and N. B. Mehta, "Impact of multiple primaries and partial CSI on transmit antenna selection for interference-outage constrained underlay CR," *IEEE Trans. Wireless Commun.*, vol. 18, no. 2, pp. 942–953, Feb. 2019.
5. **R. Sarvendranath** and N. B. Mehta, "Exploiting power adaptation with transmit antenna selection for interference-outage constrained underlay spectrum sharing," *IEEE Trans. Commun.*, vol. 68, no. 1, pp. 480–492, Jan. 2020.
6. **R. Sarvendranath** and N. B. Mehta, "Statistical CSI Driven Transmit Antenna Selection and Power Adaptation in Underlay Spectrum Sharing Systems," *IEEE Trans. Commun.*, vol. 69, no. 5, pp. 2923–2934, May 2021.

Conferences:

1. **R. Sarvendranath** and N. B. Mehta, "SEP-optimal antenna selection for average interference constrained underlay cognitive radios," in *Proc. Globecom*, Dec. 2012, pp. 2222–2227.

2. **R. Sarvendranath** and N. B. Mehta, “Optimal joint antenna selection and power adaptation in underlay cognitive radios,” in *Proc. WCNC*, Apr. 2013, pp. 3265–3270.
3. **R. Sarvendranath** and N. B. Mehta, “Optimal transmit antenna selection rule for interference-outage constrained underlay CR,” in *Proc. Globecom*, Dec. 2017, pp. 1–6.
4. **R. Sarvendranath** and N. B. Mehta, “Optimal joint antenna selection and power adaptation for underlay spectrum sharing,” in *Proc. Globecom*, Dec. 2019, pp. 1–6.
5. **R. Sarvendranath** and N. B. Mehta, “Optimal antenna selection and power adaptation for underlay spectrum sharing with statistical CSI,” in *Proc. WCNC*, Apr. 2020, pp. 1–6.
6. P. Das and **R. Sarvendranath**, “Optimal Relay and Antenna Selection in MIMO Cognitive Relay Network with Imperfect CSI,” in *Proc. WCNC*, Apr. 2020, pp. 1–6.
7. **R. Sarvendranath** and A. K. R. Chavva, “Low-Complexity Joint Antenna Selection and Beamforming for an IRS Assisted System,” in *Proc. WCNC*, Apr. 2021, pp. 1–6.
8. U. K. Ganesan, **R. Sarvendranath**, and E. G. Larsson “BeamSync: Over-The-Air Carrier Synchronization in Distributed RadioWeaves,” Accepted in Workshop on Smart Antennas (WSA), 2021.
 - (a) Z. H. Shaik, **R. Sarvendranath**, and E. G. Larsson “Energy-Efficient Power Allocation for an Underlay Spectrum Sharing RadioWeaves Network,” Accepted in ICC 2022.

Under review

1. **R. Sarvendranath**, A. K. R. Chavva, and E. G. Larsson “Optimal Antenna Selection and Beamforming for an IRS Assisted System,” under review in *IEEE Trans. Wireless Commun.*, 2021