

Dr. Ugrasen Singh

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Google Scholar Profile



EDUCATION	Doctor of Philosophy (Ph.D.)	July 2018 - August 2022
	• Institute: Indian Institute of Technology Delhi, India • Department: Bharti School of Telecommunication Technology and Management • Thesis: Design and Performance Evaluation of Space Modulation Techniques • Advisor: Prof. Manav R. Bhatnagar • CPI: 7.7/10	
	Master of Technology (M.Tech.)	July 2016 - June 2018
	• Institute: Indian Institute of Technology Indore, India • Department: Electrical Engineering • Specialization: Communication and Signal Processing • Thesis: Analysis and Design of Wireless Two-Way Relay Network with Energy Harvesting • Advisor: Prof. Prabhat Kumar Upadhyay • CPI: 8.9/10	
	Bachelor of Engineering (B.E.)	July 2011 - Jun 2015
	• University: Rajiv Gandhi Proudyogiki Vishwavidyalaya Bhopal, MP, India • Branch: Electronics and Communications Engineering • CPI: 7.2/10	
	Intermediate (XII)	July 2009 - May 2010
	• School: Govt. Higher Secondary School No. 2 Chhatarpur, MP, India • Board: MPBSE Bhopal • Subjects: Mathematics, Physics, Chemistry, English, Hindi • Aggregate Percentage: 79.4%	
RESEARCH INTERESTS	• Ultra-Reliable and Low-Latency Communication • Non-orthogonal Multiplexing • Machine Learning • Spatial Modulation • Reconfigurable Intelligent Surfaces • Joint Sensing and Communication	
PROFESSIONAL MEMBERSHIPS	• Student Member, IEEE • IEEE Communications Society • IEEE Young Professionals	

ACADEMIC EXPERIENCE

Indian Institute of Technology Dhanbad, Jharkhad, India
Assistant Professor January 2025 to Present

Aalto University Helsinki, Finland

Postdoc Research Fellow 1 January 2023–30 December 2024

- Investigated selected research problems in ultra-reliable and low-latency communication (URLLC) to enable the automation and control of wireless mission-critical services such as industry automation, remote surgery, unmanned vehicles, etc.
- Robust link-adaptation method is presented to guarantee the link-reliability against the changing channel conditions and interference using the analytical tool. Resource scheduling among the uncoordinated subnetworks is performed according to the distributed multi-agent deep reinforcement learning approach.
- Recipient of Early-Doc fellowship from Industrial Research and Development unit IIT Delhi, for three months from 25/08/2022 to 25/11/2022

Visiting Researcher 15 May 2022–14 August 2022

- Environmental optimization for 6G networks is performed by deploying reconfigurable intelligent surfaces (RIS) in the propagation environment of radio waves. Performance analysis for STAR-RIS assisted wireless network for down-link NOMA transmission is performed.

Indian Institute of Technology, Delhi

Early Doc Fellow 25 August 2022–25 November 2022

Teaching Assistant, Department of Electrical Engineering, IIT Delhi 2020 - 2022

- Tutor: ELL 725, MIMO Wireless Communication
- Tutor: ELL 714, Information Theory
- Lab Instructor: ELL 411, Digital Communication Lab

Teaching Assistant, Department of Electrical Engineering, IIT Indore 2016 - 2018

- Lab Instructor: Basic Electrical Engineering Lab

MENTORING

M.Tech. Project

- Student: Akash Bhoj, July 2020 - December 2020
Project Title: Performance analysis of RIS-enabled quadrature spatial modulation
- Student: Karthik Korada, July 2021 - May 2022
Project Title: Performance analysis of RIS-based successive coded space shift keying

JOURNAL PUBLICATIONS

1. **U. Singh**, M. R. Bhatnagar, and T. A. Tsiftsis, "Feedback-Based SSK modulation: constellation design and performance results," *IEEE Trans. Commun.*, vol. 68, no. 11, pp. 6902–6917, Nov. 2020.
2. **U. Singh**, M. R. Bhatnagar, and T. A. Tsiftsis, "Secrecy analysis of SSK modulation: adaptive antenna mapping and performance results," *IEEE Trans.*

Wireless Commun., vol. 20, no. 7, pp. 4614–4630, Jul. 2021.

3. **U. Singh** and M. R. Bhatnagar, “Secrecy analysis for spatial modulation: transmission scheme and performance evaluation,” *IEEE Commun. Lett.*, vol. 26, no. 1, pp. 35–39, Jan. 2022.
4. **U. Singh**, M. R. Bhatnagar, and J. Nebhen, “Quadrature spatial modulation-assisted full-duplex communication,” *IEEE Wireless Commun. Lett.*, vol. 10, no. 12, pp. 2629–2633, Dec. 2021.
5. **U. Singh**, M. R. Bhatnagar, and A. Bansal, “RIS-assisted SSK modulation: reflection phase modulation and performance analysis,” *IEEE Commun. Lett.*, vol. 26, no. 5, pp. 1012–1016, May. 2022.
6. **U. Singh**, H.A.-Tous, O. Tirkkonen, and M. R. Bhatnagar, “Performance Analysis of the STAR-RIS-Assisted Downlink NOMA Communication System,” *IEEE Commun. Lett.*, May. 2023.
7. **U. Singh** and O. Tirkkonen, “Robust link-adaptation in multiantenna URLLC systems with flashlight interference,” *IEEE Commun. Lett.*, August 2024.

CONFERENCE PUBLICATIONS

1. A. Srinivasan, **U. Singh**, and O. Tirkkonen, “Multi-agent reinforcement learning approach scheduling for in-X subnetworks ,” in *Proc. IEEE VTC*, Washington DC, USA, Oct. 2024.
2. **U. Singh** and O. Tirkkonen, “Link adaptation for downlink MIMO URLLC transmission,” in *Proc. IEEE WCNC*, April 2024, pp. 1–6.
3. H. Raj, **U. Singh**, and B. R. Manoj, “On the Performance of IRS-Assisted SSK and RPM over Rician Fading Channels,” in *Proc. IEEE VTC-Spring*, Jun. 2024, pp. 1–5.
4. **U. Singh** and M. R. Bhatnagar, “Partially informed transmitter-based space shift keying,” in *Proc. IEEE Annu. Int. Symp. Pers. Ind. Mobile Radio Commun. (PIMRC)*, Istanbul, Turkey, Aug 2019, pp. 1–7.
5. **U. Singh** and M. R. Bhatnagar, “Secrecy performance analysis of adaptive SSK transmission,” in *Proc. IEEE Annu. Int. Symp. Pers. Ind. Mobile Radio Commun. (PIMRC)*, London, U.K (Virtual Conference), Aug. 2020, pp. 1-7.
6. **U. Singh** and M. R. Bhatnagar, “An information transmission scheme for RIS-aided wireless communication network,” published in *Proc. IEEE Int. Conf. on Sig. Proc. and Commun. (SPCom)*, Bangalore, India, July 2022.
7. D. S. Gurjar, **U. Singh**, and P. K. Upadhyay, “Energy harvesting in hybrid two-way relaying with direct link under Nakagami- m fading,” in *Proc. IEEE Wirel. Commun. Net. Conf. (WCNC)*, Barcelona, Spain, April. 2018, pp. 1-6.
8. **U. Singh**, S. Solanki, D. S. Gurjar, P. K. Upadhyay, and D. B. da Costa, “Wireless power transfer in two-way AF relaying with maximal-ratio combining under Nakagami- m fading,” in *Proc. IEEE Int. Wirel. Commun. Mob. Comp. Conf. (IWCMC)*, Cyprus, Jun. 2018, pp. 169–173.

PEER REVIEWER

- IEEE Transactions on Communication
- IEEE Transactions on Wireless Communication
- IEEE Transactions on Vehicular Technology
- IEEE Wireless Communications Letters
- IEEE GLOBECOM, IEEE WCNC

**SOFTWARE
SKILLS**

- C, C++, Python
- MATLAB, MATHEMATICA, PyCharm
- L^AT_EX, Word, Power Point

**CORE
TECHNICAL
SKILLS**

- Probability and Random Variable, MIMO Wireless Communication, Signal and System, Information Theory, Analog and Digital Communication, Machine Learning

**ANALYTICAL
TOOLS**

- Mathematics, Signal Processing, Linear Algebra, Calculus, Optimization

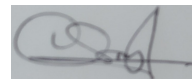
**AWARDS AND
HONOURS**

- Received “India-Finnish Consortia for Research and Education Fellowship” for the project “Environment optimization for 6G using RIS” from the Finnish Ministry of Education from 15/05/2022 to 13/08/2022.
- Received “International Travel Grant (STG)” from Industrial Research and Development unit IIT Delhi for attending IEEE PIMRC Conference, Istanbul, Turkey, Aug 2019.
- Received “Teaching Assistant Fellowship” for PhD from the Ministry of Education, Government of India.
- Qualified Graduate Aptitude Test in Engineering (GATE)-2016 with All India Rank (AIR)-1056 and 99.3 percentile.
- Second winner of 6 KM log race in “Intra IIT Tournament” organized by IIT Delhi in 2021.

**PROFESSIONAL
REFERENCES**

- Dr. Manav R. Bhatnagar (Ph.D. Supervisor)
Professor, Department of Electrical Engineering
Indian Institute of Technology Delhi
Address: Hauz Khas, IN-110016 New Delhi, India
Phone: +91-11-26597251
Email: manav@ee.iitd.ac.in
- Dr. Prabhat Kumar Upadhyay (M.Tech. Supervisor)
Professor, Department of Electrical Engineering
Indian Institute of Technology Indore
Address: Pod 1A-312, Silicon Building, IIT Indore, Simrol, Khandwa Road, Indore-453 552 Madhya Pradesh, India
Phone: +91-731-660-3271
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- Dr. Olav Tirkkonen (Research Visit Instructor)
Professor, Department of Communication and Networking
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I, hereby, declare that all the above given information is correctly entertained up to my knowledge.



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