Ish Kumar Jain

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Research Vision

My research focuses on advancing next-generation networks by optimizing spectrum resources to achieve high data rates, reliability, scalability, and practical deployments. I have particularly contributed in three areas:

- **Communication:** Develop innovative beamforming techniques (e.g., constructive multi-beams) to enhance reliable and scalable communication, particularly for mobile multi-user millimeter-wave networks.
- **Sensing:** Explore novel applications in wireless sensing, such as localization and tracking, leveraging existing infrastructure.
- **Security:** Investigate and mitigate security vulnerabilities (e.g., spoofing, jamming attacks) on wireless devices.

Education

2018 - 2024 **University of California San Diego**, *CA*.
PhD, Electrical and Computer Engineering, *GPA: 4.0*
Advisor: Prof. Dinesh Bharadia

2016 - 2018 **New York University, Tandon School of Engineering**, *NY*.
MS, Electrical and Computer Engineering, *GPA: 3.96*
Advisor: Prof. Shiv Panwar

2012 - 2016 **Indian Institute of Technology (IIT Kanpur)**, *India*.
Bachelors of Technology (B.Tech.), Electrical Engineering, *GPA: 9.5 (out of 10)*

Professional Experience

June–Sep 2022 **VMware**, *Palo Alto, CA, USA*.
Mentor: Dr. Rakesh Misra
- Designed and patented a near-real-time application (xApps) with VMware RIC in Open-RAN framework.

June–Aug 2017 **Nokia Bell Labs**, *Murray Hill, NJ, USA*.
Mentor: Dr. Özge Kaya
- Developed a Reinforcement Learning-based beam management scheme for mobile mmWave links, demonstrating 60% efficiency improvement over a baseline on a real-world mobility dataset.

Awards and Honors

- Best Poster Runner-up, Hotmobile 2023.
- VMware intern achievement award with $240,000 research grant 2022–23.
- Qualcomm Innovation Fellowship winner $100,000 research grant 2022–23.
- Winner of 3-minute research talk competition at ACM Mobisys'20, Mobicom'21, Mobicom'22.
- Commencement award for the best graduate student service in ECE, UC San Diego, May 2021.
- Commencement award for the best MS Academic Achievement in ECE, New York University, May 2019.
- Commencement award (Motorola Gold Medalist) for the best all-round performance in Electrical Engineering and Computer Science, IIT Kanpur, May 2016.
- Travel grant for MobiCom New Delhi 2018, Hotmobile CA 2023, Infocom NY 2023.
- Samuel Morse MS Fellowship ($100,000 financial support), New York University, 2016–2018.
- Secured All India Rank 390 (amongst 0.5 million students) in IIT–Joint Entrance Exam 2012.

Publications

Under Submission CommRad: Collaborative Learning for Sensing-Driven mmWave Networks
IK Jain, Suriyaa MM, D Bharadia

Hotmobile 2024 BeamArmor: Anti-Jamming in 5G Cellular Networks with MIMO Null-steering
F Zumegen, **IK Jain**, D Bharadia (to appear)

IEEE Infocom 2023 mmFlexible: Flexible Directional Frequency Multiplexing for Multi-user mmWave Networks
IK Jain, RR Vennam, R Subbaraman, D Bharadia – Media coverage

IEEE S&P 2023	mmSpoof: Resilient Spoofing of Automotive Millimeter-wave Radars using Reflect Array *IEEE Security and Privacy 2023.* RR Vennam, **IK Jain**, K Bansal, J Orozco, P Shukla, A Ranganathan, D Bharadia – Media coverage
WPMC 2022	VRProj: Delivering 360-degree video with Viewport-adaptive Truncation *International Symposium on Wireless Personal Multimedia Communications (WPMC) 2022.* T Qiu, **IK Jain**, R Wu, P Cosman, D Bharadia
HotCarbon 2022	Multiple smaller base stations are greener than a single powerful one: Densification of Wireless Cellular Networks, *ACM HotCarbon Workshop 2022* A Gupta, **IK Jain**, D Bharadia
SIGCOMM 2021	[mmReliable] Two beams are better than one: Towards Reliable and High Throughput mmWave Links **IK Jain**, R Subbaraman, D Bharadia – Media coverage
ACM mmNets 2020	mMobile: Building a mmWave Testbed to Evaluate and Address Mobility Effects *4th ACM Workshop on Millimeter-Wave Networks and Sensing Systems (Mobicom Workshop)*, 2020. **IK Jain**, R Subbaraman, TH Sadarahalli, X Shao, H Lin, D Bharadia
Usenix NSDI 2020	LocAP: Autonomous Millimeter Accurate Mapping of WiFi Infrastructure R Ayyalasomayajula, A Arun, C Wu, S Rajagopalan, S Ganesaraman, A Seetharaman, **IK Jain**, D Bharadia
MDPI Journal 2019	Extreme Multiclass Classification Criteria, *MDPI Computation Journal*, 2019. A Choromanska, **IK Jain**
IEEE JSAC 2018	The Impact of Mobile Blockers on Millimeter Wave Cellular Systems *IEEE Journal on selected areas in communications (JSAC)*, 2018 **IK Jain**, R Kumar, S Panwar
IEEE ITC 2018	Driven by Capacity or Blockage? A Millimeter-wave Blockage Analysis *IEEE International Teletraffic Congress (ITC) 2018* **IK Jain**, R Kumar, S Panwar – Invited paper

Posters/ Demos

Milcom 2023	[Demo] BeamArmor: Anti-Jamming System in Cellular Networks with srsRAN Software Radios F Zumegen, **IK Jain**, D Bharadia
Mobicom 2023	[Demo] A Compact and Real-Time Millimeter-wave Experiment Framework with True Mobility Capabilities **IK Jain**, S MM, D Bharadia
Hotmobile 2023	[Poster] Delay Phased Arrays: Towards programmable beam-bandwidth for 5G networks **IK Jain**, RR Vennam, D Bharadia – Best Poster Runner-up
Mobicom S3 2021	Demo and dataset for mmWave multi-beam tracking using mMobile 28 GHz testbed **IK Jain**, R Subbaraman, D Bharadia
MobiCom 2018	[Poster] Facilitating Low Latency and Reliable VR over Heterogeneous Wireless Networks A Ravichandran, **IK Jain**, R Hegazy, T Wei, D Bharadia

Selected Patents

US Patent (provisional)	A platform for xApp development with RAN intelligent controller R Misra, **IK Jain**, et al., inventors from VMware.
US Patent (granted)	Enabling Reliable Mmwave Link Using Multi-Beam Pro-Active Tracking. D Bharadia, **IK Jain**, R Subbaraman, T Sadarahalli
US Patent (granted)	Enable Indoor Navigation with Context assisted Localization D Bharadia, R Ayyalasomayajula, A Arun, C Wu, S Rajagopalan, S Ganesaraman, A Seetharaman, **IK Jain**

Teaching and Mentoring Experience

Teaching Assistant.

WI 2021,23	ECE 257B- Modern Wireless Communication (Graduate) – best TA 10/10 rating.
Spring 2020	ECE 157B- Communication and Sensing Systems (Undergraduate) – helped design a new class.
Spring 2018	EEGY 9123- Introduction to Machine Learning (Graduate).
Fall 2017	EEUY 4563- Introduction to Machine Learning (Undergraduate) – helped design a new class.
Spring 2017	ELGY 6373- Internet Architecture and Protocols Lab (Graduate).

Mentorship, I mentored three PhD students and eight BS/MS students at UC San Diego. I have mentored historically underrepresented and underprivileged students.

Leadership

2021–2022 The Marconi Society, *Scholar in Residence*.
Served as a student scholar for facilitating the Marconi Society meetings with the chair Vint Cerf and other prominent scientists, engineers, and policymakers.

2021–2022 Escribamos Ciencia K12 team, *UC San Diego*.
Developed interesting science modules and videos for K12 students on topics such as electricity, internet, nuclear power, etc., under guidance of Prof. Olivia Graeve.

2020–2022 Jacobs Undergraduate Mentorship Program, *UC San Diego*.
Mentored underprivileged students through lab tours, industry talks, panel discussions, technical workshops, etc., and bridged the communication gap between undergraduates and graduate students.

2020–2021 O.W.L Reading group, *Inter-continental collaboration*.
Founded in Fall 2020 as a small group of Ph.D. students interested in research talks and discussion on recent conference papers and has grown over 100+ members in a year.

2019–2021 Vice President, ECE graduate student council, *UC San Diego*.
Responsible for providing communication between ECE students and the ECE department and organizing seminars and student mentorship programs.

Services

2023 Co-chair.
ACM Mobicom S3 Workshop 2023, co-chair
ACM Mobicom mmNets 2023, publicity chair

2021–2022 Technical Program Committee (TPC).
ACM Mobicom S3 Workshop 2021
IEEE WCNC 2022

2019–2023 Artifact Evaluation Committee (AEC).
ACM Sigcomm 2023
ACM Mobicom 2023
ACM CoNEXT 2019

2019–2023 Technical Reviews.
IEEE Transactions on Communications (TCOM) 2023
IEEE Transactions Vehicular Technology (TVT) 2019-23
IEEE/ACM Transactions on Networking (TNET) 2023
IEEE Access 2021-23
IEEE Comm Letter 2022-23
IEEE JSAC 2023
IEEE WCNC 2022-23

2021–2022 Lead organizer and moderator.
Sigcomm'21 Social Trivia Organizer
COMSNETS'22 Panel Moderator