Ish Kumar Jain

Assistant Professor
Electrical, Computer, and Systems Engineering
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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, tracking, and sensing-driven communication.
○ **Security:** Investigate and mitigate security vulnerabilities (e.g., spoofing, jamming attacks) on wireless devices.

Professional Experience

Aug 2024 – present
Assistant Professor, *Rensselaer Polytechnic Institute (RPI)*, Albany, NY, USA.
Department of Electrical, Computer, and Systems Engineering
○ Established a new wireless lab at RPI that focuses on "theory meets systems" research for building the next generation of wireless networks for communication, sensing, and security.

June–Dec 2022
Research Intern, *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
Research Intern, *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.

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)*

Awards and Honors

○ Best Thesis Presentation, ITA (Information Theory Workshop), San Diego, 2024.
○ 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.
○ Marconi Society Scholar in Residence grant $5000 (sole recipient) 2021–22.
○ Winner of 3-minute Thesis Award 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 Review   FlexLink: Decoupling Control and Data Communication in mmWave Networks
IK Jain, D Bharadia   (Under review at ACM Sigcomm 2024)

Under Review   CommRad: Collaborative Learning for Sensing-Driven mmWave Networks
IK Jain, Suriyaa MM, D Bharadia   (Under review at ACM Sigcomm 2024)

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

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

Hotmobile 2024   [Poster] Tiny-twin: A Lightweight and Verifiable Digital Twin for NextG Cellular Networks
U Ghosh, **IK Jain**, S Shakkottai, D Bharadia

Hotmobile 2024   [Demo] Practical, Real-Time MIMO Apps with Programmable RAN Controller
F Zumegen, **IK Jain**, D Bharadia

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

Patents

US Patent (provisional)	Collaborative Learning for Sensing-Driven Millimeter-wave Networks D Bharadia, **IK Jain**, et al.
US Patent (provisional)	Method and Apparatus for Resilient Spoofing of Automotive Radars D Bharadia, **IK Jain**, et al.
US Patent (provisional)	Directional Frequency Multiplexing in Multi-User Millimeter-wave Networks D Bharadia, **IK Jain**, et al.
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, **IK Jain** C Wu, S Rajagopalan, S Ganesaraman, A Seetharaman

Teaching and Mentoring Experience

Teaching Assistant.

WI 2021,23	ECE 257B- Modern Wireless Communication (Graduate) – Best TA 10/10 rating [Link to class evaluations]
Spring 2020	ECE 157B- Wireless Sensing Systems (Undergraduate) – Helped design a new class [Link to my notes]
Spring 2018	EEGY 9123- Introduction to Machine Learning (Graduate)
Fall 2017	EEUY 4563- Introduction to Machine Learning (Undergraduate) – Helped design a new class[Link to class exercises]
Spring 2017	ELGY 6373- Internet Architecture and Protocols Lab (Graduate)

Mentorship Experience, I have mentored historically underrepresented and underprivileged students.

2022-23	Rohith Reddy (UCSD PhD)
2019-21	Tian Qiu (UCSD PhD)
2023-24	Ushasi Ghosh (UCSD PhD)
2023-24	Mohamed Waeel (UCSD PhD)
2022-24	Suriyaa MM (UCSD MS → Apple)
2021-23	Joshua Orozco (UCSD MS → TrellisWare Technologies)
2021-23	Puja Shukla (UCSD MS → Marvel Technology)
2020-22	Xiangwei Shao (UCSD MS → Huawei)
2020-22	Weginbara (Michael) Youpele (UCSD MS → Naval Surface Warfare Center)
2019-21	Hou-Wei Lin (UCSD MS → Amazon)
2018-20	Tejas Sadarahalli (UCSD MS → Qualcomm)
2019-21	Raini Wu (UCSD BS → UCSD PhD)

Invited Talks

University and Industry Talks.

Mar 2024	University of Texas, Austin, TX
Mar 2024	Rensselaer Polytechnic Institute, Troy, NY
Nov 2023	IMDEA Network Institute, Madrid, Spain

Aug 2023	Qualcomm Innovation Fellowship talk, San Diego, CA
Jul 2023	Indian Institute of Science, Bangalore, India
Jun 2023	Indian Institute of Technology Kanpur, India
Jun 2023	Carnegie Mellon University, Pittsburgh, PA
May 2023	Princeton University, NJ
May 2023	New York University, NY
Apr 2023	University of Washington, Seattle, WA
Sep 2022	VMware invited talk, Palo Alto, CA
Jun 2022	University of Colorado, Denver, CO

Conference Talks.

Mar 2024	Hotmobile 2024, San Diego, CA
Mar 2024	ITA–Information Theory Workshop 2024, San Diego, CA – Best Presentation Award
Nov 2023	Mobicom mmNets 2023, Madrid, Spain
May 2023	Infocom 2023, New York City, NY
Aug 2021	Mobicom Workshop 2022, virtual – Best 3-minute Thesis Award
Aug 2021	Mobicom Workshop 2021, New Orleans, LA – Best 3-minute Thesis Award
Aug 2021	Sigcomm 2021, virtual
Aug 2021	Mobisys Workshop 2020, virtual – Best 3-minute Thesis Award
Aug 2020	Mobicom mmNets 2020, virtual

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 the 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 to 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 Open-AI-RAN Workshop 2024, publicity chair
ACM Mobicom S3 Workshop 2023, co-chair
ACM Mobicom mmNets 2023, publicity chair

2021–2022 **Technical Program Committee (TPC)**.
ACM Mobicom 2025
IEEE MSN 2024
ACM Mobicom S3 Workshop 2021
IEEE WCNC 2022

2019–2023 **Artifact Evaluation Committee (AEC)**.
ACM Mobicom 2024
ACM Sigcomm 2023
ACM Mobicom 2023
ACM CoNEXT 2019

2019–2023   **Technical Reviews**.

      IEEE ISIT 2024
      IEEE Transactions on Mobile Computing (TMC) 2024
      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