Anuj Kumar Sharma

D.O.B: 15/07/1984

Assistant Professor | Wireless Communication | RF & Microwave Engineering | Antenna Design | MIMO Systems| Embedded System|Robotics Engineering | Drone Technology | Quantum Computing

Email: anujsharma@gkv.ac.in | Phone: +91-9027487036 | Location: Roorkee, Uttarakhand, India.

Professional Summary

Experienced academician and researcher with over 15 years in teaching and research in RF, Microwave, and Wireless Communication. Specializing in embedded system design with Arduino, ESP, Raspberry Pi, PIC, STM32 microcontroller, fractal and MIMO antenna design, metamaterials, and modern communication systems. Authored multiple SCOPUS/SCI-indexed publications and holds patents across India, Australia, and South Africa. Proficient in simulation tools (HFSS, CST, Qiskit) and programming (C, C++, Python). NQM(National Quantum Mission) QT-6, QT-7 certified. DGCA-certified drone pilot. Proven record in academic leadership, innovation, and technical mentorship.

Research Interests

- MIMO and Massive MIMO Antennas
- Fractal and Metamaterial Antennas
- Wireless & Satellite Communication
- OFDM
- Drone Technology
- Antenna Array and Embedded Design(Arduino, ESP, Raspberry Pi, PIC , STM32)
- Robotics Engineering
- Quantum Computing, Quantum Gates, Quantum Algorithms

Education

PG Diploma in Robotics Engineering, IIT BHU Varanasi, 2025.

Ph.D. in Electronics and Communication Engineering, Gurukul Kangri (Deemed to be University), Haridwar, 2025. **Thesis Title:** Design and Development of Wideband Fractal Array Antenna Using Metamaterial for Upcoming Wireless Technologies.

M.Tech in Electronics & Communication Engineering, National Institute of Technology (NIT) Jalandhar, 2010. **Thesis Title**: Phase Noise compensation in OFDM based Communication System.

B.Tech in Electronics & Communication Engineering, Gurukul Kangri Deemed to be University, 2008.

B.Sc. in Physics, chemistry, mathematics, HNB Garhwal Central University, 2003.

Professional Experience

Assistant Professor (Level-11), FET, GKV, Haridwar | Dec 2015 – Present **| Regular**

Assistant Professor (Level-10), GKV, Haridwar | 29(Afternoon) July 2012 – Dec 2015 **| Regular**

Assistant Professor (Level-10), GKV, Haridwar | Oct. 2010 – 29(Forenoon) July 2012 **| Contract**

Assistant Professor, RKGIT, Ghaziabad | Aug 2010 – Oct 2010 **| Regular**

Embedded Engineer, Cooper Connection, Delhi | Apr 2010 – Jul 2010 **| Regular**

Technical Skills

- Simulation Tools: HFSS, CST, Matlab, Proteus, Qiskit
- Programming: C, C++, Python, HTML
- Specialized Tools: VHDL, FPGA

Fellowship Received

-AICTE Scholarship (8000 Rs per month) received during M. Tech, (2008-2010)

-Summer Faculty Research Fellowship Received from IIT Delhi, (SFRF-2020), May- July 2020

-AICTE QIP PG Diploma certificate (Advances in Robotics: Processes, Applications, and Technology, organized by IIT BHU) Fellowship received, July-December 2025.

-Idea Hackathon 4.0 accepted and a Grant of 15 Lakh from the Ministry of Micro, Small & Medium Enterprise (MSME), Gov. of India will be received this year.

NPTEL Certifications

- Mechanics and Control of Robotic Manipulators, Centre for Continuing Education, IIT Palakkad.
- Introduction to Quantum Computing: Quantum Algorithms and Qiskit, Centre for Outreach and Digital Education, IIT Madras.

-Mechanism and Robot Kinematics, Centre for Continuing Education, IIT Kharagpur.

Projects and Training

I have undertaken a wide spectrum of academic projects and technical training programs throughout my educational and professional journey. These projects span embedded systems, communication technologies, VHDL-based circuit design, and advanced wireless systems. Each project reflects a progressive enhancement of skills, practical problem-solving, and alignment with modern engineering demands.

1. Exchange Architecture Training at Bharat Heavy Electricals Limited (BHEL)

- **Level:** B.Tech (Industrial Training), 2007
- **Description:** Undertook industrial training at BHEL Haridwar, where I studied and analyzed **telephone exchange architecture**, call routing mechanisms, and switching systems.
- **Learning Outcome:** Gained exposure to large-scale industrial telecom operations and switching system fundamentals.

2. Multiplexer Design Using VHDL and FPGA Implementation

- **Level:** B.Tech (7th Semester Project), 2008
- **Description:** Designed a **multiplexer circuit using VHDL (VLSI Hardware Description Language)** and successfully implemented it on an **FPGA**.
- **Learning Outcome:** Developed proficiency in **digital design, logic synthesis, and programmable logic devices**, forming a strong foundation for VLSI applications.

3. Microcontroller 8051-Based Digital IC Tester

- **Level:** B.Tech (Final Semester Major Project), 2008
- **Description:** Designed and developed a low-cost **digital IC tester** using the **8051 microcontroller**, capable of validating basic logic gates and small-scale ICs.
- **Learning Outcome:** Acquired practical skills in **embedded system design, C programming**, and **microcontroller interfacing**.

4. Phase Noise Compensation in OFDM-Based Communication Systems

- **Level:** M.Tech Dissertation, 2010
- **Description:** Conducted analytical and simulation-based research on **phase noise effects in OFDM systems**, a critical factor in broadband wireless communications. Proposed **compensation algorithms** to mitigate performance degradation.
- **Tools Used:** MATLAB
- **Learning Outcome:** Enhanced understanding of **signal processing, OFDM modulation**, and system-level simulation.

5. Summer Research Project on MIMO, Massive MIMO, and 4G/5G Technologies

- **Institution:** IIT Kanpur | **Duration:** June 20–23, 2017

- **Description:** Participated in a focused training and project-based workshop on **next-generation wireless technologies**, including **MIMO**, **Massive MIMO**, **OFDM**, and **5G architecture**.
- **Learning Outcome:** Developed a strong conceptual and application-oriented understanding of cutting-edge wireless communication paradigms.

6. Ph.D. Research Project: Design and Development of Wideband Fractal Array Antenna Using Metamaterial for Upcoming Wireless Technologies

- **Level:** Doctoral Research Project (2025)
- **Description:** Carried out original research on the design, simulation, fabrication, and analysis of **fractal array antennas** embedded with **metamaterials**, targeted at **C-band and satellite communication applications**.
- **Key Achievements:**
  - Developed multiple prototypes with enhanced bandwidth and isolation
  - Published several **SCOPUS/SCI-indexed journal papers** based on findings
  - Integrated techniques such as **Defected Ground Structure (DGS)**, **Split Ring Resonators (SRR)**, and **Contaminated Ground Surface (CGS)** for performance improvement
- **Tools Used:** HFSS, CST Studio, MATLAB

7. Training in Drone Technology

- **Institution:** CBRI Roorkee | **Duration:** October 12-15, 2025
- **Description:** Participated in a focused **DGCA-certified pilot** training in Drone Technology and understood the **fundamentals of drone technology** and its real-world applications. Operate drones safely under the guidance of Scientists, CBRI Roorkee.
- **Learning Outcome:** Gain hands-on experience with **drone kits and flight operations**, Learn the basics of **sensor integration and data acquisition** using drones, apply drone technology for **building research, construction monitoring, and survey applications**, and demonstrate the ability to follow **regulatory and safety guidelines** in drone operations

Publications (SCOPUS/SCI)

JOURNAL

1. Sharma, Anuj Kumar, Vipul Sharma, and Sanjay Singh. "Design and Fabrication of SRR Loaded Cantor Fractal Slotted DGS Antenna Using Quarter Wave Transformer Fed for Microwave C-Band Communication." Progress In Electromagnetics Research C, 153(2025): 33-43. doi:10.2528/PIERC24110605**.(SCOPUS)**
2. Sharma, Anuj Kumar, Vipul Sharma, and Kamal Kapoor. "Historical Development of Spatial Modulation and Massive MIMO Communication System with Implementation Challenges: A Review." International Journal of Sensors Wireless Communications and Control 11.2 (2021): 207-215. **(SCOPUS)**

3. Sharma, Anuj Kumar, Vipul Sharma, and Sanjay Singh. "A Comprehensive Examination of the Current State of the Art in Fractal Array Antennas." Advances in Systems Science & Applications 23.04 (2023).104-118. **(SCOPUS)**
4. Varshney, Atul, Vipul Sharma, and Anuj Kumar Sharma. "RLC-equivalent Circuit based Stub Loaded 2x2 MIMO Antenna for Wireless Applications." Microwave Review 29.1 (2023). **(SCOPUS)**
5. Sharma, Anuj K., Vipul Sharma, and Sanjay Singh. "Design and Fabrication of Mutually Coupled Feed-Based Cantor Fractal Patch Antenna Array for Satellite Communication." International Journal of Microwave & Optical Technology 20, no. 1 (2025):78-90. **(SCOPUS)**
6. Sharma, Anuj Kumar, Vipul Sharma, and Sanjay Singh. "Design and Fabrication of SRR Loaded Cantor Fractal Slotted DGS Antenna Using Quarter Wave Transformer Fed for Microwave C-Band Communication." Progress In Electromagnetics Research C 153 (2025): 33–43. (SCOPUS)
7. Sharma, Anuj Kumar. "A Fractal Array Antenna: A Review of the State of the Art." European Chemical Bulletin 12.07 (2023): 1460-1474. **(SCOPUS)**
8. Sharma, Anuj Kumar, Vipul Sharma, and Sanjay Singh. "Terahertz Antennas: A Review of Historical Development and Future Design Challenges." Journal for New Zealand Herpetology 12.3(2022):5577-5589. **(SCI)**
9. Raman, R., Sharma, Anuj Kumar. "Design and implementation of a smart traffic management system using Internet of Things (IOT) technology."European Chemical Bulletin 12.05 (2023): 426-434. **(SCOPUS)**
10. Sharma, Anuj Kumar, and Shiv Kumar. "Resource allocation in cognitive radio network using dirty paper coding" International Journal of Computer Application, New York, USA(2012): 28-30, ISBN: 973-93-80868-24-6.
11. Sharma, Anuj Kumar Vipul Sharma and Deepti Kakkar "Throughput improvement of cognitive radio network using orthogonal frequency division multiplexing" International Journal of Advances in Engineering Sciences 01.03(2011): 15-18, ISSN: 2231-2013, e-ISSN:2231-0347.
12. Sharma, Anuj Kumar, Vipul Sharma, and Shiv Kumar. "Adaptive modulation techniques for improving bit error rate performance of cognitive radio network" International Journal of Mobile And Ad hoc Networks (IJMAN); pp. 329- 333, Vol 1, Issue 3, ISSN (Online) 2231:6825, ISSN (Print)2249–202X.

INTERNATIONAL CONFERENCE

1. Sharma, Anuj Kumar, Vipul Sharma, and Deepti Kakkar. "Phase noise compensation in OFDM-based communication system" International Conference on Advanced Computing and Communication Technologies (ACCT 2011); pp 161-165, ISBN: 978-981-08-7932-7.
2. Sharma, Anuj Kumar, Vipul Sharma, and Shiv Kumar. "A review of the cognitive radio network paradigm" International conference on Green Technologies for environmental rehabilitation (GTER-2012); pp-4.
3. Sharma, Anuj Kumar, Vipul Sharma, and Sanjay Singh. "Design and Performance Analysis of CSRR-Loaded High-Gain Multiband Rectangular Microstrip Patch Antenna Array (1x2) for IoT and Wireless Applications." In 2024 IEEE 3rd World Conference on Applied Intelligence and Computing (AIC), pp. 1185-1191.IEEE,2024**.(SCOPUS).**

Books & Book Chapters

1. ***OFDM Communication System*** – A comprehensive book, published by Lambert Academic Publishing, Germany, covering the fundamentals and implementation aspects of OFDM systems. **ISBN-**9783659506291.
2. ***Study about Massive MIMO Communication*** – A detailed book chapter highlighting the evolution, architecture, and challenges of Massive MIMO systems, published in *Techniques and Innovation in Engineering Research*. **ISBN**- 978-93-5547-879-5
3. ***Embedded System*** – A foundational textbook authored independently, offering clear and concise explanations for beginners in microcontroller-based systems. **ISBN**- 978-93-95191-05-0.
4. ***Active and Passive Metamaterials and Metasurfaces*** – A **SCOPUS**-indexed book chapter published by IGI Global, USA, providing an in-depth study of novel metamaterial applications in antenna design. **ISBN-** 9781668482872**.**

Patents

1. **IoT-Based Intelligent Parking Notification System**
   Patent No.: AU 2021102038 | **Country:** Australia | **Status:** Granted
   Date of Grant: 26 May 2021
   Description: This invention provides a smart parking system using RFID and IoT technology to notify users of real-time parking availability, aimed at reducing urban traffic congestion and improving parking efficiency.
2. **Method for Physical Intelligent VLSI Chip Design and Development Technology**
   Patent No.: IN 202111014696 | **Country:** India | **Status:** Published
   Date of Publication: 07 May 2021
   Description: A novel technique for designing and developing intelligent VLSI chips with enhanced data processing capabilities for high-performance embedded systems and AI-based applications.
3. **Additive Manufacturing through Binder Jetting for Biomedical Equipment**
   Patent No. ZA 2022/08579 | **Country:** South Africa | **Status:** Granted
   Date of Grant: 26 October 2022
   Description: This patent proposes a method of additive manufacturing using binder jetting, specifically tailored for biomedical device fabrication, enabling cost-effective and customized healthcare solutions.
4. **Wave Antenna**
   Patent No.: IN 410451-001 | **Country:** India | **Status:** Granted
   Date of Grant: 13 March 2024
   Description: A novel antenna structure optimized for compact design and enhanced gain, suitable for modern wireless and satellite communication systems, including MIMO-based deployments.

FDPs/STCs/Referesher/Orientation (Annexure-1)

I consistently pursued continuous professional development through participation in a wide range of **Faculty Development Programs (FDPs), workshops, and certifications** offered by premier institutes such as **IITs, NITTTRs, UGC-HRDC centers, and professional societies like IEEE**. These programs have enriched his academic expertise,

pedagogical methods, and research capabilities across key areas in electronics, communication, and interdisciplinary engineering. Co-Curricular and Leadership.

Co-Curricular Activities

I actively engaged in a wide range of co-curricular activities that reflect my leadership qualities, commitment to student development, and contribution to the academic community. These activities complement my professional accomplishments and underscore my holistic involvement in institutional growth and student engagement.

1. **Athletic Achievements in Early Education**
   Represented my school at the regional and national levels in athletics.
   Secured **first position in the 800-meter race** at the regional athletic meet held at K.V. ONGC Dehradun (1998) and was selected for the **KVS National Athletic Meet**.
2. **Founder of the Academic Club "ACES"**
   Initiated and established **ACES (Academic Club of Electronics Students)** at the Faculty of Engineering & Technology, Gurukul Kangri University.
   Played a pivotal role as a **founding member and planner**, organizing technical events, workshops, and student mentoring sessions to foster a culture of innovation and academic curiosity.
3. **Workshops and Webinars Organized**
   Organized webinars on cutting-edge topics such as **MOSFET Technology** (June 2020) and **Industrial Automation** (June 2020), enriching the knowledge base of students and faculty during the pandemic.
   Conducted hands-on workshops titled **"First Step Robotics"** in 2013 and 2014, aimed at introducing undergraduate students to embedded systems, robotics, and automation fundamentals.
4. **National and International Conference Contributions**
   Served as a **committee member** in prestigious academic events, including:
   National Symposium on Instrumentation (NSI-39), jointly organized by the Instrument Society of India and IISc Bangalore.
   International Conference on Green Technologies for Environmental Rehabilitation (GTER-2012)
   National Seminar on Innovations and Applications in Engineering & Applied Sciences (IAEAS-2011)
   Contributed to **technical session coordination, publication management**, and event logistics.
5. **GATE Examination Achievements**
   Qualified for the **GATE (Graduate Aptitude Test in Engineering)** examination **three consecutive times**:
   2007 – Percentile: 86
   2008 – Percentile: 90.75
   2009 – Percentile: 87
6. **Student Mentorship and Technical Leadership**
   Actively mentored undergraduate students in academic projects, career guidance, and technical skill development.
   Encouraged participation in technical paper writing, prototype design, and inter-college competitions.

Certifications & FDPs (Annexure-1)

S.No	Course	Duration	Conducted by
1	Antenna and Microwave: learning through experimentation	27- 31 Aug. 2012	NITTTR, Chandigarh
2	DSP using MATLAB	5 – 9 Aug. 2013	NITTTR, Chandigarh
3	Optical Fiber Communication Through ICT	22-26 Sept 2014	NITTTR, Chandigarh
4	UGC-Sponsored Orientation Program	27 Oct- 22 Nov, 2014	University of Rajasthan, Jaipur
5	Application of DSP Using VLSI Architecture	6-10 July 2015	IIT Roorkee
6	Introduction to wireless LAN	10-14 Aug. 2015	NITTTR,Chandigarh
7	Emotional Intelligence	11-15 July 2016	NITTTR Chandigarh
8	UGC- Sponsored Refresher Course	02-23 Dec. 2016	Kumaon University, Nainital, Uttarakhand
9	TEQIP Sponsored STC ON Semiconductor Devices & VLSI Circuits.	25-29 June 2018	G.B. Pant Institute of Engineering &Technology, Pauri, Uttarakhand
10	AICTE Sponsored FDP on Advanced Industrial Technologies	8-13 July, 2019	UTU Dehradun
11	RF and Biomedical	10-14 Feb. 2020	NITTTR Chandigarh
12	Geometry Modeling in HFSS	04 May 2020	IEEE Bangalore Section
13	One Week Online Faculty Development Program on Recent Trends in Signal Processing: Theory and Applications	26-30 August 2020	University College of Engineering & Technology, Bikaner Technical University, Bikaner (TEQIP- III.)
14	Two-Week Online Faculty Development Program on Recent trends in communication, networking, and computing paradigms	7-18 Sept. 2020	University College of Engineering & Technology, Bikaner Technical University, Bikaner

			(TEQIP- III.)
15	One Week online FDP in Technology as a Bridge in Different Domains of Life During COVID-19	19 - 23 October 2020.	B. T. Kumaon Institute of Technology, Dwarahat (Almora) (TEQIP- III.)
16	Two-day workshop on Power System Design Simulation and Analysis using DIgSILENT PowerFactory Software	27- 28 July 2021	M/s DELLSOFT Technologies Pvt. Ltd.
17	Refresher Course in ICT (ID) ONLINE	01-13 August 2022	UGC-HRDC, Sant Gagde Baba Amravati University
18	Cloud Application Development using Red Hat OpenShift	25-29 Sept. 2023	IBM, center of excellence, FET, GK(DU), HARIDWAR
19	Innovative Technologies for smart cities: Iot, AI, and Blockchain	23-23 Feb. 2024	EICT, IIT Roorkee
20	Cybersecurity in AI-based Engineering Systems	16-21 Feb. 2024	EICT, IIT Roorkee
21	Design and Development of High-Frequency Components and Circuits	24-28 June 2024	ECE Dept. National Institute of Technology, Jalandhar
22	Faculty Development Programme on Next-Generation Semiconductor Technology Advancement, Research and Applications	23-27 June 2025	NIT Patna
23	One Week FDP on Artificial Intelligence and Machine Learning	15-19 Sept. 2025	Rajiv Gandhi Central University