

Aakash Bansal (Early Career Researcher)

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1 SUMMARY

A future communications engineer at Satellite Applications Catapult (SAC) and research associate at Loughborough University (LU), I finished my PhD in September 2022. My PhD research was focused on active mmWave beam-steering antenna, dielectric lenses, and metamaterial systems for applications in 5G and beyond. I have extensive experience in RF design, reconfigurable antenna arrays, metamaterials & metasurfaces, RF lenses, microcontrollers, fabrication, and measurement. I have collaborated on several consultancy projects for industries in India and UK. I have 10 journal papers (+ 3 submitted) and presented 5 conference papers and 4 posters. I have won multiple research and outreach awards.

2 WORK EXPERIENCE

❖ Research Associate, Loughborough University, UK <i>Collaborating on several projects focused on antenna design and measurement; consulting on industrial projects and writing new research grant applications; Building open-source kits to promote engineering to schools.</i>	(Apr 19 – Present)
❖ Future Communications Engineer, Satellite Applications Catapult, UK <i>Developed a new Ku-Band beam-steering antenna for One Web satellite handover at ground stations; advised on new technology for applications in satellite communications.</i>	(Oct 22 – Jan 23)
❖ Voluntary Sub-Warden, Telford Hall, Loughborough University, UK <i>Supporting a team of four sub-wardens to create a supporting, enjoyable, stimulating, and safe environment for the 500 student residents of Telford Hall.</i>	(Aug 20 – Dec 22)
❖ Head of Innovation (Voluntary Position), National Indian Students & Alumni Union UK <i>Promoted within a year to Head of Innovation, lead a team of 12 volunteers providing end-to-end query and grievance redressal for students, and volunteer recruitment and lead projects to enable the organisation to leverage technology.</i>	(Jun 19 – Jul 21)
❖ Innovation Coach and Consultant, Connecting Dreams Foundation <i>Responsible for consulting and training of students and faculty under Atal Tinkering Labs on design innovation, introduction to electronics and programming established among 2400 schools throughout India.</i>	(Jul 18 – Feb 19)
❖ Research Associate, CSIR – Central Electronics Engineering Research Institute, Pilani (India) <i>Developed a computationally efficient, integrated, and dynamic model for the design of Staggered Double Vane Slow Wave Structure (SDVSWs) and beam-wave interaction analysis of a planar Traveling Wave Tubes (TWT) with a sheet electron beam to determine its RF performance.</i>	(Jul 17 – Feb 19)

3 EDUCATION

- ❖ **Doctor of Philosophy (Ph.D.)** (2019 – 2022)
Loughborough University, UK
Supervisors: Dr. Chinthana Panagamuwa, Prof. Will Whittow
Dissertation: Active Beam-Steering mmWave Antenna System for 5G and Beyond ([DOI](#))
- ❖ **Bachelor of Technology (B.Tech.): 78.3%, Ranked in top 15 out of 200** (2013 – 2017)
Guru Gobind Singh Indraprastha University, New Delhi (India)
Major: Electronics and Communication Engineering

4 SKILLS

- ❖ **Electromagnetic Simulation and Antenna Designing** with EM modelling tools such as CST Microwave Studio, Ansys HFSS, Empire XPU, Microwave AWR Office, and Keysight Advanced Design Suite (ADS).
- ❖ **Programming and Scripting** in C/C++, MATLAB, Python and MS Excel/Google Sheets for automation and data analysis; and building embedded systems and automation units using microcontroller/microprocessor boards including Arduino, AVR MCU, Raspberry Pi and NodeMCU.
- ❖ **Operating Lab Equipment** including anechoic chamber, network analysers, spectrum analysers, 3D-printers, etc; and manufacturing PCB based antenna designs.

- ❖ **Research Interests:** Electromagnetics, Antenna Arrays, Microwave and Millimeter Wave Communication, Metamaterial and Metasurfaces, Dielectric Lenses, Space Communication, 5G/6G, Beamforming/Beam Steering Antennas.

5 AWARDS AND ACHIEVEMENTS

- ❖ Recipient of [Loughborough University's Doctoral President's Award 2022](#).
- ❖ Recipient of [Sir Robert Martin University Prize 2020](#) (LU most prestigious award)
- ❖ Runner-up for [Loughborough University's PhD Award for Overall Impact 2020](#).
- ❖ Recipient of *Action Volunteer Bronze Award 2020* by LU Students' Union for STEM Promotion Activities.
- ❖ Recipient of [Electronics Weekly BrightSparks 2020 Award](#) for research and STEM Promotion in the UK.
- ❖ Recipient of *Young Engineer Award 2019* by CSIR-CEERI, Pilani.
- ❖ *Exemplary Performance Award for Student Training and Research 2017* by MSIT, India.
- ❖ Recipient of [IEEE Computer Society Richard E. Merwin Student Scholarship 2016](#).
- ❖ Recipient of *MIT GSW Fellowship 2016* for the proposed idea of self-sustained LED Bulbs.
- ❖ Received Project Funding for Design of Self Sustained LED Bulbs from NGO: Sristi.
- ❖ Won *IEEE MTT-S YouTube/Youku Video Contest* for Offline GPS.
- ❖ Recipient of the *IEEE Delhi SAC Outstanding Student Volunteer Award 2016*.
- ❖ Winner of multiple hardware hackathons organised by TATA power, DTU 2015, IIIT 2016, etc.
- ❖ Winner of various paper presentation competitions organised by MSIT 2016, JMI 2016, etc.

6 POSITIONS OF RESPONSIBILITY

- ❖ Associate Editor, IEEE Open Journal of Antennas and Propagation (Special Issue: Advances in Additive Manufacturing & 3D Printing: Novel Materials & Metamaterial Structures for Antennas and Other Electromagnetic Devices).
- ❖ Review Editor, Frontiers in Antennas and Propagation.
- ❖ Reviewer, IET Microwave, Antennas and Propagation.
- ❖ Reviewer, Progress in Electromagnetics Research.
- ❖ Member, Institute of Electrical and Electronics Engineers (IEEE).

7 JOURNAL PUBLICATIONS: 3 PAPERS SUBMITTED (1-3), 10 PAPERS PUBLISHED (4-13)

- (Under Review) A. Bansal, E. Mellios, H. Nagi, P. Febvre, W. G. Whittow, "Two-Dimensional Beam-Steering Lens Antenna with Fast Inter-Beam Handover for Satellite Communications," IEEE Transactions on Antennas and Propagation, 2023.
- A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Millimeter-Wave Beam-Steering Antennas for 5G and Beyond – A Comprehensive Review," To be submitted to IEEE APS Magazine, 2023 (Proposal Accepted).
- (Under Review) A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Integrated Digitated Capacitor based Corrugated Substrate Integrated Waveguides," Submitted to IET Microwave, Antennas and Propagation, 2023.
- A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Novel Design Methodology of 3D-Printed Lenses for Travelling Wave Antennas," Accepted at IEEE Open Journal of Antennas and Propagation, 2023.
- A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Millimeter-Wave Beam Steerable Slot Array Antenna Using an Inter-Digitated Capacitor Based Corrugated SIW", IEEE Transactions on Antenna & Propagation, vol. 70, no. 12, pp. 11761-11770, 2022. [DOI](#).
- A. Bansal, V. Srivastava, R. Gupta, R. K. Sharma, "Novel Microfabricated Slow Wave Structure for a 0.22-THz Sheet Beam Travelling Wave Tube," IEEE Transactions on Electron Devices (Accepted and in Press).
- R. Gupta, G. Bakshi, and Aakash Bansal, "Dual-Band Circularly Polarized Stacked Sapphire and TMM13i Rectangular DRA," Progression in Electromagnetics Research, vol. 91, pp. 143-153, 2019. [DOI](#).
- A. Bansal, et. al. "Integrated Model for Design of SWS and Beam-Wave Interaction Analysis of a Planar THz Sheet-Beam TWT," Progress in Electromagnetics Research, vol. 87, pp. 179-187, 2019. [DOI](#).
- A. Bansal, "Design and Implementation of a Long-Range Decentralized Vehicular Network," Journal of Mechatronics and Automation, vol. 5, pp. 24-30, 2018. [DOI](#).
- A. Bansal, et. al. "Any Touch: Design and Implementation of a Touch Interface for Bluetooth Enabled Personal Devices," Intl. Journal of Engineering and Manufacturing, vol. 8, no. 2, pp. 1-11, 2018. [DOI](#).
- A. Bansal, R. Gupta, "A review on microstrip patch antenna and feeding techniques." International Journal of Information Technology, vol. 12, no. 1, pp. 1-6, 2018. [DOI](#).
- A. Bansal, et. al. "Analysis and Design of Coaxial Fed Microstrip Antenna on Multilayer substrate at Terahertz Frequency," Journal of Microwave Engineering and Tech., vol. 4, no. 3, pp. 11-14, 2018. [DOI](#).
- A. Bansal, V. Goyal, "Real-Time Electricity Monitoring using Smart Energy Meter in a Smart LAN based Network," Intl. J. of Electronics, Electrical and Comp. System, vol. 6, no. 5, pp. 2348-3117, 2017. [DOI](#).