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 8 journal papers (+ 3 submitted) and presented 4 conference papers. I have won multiple research and outreach awards.

2 WORK EXPERIENCE

- **Future Communications Engineer, Satellite Applications Catapult, UK** (Oct 22 – Present)
  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.
- **Research Associate (Part-Time), Loughborough University, UK** (Apr 19 – Sep 22)
  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.
- **Voluntary Sub-Warden, Telford Hall, Loughborough University, UK** (Aug 20 – Dec 22)
  Supporting a team of four sub-wardens to create a supporting, enjoyable, stimulating, and safe environment for the 500 student residents of Telford Hall.
- **Head of Innovation (Voluntary Position), National Indian Students & Alumni Union UK** (Jun 19 – Jul 21)
  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.
- **Innovation Coach and Consultant, Connecting Dreams Foundation** (Jul 18 – Feb 19)
  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.
- **Research Associate, CSIR – Central Electronics Engineering Research Institute, Pilani (India)** (Jul 17 – Feb 19)
  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.

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 RESPONSIBILTY

- 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).
- Associate 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 IEEE PAPERS SUBMITTED (1-3), 8 PAPERS PUBLISHED (4-12)

1) (Under Review) A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Integrated Digitated Capacitor based Corrugated Substrate Integrated Waveguides," Submitted to IEEE Antennas and Wave Propagation Letters, 2022.
2) (Under Review) A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Novel Design Methodology of 3D-Printed Lenses for Travelling Wave Antennas," Submitted to IEEE Transactions on Antenna & Propagation, 2022.
3) (Under Review) A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Millimeter-Wave Wideband SIW Bow-Tie Slot Arrays Antenna with Frequency-Controlled Beam-Steering Operation for 5G Base Stations," Submitted to IET MAP, 2022.
4) A. Bansal, C. J. Panagamuwa, W. G. Whittow, "Millimeter-Wave Beam Steerable Slot Array Antenna Using an Inter-Digitated Capacitor Based Corrugated SIW", Submitted to IEEE Transactions on Antenna & Propagation, 2022. DOI.
5) 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).
6) 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.
7) 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.
8) A. Bansal, "Design and Implementation of a Long-Range Decentralized Vehicular Network," Journal of Mechatronics and Automation, vol. 5, pp. 24-30, 2018. DOI.
9) 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.
10) 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.
11) 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.
12) 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.