

# Vaibhav Garg

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DEGREE	INSTITUTE	CPGA/%	YEAR
PhD, Mobile network Information and Communication Technologies	University of Cantabria, Santander, Spain	Excellent	2021
M.S., Information and Communication Technology	Universitat Politècnica de Catalunya, Barcelona, Spain	7.531/10	2012
B.Tech., Electronics and Communication Engineering	Krishna Institute of Engineering and Technology, Ghaziabad, India	65.24%	2008

## TOOLS and SOFTWARE

- Python, MatLab, Latex, Microsoft Excel, Orange, CST

## PUBLISHED PAPERS

- **Total Citations:** 47
- **h-index:** 4
- **i10-index:** 1
- **Research Profiles:** [scholar.google.com/citations?hl=en&user=ZkmhZ0oAAAAJ](https://scholar.google.com/citations?hl=en&user=ZkmhZ0oAAAAJ)  
[www.researchgate.net/profile/Vaibhav-Garg-5](https://www.researchgate.net/profile/Vaibhav-Garg-5)
- **IEEE Signal Processing Letter**, 2021 on Order Estimation via Matrix Completion for Multi-switch Antenna Selection.
- **IEEE Statistical Signal Processing (SSP) Workshop**, 2021 on Sparse Subspace Averaging for Order Estimation.
- **ELSEVIER Signal Processing**, 2021 on DOA Estimation via Shift-invariant Matrix Completion.
- **IEEE International conference on Acoustics, Speech and Signal Processing (ICASSP)**, 2020 on Source Enumeration via Toeplitz Matrix Completion.
- **European Signal Proc. Conference (EUSIPCO)**, 2019 on Source Enumeration in Non-white Noise and Small Sample Size via Subspace Averaging.
- **IEEE Trans. Signal Processing**, 2019 on Subspace Averaging and Order Determination for Source Enumeration.
- **Infrared Millimeter and Terahertz Waves**, 2012 on Retina Design for Tomographic Imaging at 100GHz.
- **XXVII Simposio de la URSI** (Unión Científica Internacional de Radio) on Retina Design for Tomographic Imaging at 100 GHz.
- **IEEE Antennas and Propagation Society International Symposium**, 2012 on Retina Design for 100GHz MST Imaging System.
- **6<sup>th</sup> European Conference on Antennas and Propagation** (EuCAP) on Real time 100GHz MST Imaging Retina.

## CERTIFICATIONS

- Machine Learning with Python (By IBM on Coursera)
- Data Analysis with Python (By IBM on Coursera)
- Data Visualization with Python (By IBM on Coursera)
- Python for Data Science and AI (By IBM on Coursera)
- Database and SQL for Data Science with Python (By IBM on Coursera)
- Excel Basics for Data Analysis (By IBM on Coursera)
- S4D4C European Science Diplomacy (By science for/in diplomacy for addressing global challenges)
- Terahertz Technology and Applications (By European School of Antennas)

EXPERIENCE		
Postdoctoral Researcher	UC3M – Santander Big Data Institute (IBiDAT)	From April'24
Project Manager and Data Analyst	CARNET Barcelona	From July'22 to June'23
Postdoctoral Researcher	University of Cantabria	From June'21 to June'22
Visiting Researcher	Universidad Carlos III de Madrid	From Oct'20 to Jan'21
Assistant Professor in Electronics & Telecommunication Engineering Department	D Y Patil School of Engineering Academy, Pune	From June'16 to Feb'18
Assistant Professor in Electronics & Communication Engineering Department	Shri Venkateshwara University, Gajraula	From Aug'15 to May'16
Lecturer in Electronics & Communication Engineering Department	Indraprastha Engineering College, Ghaziabad	From Sep'14 to Aug'15
Assistant Professor in Electronics & Communication Engineering Department	Shridhar University, Pilani	From Jan'13 to June'14

ACADEMIC ACHIEVEMENTS	
<ul style="list-style-type: none"> <li>Awarded with <b>FPI scholarship</b> for doing <b>PhD and postdoctoral</b> from University of Cantabria, Spain.</li> <li><b>One among 17 in India</b> to be <b>awarded Willpower Erasmus Mundus Window Scholarship</b> <ul style="list-style-type: none"> <li>Received <b>full funding</b> for doing the master course from UPC Barcelona.</li> </ul> </li> </ul>	

PROJECT UNDERTAKEN	
<b>Mobility in the city of the future</b>	<b>CARNET Barcelona, Spain</b>
<p>The project aims to develop smart mobility applications based on data-driven collaborative strategies for passenger and freight distribution in metropolitan areas. These technological-centred measures will help regional and local authorities addressing the mobility targets in terms of sustainability, safety and equity, while creating new business opportunities for old and new players in the mobility ecosystem. I worked as a <b>Project Manager and Data Analyst</b> and used <b>Python</b> and <b>Excel</b> for data analysis.</p>	
<b>Advances in coding and signal processing for the digital society (ADELE)</b>	<b>University of Cantabria, Spain</b>
<p><b>Prof. Ignacio Santamaria</b> (Publisher of 100+ scientific and technical papers)</p> <p>During this project, Matrix Completion techniques were exploited for Source Enumeration. We developed two new algorithms named Toeplitz Matrix Completion (TMC) and Shift-invariant Matrix Completion (SIMC) algorithms for Source Enumeration and Direction of Arrival applications. <b>MatLab</b> and <b>LaTeX</b> tools were used during this project. This work was supported by the Ministerio de Ciencia e Innovación (MICINN) of Spain, and AEI/FEDER funds of the E.U., under grants PID2019-104958RB-C43/C41 (ADELE) and BES-2017-080542.</p>	
<b>Coding and Signal Processing for Emerging Wireless Communication and Sensor Networks (CARMEN)</b>	<b>University of Cantabria, Spain</b>
<p><b>Prof. Ignacio Santamaria</b> (Publisher of 100+ scientific and technical papers)</p> <p>During this project, we worked on Subspace Averaging technique for Source Enumeration. The idea was to develop a Source Enumeration Technique which was free from any penalty term and useful for large array and massive MIMO. We used the Shift Invariance property of Uniform Linear Array for averaging different subspaces. Averaging mechanism cancels out noise directions and only signal direction is being left, which can estimate the number of signals received by an antenna array. MatLab and LaTeX tools were used during this project. This work was supported in part by the Ministerio de Economía y Competitividad of Spain, and in part by the AEI/FEDER funds of the E.U., under Grants TEC2016-75067-C4-4-R(CARMEN), TEC2015-69648-REDC, and BES-2017-080542.</p>	

<b>100 GHz MST retina for Real Time Near Field Imaging System</b>	<b>Universitat Politecnica de Catalunya, Spain</b>
<p><b>Prof. Luis Jofre Roca</b> (Publisher of 300+ scientific and technical papers).          We Developed a real time near field imaging system for applications in security and biological applications. The system is based on tomography imaging technique using an array of antenna elements at 100GHz. To obtain the dielectric properties, the diffracted field by the object under test is measured, when an electromagnetic wave is illuminating it and by using dielectric property, the image of the object under test can be recovered. WE Checked the effects of different scenarios like multi-view and multi-frequency on the result. During this project, we worked with CST, MatLab and LaTeX software. This work was supported in part by the Spanish Inter-ministerial Commission on Science and Technology.</p>	
<b>Remote Car Key Patch Antenna</b>	<b>Universitat Politecnica de Catalunya, Spain</b>
<p><b>Prof. Jordi Romeu Robert</b> (Grand Winner of the European IT Prize by the European Commission in 1998).          We designed a patch antenna with helical shape of size 1cmX1cmX1cm. The central frequency of the antenna was 868.3MHz, Bandwidth was 0.6 MHz and Gain was -11.29dB. We tried various shapes and methods to miniaturize the antenna. A helical shaped design with silicon substrate with relative permittivity of 11.9 was designed.</p>	
<b>Project Guided</b>	
<b>design, Simulation and Implementation of Vee Patch Antenna</b>	<b>Indraprastha Engineering College, India</b>
<p>We designed a vee patch antenna using a fractal antenna with moderate gain and frequency, improved Bandwidth and reduced size. The operating frequency of the antenna was 2.45 GHz and relative permittivity of the substrate was 4.4. Size of antenna was 29X37X0.8mm</p>	