



# Sunanda Roy

RF & Antenna Postdoctoral Researcher

Advanced Radar Research Center (ARRC), The University of Oklahoma

Portfolio: <https://sunandaresearch.org/portfolio/>

Experience: <https://sunandaresearch.org/experiences-skills/>

## CONTACT

+19404359120

sunandaroy75@gmail.com

1802 W. Robinson St., Apt. D,  
Norman, OK-73069

[LinkedIn.com/in/Sunanda-186](https://www.linkedin.com/in/Sunanda-186)

[Sunanda Roy - Google Scholar](#)

## COMPUTER SKILLS

- ❖ CST STUDIO SUITE
- ❖ ALTAIR FEKO
- ❖ ANSYS HFSS
- ❖ KEYSIGHT ADS
- ❖ MATLAB
- ❖ MICROSIM Ps PICE
- ❖ MICROSOFT OFFICE
- ❖ POWER POINT
- ❖ MICROSOFT EXCEL
- ❖ VISIO

## PROFILE SUMMARY

I am a goal-oriented RF design engineer with more than 6 years of experience designing innovative different types of antenna and RF products by way of demonstration. The implementation of cutting-edge concepts is driven by research and analysis, from large-scale product development to feasibility study. During 3 years of postdoctoral research career, experienced with different types of antenna design, fabrication, and measurement in different criteria.

## TECHNECAL KNOWLEDGE

**Antenna Simulation:** CST, Ansys HFSS, MATLAB, FEKO and Keysight ADS

**Antenna Fabrication:** LPKF ProtoLaser U4 Micro-material processing, Electroless- and electro-plating setup, Multilayer lamination capabilities, Polymer chemical vapor deposition, 3D solid free-form fabrication and Photolithography patterning.

**Major Testing Equipment:** VNA, PNA, PNA-X with 20 to 110 GHz, Agilent PSA and EXA Spectrum Analyzers, Agilent PSG Analog and digital generator and RF front extender Cobalt FEV-10 Frequency Extension system and different spectrum and waveform generator etc.

**Antenna Measurement System:** Diamond Engineering 360 Automated Measurement System, NSI 2000 Near Field Measurement System, MiliBox Antenna Test Chamber.

**Programing Languages:** MATLAB, C and C++

## EDUCATIONAL QUALIFICATIONS

### Doctor Of Philosophy in Electrical & Communication Engineering (Ph.D.)

Multimedia University (MMU), MMU Cyberjaya, Malaysia  
Duration: 3<sup>rd</sup> June 2019 to 11<sup>th</sup> Jan 2024

### Master of Science in Electrical & Electronics Engineering (M. Sc. Engg.)

Khulna University of Engineering and Technology (KUET), Khulna, Bangladesh  
CGPA: **3.71** (in a scale of 4.00)  
Duration: 1<sup>st</sup> January 2013 to 27<sup>th</sup> February 2016

### Bachelor of Science in Electronic & Comm. Engineering (B. Sc. Engg.)

Khulna University (KU), Khulna-9203, Bangladesh  
CGPA: **3.60** (in a scale of 4.00)  
Duration: 1<sup>st</sup> January 2007 to 4<sup>th</sup> August 2011

### Cisco Local Certified (CCNA)

Khulna University of Engineering and Technology (KUET), Khulna, Bangladesh  
Grade: A (75% marks)  
Duration: 1<sup>st</sup> January 2014 to 30<sup>th</sup> December 2014

## INTERESTS AND EXPERTISE AREA OF RESEARCH

- ❖ UWB Phased Array for finite and infinite Approaches
- ❖ Lens Antenna (dielectric and meta surface)
- ❖ Beam Steerable Reconfigurable Reflectarray Antenna System
- ❖ 3D All Metal Antenna Array System
- ❖ Rectifier and Rectenna System
- ❖ Ambient RF Energy Harvesting System

- ❖ Wireless Power Transfer (WPT) System

## COMPUTER SKILLS

- ❖ PROGRAMMING C/C++
- ❖ LINUX (FEDORA CORE)
- ❖ INTERNET & E-MAIL
- ❖ PC ASSEMBLING
- ❖ TROUBLESHOOTING
- ❖ SOFTWARE DEVELOPMENT

## LANGUAGE

- ❖ ENGLISH
- ❖ HINDI
- ❖ BANGLA

## HOBBY

- ❖ WATCHING MOVIE
- ❖ TRAVELLING
- ❖ PHOTOGRAPHY
- ❖ WATCHING FOOTBALL
- ❖ WATCHING CRICKET
- ❖ LISTENING TO MUSIC

## SKILLS

- ❖ MENTORSHIP
- ❖ MANAGEMENT
- ❖ LEADERSHIP
- ❖ DYNAMIC TEAM MEMBER

## PROFESSIONAL EXPERIENCE

**Postdoctoral Research Scientist at Advanced Radar Research Center (ARRC) of The University of Oklahoma, Norman, Oklahoma**

**Project Details:** Phased Array and Applied Electromagnetic System, Grant No: SPNSR ENGO7101 00000

**Duration:** 9<sup>th</sup> September 2024 to present

### Antenna and Electromagnetic Part:

- ❖ Design and analysis of UWB Phased Array Antenna for Radar system.
- ❖ Analyzing and designing dielectric Lens Antenna using ray-tracing and optics features.
- ❖ Fabrication and measurement using fully anechoic chamber to check the Far/Near field pattern for different criteria such as co-pol, cross-pol, RHCP, LHCP etc.

### Responsibilities:

- ❖ Design, analysis, and fabrication of various UWB phased array and lens antennas covering frequency ranges such as 0.1– 6 GHz, 2–10 GHz, and 2–30 GHz.
- ❖ The dual-polarized Airborne Phased Array Radar (APAR), featuring a two-dimensional (2D) electronically scanned C-band radar system, is designed and analyzed for integration with the C-130 aircraft using Altair Feko.
- ❖ The FEKO-formatted data files (.ffe) were converted into MATLAB-formatted data for use in analyzing different scanned far-field radiation patterns.

### Advanced Tech Skills & Tools:

- CST Studio Suite, Altair FEKO Keysight ADS, MATLAB, HFSS, VNA, Spectrum Analyzer, Signal Generator, Oscilloscope, Digital Multimeter, Soldering Tools.
- Antenna measurement experience using Anechoic Chamber with two types of measurement systems like NSI2000 and DAMS.

### Advanced Tech Skills & Tools

- CST Studio Suite, Keysight ADS, HFSS, Spectrum Analyzer, VNA, Signal Generator, Oscilloscope, Digital Multimeter.

## PROFESSIONAL EXPERIENCE

**Postdoctoral Research Associate, The University of Texas at Dallas, UTD, Tx**

**Project Details:** DARPA, WPT system for UMV, Grant No: W911NF-23-1-0029

**Duration:** 1<sup>st</sup> January 2021 to 9<sup>th</sup> September 2024

### Antenna and Electromagnetic Part:

- ❖ Design, analyzed, and simulations different types of UWB antenna array such as microstrip antenna array, reflectarray, metasurface array and metamaterial antenna array.
- ❖ Analyzing beam steering techniques for controlling the phase of the array antennas using Lens technology.
- ❖ NSI 2000 anechoic chamber is used to measure the Far/Near field pattern for different criteria such as co-pol, cross-pol, RHCP, LHCP etc.

### Active Circuit Part:

- ❖ Design, analyzed, and simulation on UWB rectifiers and Rectenna.
- ❖ Take fabricated printed circuit board test them various performance parameters (s-parameter, rectification efficiency, dc generated voltage on load section etc.) on the lab environment.
- ❖ Demonstration and feasibility studied for long range WPT system by applying different RF input power levels.

### Advanced Tech Skills & Tools:

- CST Studio Suite, Keysight ADS, MATLAB, HFSS, VNA, Spectrum Analyzer, Signal Generator, Oscilloscope, Digital Multimeter, Soldering Tools.
- Antenna measurement experience using Anechoic Chamber with two types of measurement systems like NSI2000 and DAMS.

### Advanced Tech Skills & Tools

- CST Studio Suite, Keysight ADS, HFSS, Spectrum Analyzer, VNA, Signal Generator, Oscilloscope, Digital Multimeter.

## PATENT SUBMISSION

- 1) A Novel Hexagonal -shaped wideband dualpolarized RA antenna for Wireless Power Transfer System (in review)
- 2) Y Shaped Dual Layer Ultra-wideband Reflectarray Antenna with Active-Feeding Beam-Steering for Wireless Power Transfer (WPT) Application (in review)

## **Efficient Working Experience**

---

- ❖ Experience in the design and development of RF antennas encompasses a wide range of applications, particularly in telecommunications and wireless communication technologies.
- ❖ Designed and analysis of UWB Phased Array Antenna for Radar system. Analyzing and design large, phased Array for infinite and finite approach.
- ❖ Lens antennas are designed in various shapes, each suited for specific functions such as focusing, collimation, beam scanning, or minimizing aberrations. Based on their features, the main types of lens shapes used in antenna systems are described along with their design characteristics and ray-tracing behavior.
- ❖ Designing a lens antenna using ray tracing properties involves applying geometrical optics (GO) principles to focus or collimate electromagnetic waves using a dielectric lens structure. Lens antennas are fabricated and measured in lab used in satellite communications, radar, and other high-frequency applications due to their high directivity and efficiency.
- ❖ Conducts analysis of precise satellite data and frequency interference to evaluate potential impacts on public safety, environmentally sensitive areas, and mission readiness. Assesses operational performance under all weather conditions to ensure system reliability, continuous functionality, and minimal disruption to critical services.

## **PUBLICATIONS**

---

(Refer to <https://scholar.google.com/citations?user=R2qoFwAAAAJ&hl=en> for a list of 40+ Publications)

### **JOURNALS**

- ❖ **Sunanda Roy**, R. Mahin and I. Mahbub, "A Comparative Analysis of UWB Phased Arrays with Combining Network for Wireless Power Transfer Applications," in *IEEE Transactions on Antennas and Propagation*, Electronic ISSN: 1558-2221, February 2023, doi: 10.1109/TAP.2023.3243852.
- ❖ **Sunanda Roy**, Nabanita Saha and I. Mahbub, "A wireless power beaming system using Y shaped reflect array and rectenna achieving 8.33% power transfer efficiency," in *Scientific Reports*, April 2025, (Accepted).
- ❖ I. Mahbub, A. B. Patwary, R. Mahin and **Sunanda Roy**, Far-Field Wireless Power Beaming to Mobile Receivers Using Distributed, Coherent Phased Arrays: A Review of the Critical Components of a Distributed Wireless Power Beaming System," in *IEEE Microwave Magazine*, vol. 25, no. 5, pp. 72-94, May 2024, doi: 10.1109/MMM.2024.3363982.
- ❖ **Sunanda Roy**, J.-J. Tiang, M. B. Roslee, M. T. Ahmed and M. A. P. Mahmud, "Quad-Band Multiport Rectenna for RF Energy Harvesting in Ambient Environment," in *IEEE Access*, vol. 9, pp. 77464-77481, 2021, doi: 10.1109/ACCESS.2021.3082914.
- ❖ **Sunanda Roy**, J. -J. Tiang, M. B. Roslee, M. T. Ahmed and M. A. P. Mahmud, "A Quad-Band Stacked Hybrid Ambient RF-Solar Energy Harvester With Higher RF-to-DC Rectification Efficiency," in *IEEE Access*, vol. 9, pp. 39303-39321, 2021, doi: 10.1109/ACCESS.2021.3064348.
- ❖ **Sunanda Roy**, Jun-Jiat Tiang, Mardeni Bin Roslee, Md. Tanvir Ahmed, Abbas Z. Kouzani, and M. A. Parvez Mahmud. 2022. "Design of a Highly Efficient Wideband Multi-Frequency Ambient RF Energy Harvester." *Sensors* 22, no. 2: 424. <https://doi.org/10.3390/s22020424>
- ❖ **Sunanda Roy**, Jun Jiat Tiang, Mardeni Bin Roslee, Md Tanvir Ahmed, Abbas Z. Kouzani, and M. A. Parvez Mahmud. 2021. "Quad-Band Rectenna for Ambient Radio Frequency (RF) Energy Harvesting." *Sensors* 21, no. 23: 7838. <https://doi.org/10.3390/s21237838>
- ❖ **Sunanda Roy**, Himadri S. Mondal, and Md N. Mollah. "Design and Validification of Trilateral Censored Resonator Structure with Patch Antenna Intended for WLAN Purposes." *International Journal of Sensors Wireless Communications and Control* 10.5 (2020): 812-826.
- ❖ **Sunanda Roy**, K. Kakaraparty and I. Mahbub, "A Slot-Connected Cavity Design with Corresponding Equivalent Circuit Model Analysis for Fully Metallic 3D Vivaldi Antenna for Wireless Power Telemetry Applications," in *IEEE Open Journal of Antennas and Propagation*, doi: 10.1109/OJAP.2023.3333800.
- ❖ I. Mahbub, A. B. Patwary, R. Mahin, and **Sunanda Roy**, "Far-field Wireless Power Beaming to Dynamic Mobile Receivers Using Distributed, Coherent," in *IEEE Open Journal of Antennas and Propagation, IEEE Microwave Magazine*.2024.

## **ACHIEVEMENT AND AWARD**

---

- ❖ Excellence in Rectenna Design Award – Faculty of Engineering (FOE), MMU (2021)
- ❖ Honorable mention – Reflectarray Antenna and near-field measurements

- ❖ Best Paper Award - Turkish Journal of Computer and Mathematics Education (TURCOMAT) 2021 for paper titled 'The Frequency-Independent Wideband Planar Log-Periodic Antenna for Multiband Applications
- ❖ Low Profile, High Gain Reflectarray Antennas for long Distance Applications.

### **IMMIGRATION STATUS**

---

- ❖ I-485 or Green card Application is in Progress
  - ✓ I-485 Application is submitted on **June 4<sup>th</sup>, 2025.**