SYED SHAHAN JEHANGIR

Last updated: Feb. 2023

Phased Array Antenna Research & Development Group (PAARD)
Advanced Radar Research Center (ARRC), The University *of* Oklahoma, Norman, Ok, 73019, USA
+1-405-2273424
syed.s.jehangir-1@ou.edu, syedjehangir43@gmail.com

RESEARCH INTERESTS

Applied Electromagnetics, Phased Array Antennas, mm-Wave Lens Antennas, MIMO Antennas, RF & Microwave Filters, Biomedical sensors, Metamaterials, Material characterization, UAV-based radar characterization, Ultrawideband probes for calibration.

EDUCATION

The University of Oklahoma, Norman, Oklahoma, USA

Ph.D. candidate, Electrical Engineering (CGPA: 4/4) Aug. 2019 - present
Advisor: Dr. Jorge L. Salazar-Cerreno
Courses: Phased Array Antennas, RF & microwaves Filter Design, Radar Engineering, RF & Microwave Circuits

King Fahd University of Petroleum and Minerals, Dhahran, KSA

MS in Electrical Engineering (CGPA: 3.714/4) Jan. 2015 - Jun. 2017
Thesis: *Design of a Wideband Directive Yagi Based MIMO Antenna System with Loop Exciter.*
Advisor: Prof. Mohammad S. Sharawi.
Courses: RF & microwave transistor design & analysis, Antenna theory & applications, Digital signal processing, Radiation & propagation of electromagnetic waves, Theory & applications of antenna arrays, Linear control systems, and Math methods for engineers.

COMSATS Institute of Information Technology, Lahore, Pakistan

BS in Electrical Engineering (CGPA: 3.79/4) Jan. 2010 - Feb. 2014

RESEARCH EXPERIENCE

The University *of* Oklahoma, Norman, Oklahoma, USA

Phased Array Antenna Research & Development Group (PAARD)
Advanced Radar Research Center (ARRC)
Graduate Research Assistant (GRA) Aug. 2019 - present
Supervisor: Dr. Jorge L. Salazar-Cerreno

Research Work:

Dual-polarized slotted waveguide arrays, mm-Wave lens antennas, mm-Wave low-loss artificial materials, material characterization, particle mixing theory, Dual-polarized Ridged Horn antennas, UAV-based radar calibration.

United Arab Emirates University, Al Ain, UAE

Research Associate, Department of EE Sep. 2017 - July 2019
Supervisor: Dr. Mousa Hussein.

Research Project Sep. 2018 - July 2019

Artificial Thin Nanostructured Surfaces for Microwave and Optical Applications.
Sponsored by Dassault Aviation, France.
Description:

- Worked on the analysis of the dielectric properties of Carbon Nanotube composites using DAK setup.
- Previously, worked on the percolation threshold measurement of the Carbon Nanotube samples using LCR meter.

Research Project Sep. 2017 - Sep. 2018

Nanocomposites for UAV Application: Evaluation of The Electrical, Mechanical and Thermal Properties of The Carbon Nanotubes Impregnation in Composites

Sponsored by Abu Dhabi Autonomous Systems Investments Co., LLC.

Description:

- Worked on measuring the Radar Cross Section (RCS) of various Carbon Nanotube samples with different concentrations of ionic liquids wrapped around an aircraft model on a mechanically controlled rotational setup using Anritsu Vector Network Analyzer (VNA) with transmitting and receiving horn antennas for the radar band applications.
- Worked on the frequency domain analysis of the measured RCS data using FFT algorithm.
- Designed a Metamaterial antenna for the X-band applications with Floquet and wave ports. It was aimed to be used on the aircraft model with improved absorption characteristics in the X-band.
- Designed a plasmonic nano-antenna array for solar energy harvesting using CST microwave studio.

King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, KSA

Antennas and Microwave Structures Design Laboratory (AMSDL)

Research Assistant, Department of EE Jan. 2015 - Jun. 2017

Supervisor: Prof. Mohammad S. Sharawi.

Description:

- As a member of AMSDL, I have got hands-on experience in operating and testing various RF equipment, fabricating antennas using LPKF S-103 milling machine, soldering of electronic components on PCBs, and testing RF circuits as well as antennas for their performance using VNA.
- Delivered several tutorials to members of the research group on fabrication of antennas using LPKF machine, using soldering workstation, and on designing antennas using various CAD tools.

National University of Science and Technology, Islamabad, Pakistan

R&D Lab, School of Electrical Engineering and Computer Science (SEECS)

Research Assistant Jan. 2014 - June. 2014

- Worked on the project based on IoT platform consisting of communications modules and cloud platform in C++.

TEACHING ASSISTANT EXPERIENCE

The University *of* Oklahoma, Norman, Oklahoma, USA

- **Graduate Teaching Assistant (GTA)- Spring 2022.** Jan. 2022 – May. 2022
  Course: ECE 3723 - Electric Circuits II
  Responsibilities: Grading and helping students in understanding the topics.
- **Graduate Teaching Assistant (GTA)- Fall 2021.** Aug. 2021 – Dec. 2021
  Course: ECE3813- Introductory Electronics
  Responsibilities: Creating and grading homework, designing its solution manuals, and helping students in understanding the topics.
- **Graduate Teaching Assistant (GTA)- Spring 2020.** Jan. 2020 – May. 2020

Course: ECE 3613- Electromagnetic Fields I
Responsibilities: Creating and grading homework, designing its solution manuals, and helping students in their projects.

- **Graduate Teaching Assistant (GTA)- Fall 2019.** Aug. 2019 – Dec. 2019
  Course: ECE 3723 - Electric Circuits II
  Responsibilities: Grading and helping students in understanding the topics.

PROFESSIONAL EXPERIENCE

Xongxing CMPAK, ZTE Corporation, Lahore, Pakistan
Trainee Engineer Jun. 2013 - Aug. 2013
Description:

- Planning new BTS sites.
- Identification of different faults faced during the maintenance of new BTS sites such as: wapda outage, power drop, under voltage, DC low voltage, and AC main failure, etc.
- Implementation of various techniques: handover of cells and reselection (ingoing and outgoing both), frequency hopping (adding frequency "hops" for the frame and adding TRX's when needed), removing critical alarms and sending reports (aging, counts, and Trouble Tickets) to site engineers.

National Transmission and Dispatch Company (NTDC), WAPDA, Lahore, Pakistan
Trainee Engineer May 2013 - Jun. 2013
Description:

- Understanding basic algorithms of Power Line Communication (PLC) and Optical Fiber Communication.
- Study and analysis of various applications and advantages of different microwave devices such as: rectangular waveguides, circular waveguides, dielectric slabs, power dividers, and couplers, etc.

GRANTS PROPOSAL (Pending/Approved)

1. ***Co P. I.*** in the grant related to the design of a Dual-Linear Polarized Quad-Ridged Horn Antenna (QRHA) working from 1-18GHz, ***submitted to Custom Microwave Inc. (CMI), Longmont, CO, USA, having a value of $80,000***, 2022.

2. ***Co P. I.*** in the grant related to the design, fabrication, and measurement of the L-Band Dual-Polarized Backed-Cavity Proximity-Coupled Microstrip Patch Antenna (BC-PCMPA). Due to its unique feeding mechanism and cavity-backed structure, this special antenna has achieved a wide bandwidth of more than 26%. ***This work was submitted as a grant to the Agile RF Systems LLC, Berthoud, CO, USA, with a funding of $40,000***, 2020.

PATENTS (GRANTED)

4. M. S. Sharawi and **Syed. S. Jehangir**, Multi-beam Yagi-based MIMO antenna system, *US10892562*, Jan, 2021.
3. M. S. Sharawi and **Syed. S. Jehangir**, A Miniaturized Directional UWB Bi-Planar Yagi MIMO Antenna System, *US10847885B2*, Nov, 2020.
2. M. S. Sharawi and **Syed. S. Jehangir**, Compact size , Low profile , Dual wideband , Quasi-Yagi MIMO Antenna System, *US10256549B2*, April, 2019.

PATENTS (PENDING)

1. R. Hussain and **Syed. S. Jehangir**, A Frequency Agile Slot-Based Yagi-Like MIMO antenna System, *Filed to USPO*, Sep, 2021.

JOURNAL PUBLICATIONS (PUBLISHED)

11. **S. S. Jehangir**, Z. Qamar, N. Aboserwal, and J. L. Salazar-Cereno, "Application of the Mixing Theory in the Design of a High-Performance Dielectric Substrate for Microwave and Mm-Wave Systems," *IEEE Access*, vol. 8, pp. 180855-180868, 2020, Sep, 2020.
10. Mousa I. Hussein, **Syed S. Jehangir**, I. J. Rajmohan, Y. Haik, Q. Clément, and N. Vukadinovic "Microwave Absorbing Properties of Metal Functionalized-CNT-Polymer Composite for Stealth Applications", *Scientific Reports*, vol. 10, no. 16013, Sep, 2020.
9. **Syed. S.** Jehangir, R. Hussain, Mousa I. Hussein, and M. S. Sharawi, "Frequency Reconfigurable Yagi-Like MIMO Antenna System with a Wideband Reflector," *IET Microwaves, Antennas & Propagation*, vol. 14, no. 7, pp. 586-592, June, 2020.
8. **S. S. Jehangir**, and M. S. Sharawi, "A Compact Single Layer Four-Port Orthogonally Polarized Yagi-Like MIMO Antenna System," *IEEE Transactions on Antennas & Propagation*, vol. 68, no. 8, pp. 6372-6377, Aug., 2020.
7. R. Hussain, **Syed. S. Jehangir**, Muhammad U. Khan, and M. S. Sharawi, "Stacked Frequency Reconfigurable Yagi-Like MIMO Antenna System," *IET Microwaves, Antennas & Propagation*, vol. 14, no. 6, pp. 532-538, May, 2020.
6. **S. S. Jehangir** and M. S. Sharawi, "A Wideband Sectoral Quasi-Yagi MIMO Antenna System with Multi-Beam Elements," *IEEE Transactions on Antennas & Propagation*, vol. 67, no. 3, pp. 1898-1903, March, 2019.
5. **S. S. Jehangir** and M. S. Sharawi, "A Miniaturized Multi-Wideband Quasi-Yagi MIMO Antenna System," *International Journal of RF and Microwave Computer-Aided Engineering*, vol. 28, no. 5, June, 2018.
4. **S. S. Jehangir** and M. S. Sharawi, and A. Shamim, "Highly Miniaturized Semi-Loop Meandered Dual-band MIMO Antenna System," *IET Microwaves, Antennas & Propagation*, vol.12, no. 6, pp. 864-871, May, 2018.
3. **S. S. Jehangir** and M. S. Sharawi, "A Miniaturized UWB Bi-Planar Yagi-Like MIMO Antenna System," *Antennas and Wireless Propagation Letters*, vol. 16, pp. 2320-2323, June, 2017.
2. **S. S. Jehangir** and M. S. Sharawi, "A Single Layer Semi-Ring Slot Yagi-Like MIMO Antenna System with High Front-to-Back Ratio," *IEEE Transactions on Antennas & Propagation*, vol. 65, no. 2, pp. 937-942, Dec., 2016.
1. **S. S. Jehangir** and M. S. Sharawi, "A novel dual wideband circular quasi-yagi MIMO antenna system with loop excitation," *Microwave and Optical Technology Letters*, vol. 58, no. 11, pp. 2769-2774, Nov., 2016.

JOURNAL PUBLICATIONS (SUBMITTED/UNDER PREPARATION)

1. **S. S. Jehangir**, Sergio Masamura, and J. L. Salazar-Cereno, "An Ultrawideband Lens-integrated UAV-based Calibration Platform for Radars and Communication Systems,", under preparation, *IEEE Transactions on Antennas and Propagation,* Jan., 2022.
2. **S. S. Jehangir** and J. L. Salazar-Cereno, "A Dual-polarized Ultrawideband Ridged-Horn Conical Horn Antenna for UAV based Radars and Communication Systems,", under preparation, *IEEE Transactions on Antennas and Propagation,* Jan. 2022.
3. **S. S. Jehangir** and J. L. Salazar-Cereno, "Design Principles, Traits, and Limitations of an Ultrawideband Dual-polarized Quad-Ridged Horn Antenna,", under preparation, *IEEE Transactions on Antennas and Propagation,* Jan. 2022.

4. **S. S. Jehangir** and J. L. Salazar-Cereno, "Design of a 3D-printed Hyperbolic Lens Antenna for Beamwidth Reduction in Quad-Ridged Horn Antenna for UAV-based In-situ Characterization of Radars,", under preparation, *IEEE Transactions on Antennas and Propagation,* Jan. 2022.

CONFERENCE PUBLICATIONS

20. **Syed. S. Jehangir** and J. L. Salazar-Cereno, "A Hyperbolic Lens-Integrated UWB Dual-Polarized Quad-Ridged Horn Antenna for UAV-Based In-situ Calibration of Digital Phased Array Radars," *IEEE International Symposium on Antennas and Propagation (APSURSI)*,Oregon , USA, July, 2023.
19. **Syed. S. Jehangir** and J. L. Salazar-Cereno, "The Need for Narrow Beamwidth in Ridged Horn Antennas for UAV-Based In-situ Measurements of Radars and Communication Systems," *IEEE International Symposium on Antennas and Propagation (APSURSI)*, Colorado, USA, July, 2022.
18. **Presented**: **Syed. S. Jehangir** and J. L. Salazar-Cereno, "Achieving Near-Constant Beamwidth and Symmetry in Patterns of the Pyramidal Ridged Horn Antenna for UAV-Based In-situ Characterization and Measurement of Phased Array Radars," *IEEE Texas Symposium on Wireless & Microwave Circuits and Systems,* Waco, Tx, April, 2022.
17. **[** Won the 1st place in Industrial Engineering Paper Award **]** J. L. Salazar-Cereno, **S. S. Jehangir**, Antony Segales, Z. Qamar, and N. Aboserwal, "A UAV-Based Polarimetric Antenna Measurements for Radar and Communication Systems from 3 GHz to 32 GHz,", *IEEE Conference on Antenna Measurements & Applications (CAMA)*, France, pp. 55-60, Oct, 2021.
16. J. L. Salazar-Cereno, **S. S. Jehangir**, Antony Segales, Z. Qamar, and N. Aboserwal, "An Ultrawideband UAV-Based Metrology Platform for In-situ EM Testing of Antennas, Radars, and Communication Systems," *IEEE Radar Conference*, New York, USA, pp. 1-5, March, 2022.
15. **Syed. S. Jehangir**, R. Hussain, and M. S. Sharawi, "A Novel Frequency Reconfigurable Yagi-Like MIMO Antenna System," *12th European Conference on Antennas and Propagation (EUCAP)*, Denmark, March, 2020.
14. R. Hussain, **Syed. S. Jehangir**, Muhammad U. Khan, and M. S. Sharawi, "A Wide-band Slot-based Frequency Agile Yagi-Uda-Like MIMO Antenna System," *12th European Conference on Antennas and Propagation (EUCAP)*, Denmark, submitted, 2019.
13. **Presented**: **Syed S. Jehangir**, Mousa I. Hussein, I. J. Rajmohan, Y. Haik, Q. Clément, and N. Vukadinovic, "Polyurethane-Based Functionalized CNT Composites as Absorbers for Microwave Applications," *IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications (IMWS-AMP)*, pp. 91-93, 2019.
12. **S. S. Jehangir** and M. S. Sharawi, "A Compact Single Layer Orthogonal Polarized Yagi-Like Directional Antenna," *IEEE International Symposium on Antennas and Propagation (APSURSI)*, Boston, MA, USA, pp. 1607-1608, 2018.
11. **S. S. Jehangir** and M. S. Sharawi, "A Miniaturized Dual UWB Quasi-Yagi MIMO Antenna System using a Defected Ground Structure", *IEEE International Symposium on Antennas and Propagation (APSURSI)*, Boston, MA , USA, pp. 399-400, 2018.
10. **Presented**: Tri B. Susilo, **Syed. S. Jehangir**, M. I. Hussein, A. Wahyudie, "A Plasmonic Nanoantenna Array for Solar Energy Applications," *5th International Conference on Renewable Energy: Generation and Applications (ICREGA)*, Al Ain, UAE, pp. 181-182, 2018.
9. A. Wahyudie, Tri B. Susilo, and **Syed. S. Jehangir**, " Design of A 100 W Mini Permanent Magnet Linear Generator for Wave Energy Converter System," *5th International Conference on Renewable Energy: Generation and Applications (ICREGA)*, Al Ain, UAE, pp. 223-226, 2018.
8. **S. S. Jehangir**, R. Hussain, M. I. Hussein, and M. S. Sharawi, "A Wideband Multi-Beam Yagi based MIMO Antenna System with Multiple Parasitic Directors," *12th European Conference on Antennas and Propagation (EUCAP)*, London, UK, pp. 1-4, 2018.

7. **S. S. Jehangir** and M. S. Sharawi, "A Miniaturized Multi-Wideband Quasi-Yagi Antenna with Rectangular Loop Excitation," *IEEE International Symposium on Antennas and Propagation (APSURSI)*, San Diego, CA, USA, pp. 2527-2528, 2017.
6. **S. S. Jehangir** and M. S. Sharawi, "A Miniaturized UWB Bi-Planar Yagi-Like Antenna," *IEEE International Symposium on Antennas and Propagation (APSURSI)*, San Diego, CA, USA, 501-502, 2017.
5. **S. S. Jehangir** and M. S. Sharawi, "A highly miniaturized loop excited Quasi-Yagi antenna with high front-to-back ratio", *11th European Conference on Antennas and Propagation (EUCAP)*, Paris, France, 2017, pp. 1976-1979.
4. **S. S. Jehangir** and M. S. Sharawi, "A comparison between two different excitations for Quasi-Yagi antennas," *IEEE Middle East Conference on Antennas and Propagation (MECAP)*, Beirut, Lebanon, pp. 1-2, 2016.
3. **Presented**: **S. S. Jehangir** and M. S. Sharawi, "A Miniaturized Dual Wideband Loop Excited Quasi Yagi Antenna using a Defected Ground Structure," *16th Mediterranean Microwave Symposium (MMS)*, Abu Dhabi, UAE, pp. 1-3, 2016.
2. **S. S. Jehangir** and M. S. Sharawi, " A novel compact single layer semi-ring slot Yagi-like antenna with high front-to-back ratio," *IEEE 5th Asia-Pacific Conference on Antennas and Propagation (APCAP)*, Kaohsiung, Taiwan, pp. 131-132, 2016.
1. **S. S. Jehangir**, A. Hassan, and M. S. Sharawi, "A 4-element dual wideband circular Yagi MIMO antenna system with loop excitation," *IEEE International Symposium on Antennas and Propagation (APSURSI)*, Fajardo, pp. 69-70, 2016.

AWARDS AND HONORS

Year 2022

- Won the 2nd place and a cash prize for the poster "Designing Ultrawideband High Precision Dual-polarized Antenna Probes for Unmanned Aerial Vehicle (UAV) Based Real-time Calibration of Digital Phased Array Radars for Defense and Meteorology Applications", **Oklahoma Aerospace & Defense Innovation Institute (OADII) Student Poster Competition**, Oct., 2022.
- Awarded The **Farrar Endowment Scholarship**, College of Engineering, The University *of* Oklahoma (OU), for outstanding academic achievements, 2022.
- Awarded **The William H. Barkow Scholarship**, Gallogly College of Engineering, The University of Oklahoma (OU), for outstanding academic achievements, 2022.
- Awarded The **Nettie Vincent Boggs Graduate Scholarship**, Gallogly College of Engineering, The University *of* Oklahoma (OU), for excellent academic performance, 2022.
- Awarded **The University *of* Oklahoma Pandemic Scholarship**, 2022.

Year 2021

- Awarded The **Farrar Endowment Scholarship**, College of Engineering, The University *of* Oklahoma (OU), for outstanding academic achievements, 2021.
- Awarded The **William H. Barkow Scholarship**, Gallogly College of Engineering, The University *of* Oklahoma (OU), for outstanding academic achievements, 2021.
- Awarded The College of International Studies (CIS) Access **International Student Scholarship**, The University *of* Oklahoma, OU, 2021.
- Awarded the **James and Billie Wright International Student Scholarship**, The University *of* Oklahoma (OU), for outstanding academic achievements, 2021.
- Awarded **The University *of* Oklahoma Pandemic Scholarship**, 2021.

Years <2020

- **Student Journal paper award**, both from the ECE Department and the ARRC OU, Dec 2020.
- Awarded **fully funded scholarship** for M.S. studies in KFUPM.
- Awarded **fully funded scholarship** for undergraduate studies in COMSATS (Ministry of Federal Employees and Benevolent Fund Scholarship).
- Awarded the **Campus Gold Medal** by the rector of COMSATS, Pakistan, March, 2014.
- **Highest CGPA holder** in the batch (class rank: 1 out of 103). Awarded Distinction and Merit scholarships each semester, 2010-2014.
- **BS senior project** was selected for the yearly competition of the International Conference on Frontier Institute of Technology (FIT), Pakistan, Dec. 2013.
- Awarded for securing **1st place in HSSC studies** in district Nowshera, Khyber-Pakhtunkhwa (KPK) state, 2007.

SELECTED ACADEMIC PROJECTS (Ph.D.)

- Design of a dual-polarized slotted waveguide array. Fall 2019
- Design of an Artificial material for microwave and mm-Wave applications. Spring 2020
- Design of a metallic and dielectric-based Luneburg lens antenna. Fall 2020
- Design of Matlab GUI platform for Horus radar. Spring 2021
- Design of broadband and directional probe antenna for UAV-based in-situ outdoor measurements of radars and communication systems. Fall 2021-2022

PROFESSIONAL CERTIFICATIONS

- Computer-Aided Design (CAD), Computer Aided Manufacturing (CAM), Computer Numerical Control (CNC), and Milling – Lathe (School of Mechanical and Manufacturing Engineering), NUST, Islamabad, Pakistan, 2014.

PROFESSIONAL SERVICE

Referee service

- IET Microwaves, Antennas & Propagation.
- IEEE Antennas and Wireless Propagation Letters.
- International Journal of Microwave and Wireless Technologies.
- IEEE Open Journal of Microwave and Wireless Technologies.

SKILLS

Programming Languages: C, C++, Java, Matlab, Matlab AppDesigner, LabVIEW.
CAD Tools: HFSS, CST, ADS, DAK, PSpice, Solidworks, Microwave Office/AWR.
Prototype Fabrication: 3D printing, CNC Milling, PCB LPKF Milling and Laser Prototyping, Electro-less/Electro-plating, Photolithography.
Applications: Latex, Visio, Inkscape.

LANGUAGES

- English (as second and official language).
- Pashtu (as native language).

REFERENCES

- Dr. Jorge L. Salazar-Cerreno, ARRC-PAARD, The University *of* Oklahoma, Norman.
  Email: salazar@ou.edu
- Prof. Mohammad S. Sharawi, Department of EE, Polytechnique Montréal, Canada.
  Email: mohammad.sharawi@polymtl.ca
- Prof. Husain M. Masoudi, Department of EE, King Fahd University of Petroleum and Minerals, Dhahran, KSA.
  Email: husainm@kfupm.edu.sa
- Dr. Muhammad Adnan Siddique, Department of Computer Engineering, Information Technology University, ITU, Lahore, Pakistan.
  Email: adnan.siddique@itu.edu.pk