Ali I. Hammoodi – PhD

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Current Job:

Signal Integrity Engineer – Project Manager (Full Time)

Amphenol Inc.
200 innovative Way, Suite 201
Nashua, NH, 03060

Education

Ph.D. Telecommunications and Network Engineering — December 2018
University of Arkansas at Little Rock — 4.0 GPA

- Developed new methodolog for designing and evaluating of flexible antennas using machine learning based on Artificial Neural Networks (ANNs)

M.Sc. Systems Engineering — December 2015
University of Arkansas at Little Rock — 4.0 GPA

- Introduced a new concept of sequentially-rotated circular-polarized antennas arrays for GPS applications.

B.Sc. Telecommunications Engineering — June 2011
University of Technology, Baghdad, Iraq — 4.0 GPA

Teaching and Advising

University of Arkansas at Little Rock — August 2015 to December 2016

- SYEN 3000 Circuit and Systems
- SYEN 3150 Signals and Systems Laboratory
- SYEN 3356 Electromagnetic Fields and Waves
- SYEN 4357 Advanced Antennas for Wireless Systems
- SYEN 5356 Electromagnetic Waves and Antennas
- SYEN 5353 RF Techniques and Systems
- SYEN 7357 Advanced Antennas for Wireless Systems

University of Technology, Baghdad — November 2011 to December 2013

- Signals and Systems Laboratory
- Electromagnetic Fields and Waves Laboratory
- Analog Communication Laboratory

- Digital Communication Laboratory
- Antenna and Microwave Laboratory

Experience

Signal Integrity Engineer - Project Manager January 2019 – Present

- Lead different design platforms from development to production
- Project planning and management
- Working as part of a multi-disciplinary team in the development of next generation high speed backplane and interconnect products
- Working on next generation technologies and processes that support the development of high-speed interconnect products
- Helping customers across a wide range of sectors solving their high-speed data transmission problems
- Helping the internal Sales Engineers to develop strategies for product break-in at existing and new accounts based on our SI expertise

Senior Electrical Engineer October 2018 – December 2019

Spectra7 Microsystems Inc., Little Rock, Arkansas, USA

- Leads the design, build and qualification of passive and active high data rates (High Frequency) modules for datacenter and AR/VR applications
- Recommends changes in designs or technical procedures to improve product/system performance
- Conducts and coordinates analytical simulations (SPICE) for the whole channel of active cable design up to 25Gbps
- Provides development input to design teams and creates electrical product models and documentation
- Analyze variation dependence and parametric optimization of different product and correlate signal integrity and power integrity of simulation versus measurement
- Works in laboratory environment to validate design and correlate measurement with simulations using VNA, TDR and Oscilloscope
- Develop empirical and analytical electrical test procedures and specifications and design and development of test fixtures for testing mated connector solutions
- Design characterization and customer verification test vehicles that include working with PCB design & fabrication houses
- Perform detailed design reviews for customers and provide recommendations, making selection of appropriate signaling and interconnect technology for high performance links
- Simulate and analyze the overall link to develop the sensitivity of each piece of physical layer. Generate routing and electrical margins requirements for specific interfaces and verify correctness
- Conduct detailed testing and measurements to collect data for validation and correlation of design analysis. Generate evaluation and qualification reports or presentation materials for both internal and customer use
- Create and maintain proper documentation of work output. Assist in preparing and conducting technical presentations to Sales, Marketing, or Customers

- Understanding and implementation different specifications of USB, DisplayPort, HDMI, and SFF to design and develop passive and active high data rate modules for AR/VR and datacenter applications

Electrical Engineer January 2016 – September 2018

Spectra7 Microsystems Inc., Little Rock, Arkansas, USA

- Understanding and implementation of USB, DisplayPort, HDMI, and SFF specifications to design and develop passive and active paddle cards for virtual reality, augmented reality, and datacenter applications
- Printed circuit board (PCBs) design using Mentor Graphic software (DxDesigner, PADS, and Router) for USB3 Gen1 and Gen2 (Type-C, Type-A, Type-B), DisplayPort (HBR2 and HBR3), miniDisplayPort (HBR2 and HBR3), HDMI, SFP28, and QSFP28 applications
- Modeling and analyzing of high-speed paddle cards up to 25 Gbps using EM simulators and 2D field solvers to evaluate signal integrity, power integrity, and full channel loss budget
- Compliance testing of several passive and active products, including DisplayPort, USB3 (Gen1 and Gen2), HDMI, QSFP28, SFP28, and DDQSFP28
- Conducting troubleshooting and failure analysis of defective products on production lines to find the root cause, and developing new methods to improve the quality of the process
- Developing test plans for AR/VR products and deploying software to program IC's and set the best equalization setting for active paddle cards

Teaching and Research Assistant August 2015 - December 2016

University of Arkansas at Little Rock, Little Rock, Arkansas, USA

- Conducted research in antennas designs for various applications including UWB antennas, antennas arrays, circular-polarized antenna, dual-band antenna, flexible antenna, metamaterial, mutual coupling reduction in antennas arrays, and drooped antennas
- Instructed several labs and assisted in teaching courses in Electric Circuits, Electronics, Antennas, Microwave Engineering, and Electromagnetic Fields
- Instructed capstone projects and master thesis projects in antennas designs and RF circuitry

Lecturer/Laboratory Engineer November 2011 - December 2013

University of Technology, Baghdad, Iraq

- Developed and maintained three different educational labs for analogue communication, digital communication, and antenna and microwave engineering
- Tested and evaluated lab equipment for different applications, such as oscilloscopes, multimeters, spectrum analyzers, and analog / digital transceivers
- Taught analog and digital communication fundamentals, as well as antenna and microwave engineering advanced courses

Skills/Summary

- Plan and develop antennas, antenna arrays, and antenna feeding networks for different wireless applications and wide range of frequencies, up to 30GHz

- Eight years of experience with Ansys, Ansoft simulator (HFSS, Circuit Design, 2D extractor, Q3D, and PCB Layout) to design and implement passive and active PCBs, as well as antenna designs
- Seven years of experience using CST Microwave Studio to design and implement EM devices
- Very good Knowledge of analytical and numerical techniques applied to electromagnetic waves and microwave engineering problems (coaxial, waveguide, microstrip, strip-line, coplanar waveguide, antennas, filters, metamaterial, defected ground structures, periodic structures, frequency selective surfaces)
- Design and implement high speed passive and active printed circuit boards (PCBs) up to 25Gbps, for various applications such as virtual reality, augmented reality, and datacenters
- Implement electromagnetic and signal integrity theories in PCBs and RF circuits
- Strong understanding of s-parameters and signal integrity issues, such as crosstalk, insertion loss, return loss, mode conversion, intra-pair skew, eye diagram, and jitter analysis
- Proficient in PCB design and layout using Mentor Graphics, including DxDesigner, Hyperlinks, PADS, and PADS router
- Knowledgeable in programming languages such as MATLAB and Python
- Author/co-author of more than 30 published papers in peer-reviewed journals and international conferences focused on state-of-the-art antennas designs and applying of EM theories to find practical solutions for wearable EM devices and antennas arrays

Hardware/Laboratory

- Testing of s-parameters and radiation patterns for antennas operating in wide spectrum applications, including UWB, wideband, flexible, circular polarized, reconfigurable, array, and 3D antennas
- Excellent experience using anechoic chambers and high-speed, mixed-signal laboratory equipment, such as vector network analyzers (VNAs) up to 26.5 GHz, oscilloscopes, time-domain reflectometers (TDRs), 12.5Gb/s high-performance serial bit error rate testers (BERTs), function generators, digital power supplies, and oscilloscopes
- Testing of high-speed passive and active cable assemblies for datacenter and AR/VR applications, such SFP28, QSFP28, miniSAS-HD, HDMI, DisplayPort, USB2, and USB3.1 Gen. 1 and Gen. 2, including USB Type-C
- Excellent experience in building test systems to program active cables ICs, verify electrical continuity, and perform signal integrity measurements
- Failure analysis and troubleshooting of defective samples in terms of power delivery, signal integrity, mechanical rigidity, and active component functionality
- Industry compliance testing of HDMI, DisplayPort, USB, SFP+, SFP28, QSFP+, QSFP28, OCuLink and miniSAS-HD

Research Interest

- Design and implement antenna for Global Positioning Systems (GPS), satellite, wireless systems and 5G Applications
- Design and implementation of phased, beam forming, and beam scanning antennas array.

- Miniaturization of antennas and antennas arrays using fractal geometries and multilayer antennas
- Design and deploy of wearable, implantable antennas and transparent antennas for industrial and medical applications
- Mutual coupling reduction between antennas array using different techniques such as Electromagnetic bandgap (metamaterial), defective ground structure (DGS), meta-surface and frequency selective surface (FSS) structures
- Bandwidth and gain enhancement of signal band and multiple-band antennas for different applications such as GPS, WLAN, WiMAX, and cellular system
- Develop and implement of UWB antennas for Magnetic resonance imaging and RFID applications
- Enhance simulation time and develop of cost-effective models for different type of antennas designs using neural network and deep learning approaches
- Analyze and emphasis the theory of signal and power integrity of high speed printed circuit design for wide range of applications up to 30GHz
- Implement and analyze of RF active devices for different type of applications such as reconfigurable antennas, phased-array antennas, in addition to beam steering and beam forming techniques

Services in Committees

- Industrial Advisory Board Member, University of New Hampshire, Durham, 2019
- Dean assistant of Graduate School, Electrical Engineering Department, University of Technology, Baghdad, Iraq, 2012-2013
- Member of Laboratory Equipment Committee, Electrical engineering department, University of Technology, Baghdad, Iraq. 2011-2013

Honors and Awards

- One-minute Elevator Speech Award, University of Arkansas at Little Rock, 2016
- The 2016 Best Paper Award, eTelemed Conference, Italy
- Who's who Award, University of Arkansas at Little Rock, 2016
- First-rank Student Award (four times) University of Technology, Baghdad, Iraq, 2008-2011
- Outstanding Master Student Award, Department of Systems Engineering, University of Arkansas at Little Rock, 2015
- EXPO Award of research competition, University of Arkansas at Little Rock, 2015
- International Student Award, University of Arkansas at Little Rock, 2015

Activities

IEEE Professional Activities Representative, Arkansas Section 2018 – 2019

IEEE Student Member, Antenna and Propagation Society	2014 – Present
IEEE Microwave Theory and Technique Society (MTT-S) student member	2015 – Present
IEEE Transactions on Biomedical Circuits and Systems, reviewer	2018 – Present
American Journal of Engineering and Applied Sciences, editor	2017 – Present

Grants

- Principal Investigator: NSF Combined Research and Curricula Development Grant, "Track Driver Behaviors Detection System using Machine Learning and Internet of Things," July 2016, $50,000.

Publications

Patent

1. **Ali I. Hammoodi** and Mariofanna Milanova, "Systematic Approach for the Design of Antenna using Neural Network", Assignees: Board of Trustees University of Arkansas at Little Rock, 2018, pending.

2. **Ali I. Hammoodi** and Hussain Al-Rizzo, "Sequential Rotated Virtual Antenna Array for GPS Applications", Assignees: Board of Trustees University of Arkansas at Little Rock, 2017, pending.

Refereed Journals Publications

1. **Ali I. Hammoodi**, Haider Raad, and Mariofanna Milanova, "Design of Flexible Dipole Antenna using Neural Network", PIER Letter, 2018, Submitted.

2. **Ali I. Hammoodi** and Mustafa S. Bakr, "Novel Approach for Mutual Coupling Reduction Between Two Closely Spaced Patch Antennas, IEEE Antenna and Propagation Letter, 2018, Submitted.

3. **Ali I. Hammoodi**, Hussain AL-Rizzo, Ayman A. Isaac, "A Sequentially Rotated GPS Virtual Antenna Array Using a Single Conducting Patch", IEEE Transaction Antenna & Propagation, 2018, Submitted.

4. Haider Khaleel Raad, Casey White, Heidrun Schmitzer, Dennis Tierney, **Ali I. Hammoodi**, Ayman Issac Abbosh, "A Single-band Optically Transperant Antenna for Wearable Smart Glasses", PIER Jouranl, 2018. Submitted.

5. **Ali I. Hammoodi**, Seevan F. Abdulkareem, Jawad K. Ali, Ali J. Salim, Mohammed R. Hussan, Mahmood T. Yassen, "A Circular Cantor Fractal Based Printed Slot Antenna for Triple and Dual-band Wireless Applications", International Journal of Electronics Communication and Computer Engineering, ISSN (Online): 2249–071X, ISSN (Print): 2278–4209, Volume4, Issue-6, November 2014.

6. Jawad Ali , Seevan Abdulkareem , **Ali I. Hammoodi** , Ali Salim , Mahmoud Yassen , Mohamad Hussan , and Hussain Al-Rizzo , "Cantor fractal-based printed slot antenna for dual-band wireless applications", International Journal of Microwave and Wireless Technology, ISSN: 1759-0795, Volume-First View, Issue-1, 2015.

7. Mahmood T. Yassen, Jawad K. Ali, Ali J. Salim, Seevan F. Abdulkareem, **Ali I. Hammoodi**, Mohammed R. Hussan, "A New Compact Slot Antenna for Dual-band WLAN Applications", International Journal of Science and Modern Engineering (IJISME), ISSN: 2319-6386, Volume-1, Issue-10, September 2013.

8. Mahmood T. Yassen, Jawad K. Ali, Ali J. Salim, Seevan F. Abdulkareem, **Ali I. Hammoodi**, Mohammed R. Hussan, "A Compact Fractal Based Printed Monopole Antenna for WiBro, WiMAX and UWB Applications", International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249 – 8958, Volume-1, Issue-1, October 2013.

9. Sevan F. Abdulkareem, Jawad K. Ali, **Ali I. Hammoodi**, Ali J. Salim, Mahmoud T. Yassen and Mohammed R. Hussan, "Fabrication and Performance Evaluation of a Fractal-based Slot Printed Antenna for Dual-band Wireless Applications", Iraqi Journal of Computer, Communication, and Control Engineering, Volume14, Issue-2, 2014.

10. Seevan F. Abdulkareem, **Ali I. Hammoodi**, Jawad K. Ali, Ali J. Salim, Mahmood T. Yassen, Mohammed R. Hussan, "A Dual-band Printed Slot Antenna Based on Modified Sierpinski Triangle", International Journal of Electronics Communication and Computer Engineering, ISSN (Online): 2249–071X, ISSN (Print): 2278–4209, Volume5, Issue-1, 2014.

Papers Presented at Conferences and Professional Meetings

1. **Ali I. Hammoodi**, Mustafa S. Bakr, H. Raad and Mariofanna Milanova, "Effect of Bending on UWB Flexible Pentagonal Shape Antenna," *13th European Conference on Antennas and Propagation*, London, Poland, 31 March-5 April, 2019. Submitted.

2. **Ali I. Hammoodi**, H. Raad and Mariofanna Milanova, "Mutual Coupling Reduction Between Two Vertically Closely Spaced PIFAs," *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018. Accepted.

3. **Ali I. Hammoodi**, H. Raad and Mariofanna Milanova, "Mutual Coupling Reduction between Two Circular Patches Using H-Shape DGS," *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018. Accepted.

4. **Ali I. Hammoodi**, Mariofanna Milanova, and H. Raad, " Baysian Regularization based ANN on the Design of Flexible Antenna for UWB Wireless," *Multimodal Representation, Retrieval, and Analysis of Multimedia Content*, Miami, FL, USA, April 2018.

5. **Ali I. Hammoodi**, Mustafa S. Bakr, H. Raad and M. Milanova, " Isolation Enhancement Between Two Closely Spaced Rectangular Patches for MIMO Applications," *12th European Conference on Antennas and Propagation*, London, UK, 9-13 April, 2018.

6. **Ali I. Hammoodi**, Mariofanna Milanova, and H. Raad, " Design of Flexible Antenna for UWB Wireless Applications Using ANN," *4th Annual Conf. on Computational Science & Computational Intelligence (CSCI'17), Dec 14-16, 2017, Las Vegas, Nevada, USA.*

7. H. Raad, C. White, H. Schmitzer, D. Tierney, A. Issac and **Ali I. Hammoodi**, "A 2.45 GHz transparent antenna for wearable smart glasses," 2017 Progress in Electromagnetics Research Symposium - Fall (PIERS - FALL), Singapore, 2017, pp. 99-102.

8. **Ali I. Hammoodi**, A. A. Isaac and H. Raad, "Mutual coupling reduction using grounded strip line with diamond slots," *2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, San Diego, CA, 2017, pp. 2219-2220.

9. **Ali I. Hammoodi**, A. A. Isaac and H. Raad, "Isolation enhancement between two closely spaced circular patches using dgs," *2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, San Diego, CA, 2017, pp. 2273-2274.

10. **Ali I. Hammoodi**, H. Al-Rizzo, A. A. Isaac, A. S. Kashkool, K. Gamer and H. Khaleel, "Studying the effect of bending on the performance of flexible dual band microstrip monopole antenna," *2016 IEEE Conference on Antenna Measurements & Applications (CAMA)*, Syracuse, NY, 2016, pp. 1-3

11. A. S. Kashkool, H. Al-Rizzo, **Ali I. Hammoodi** and A. A. Isaac, "Effects of flexible substrates on the performance of UWB planar monopole antennas," *2016 IEEE Conference on Antenna Measurements & Applications (CAMA)*, Syracuse, NY, 2016, pp. 1-4.

12. Haider Khaleel Raad, Casey White, Hussain Al-Rizzo, Ayman Isaac, and **Ali I. Hammoodi**, " A Compact Dual-Band Antenna for Wearable e-Health Devices," The Eighth International Conference on eHealth, Telemedicine, and Social Medicine, Venice, Italy, 2016, pp. 2308-4359.

13. **Ali I. Hammoodi**, H. M. Al-Rizzo, Ayman A. Isaac, "A Wearable Dual-Band Square Slot Antenna with Stub for ISM and WiMAX Applications," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

14. **Ali I. Hammoodi**, H. M. Al-Rizzo, Ayman A. Isaac, "Mutual Coupling Reduction between Two Monopole Antennas Using Fractal Based DGS," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

15. **Ali I. Hammoodi**, H. M. Al-Rizzo, Ayman A. Isaac, "A Proposed Flexible Elliptical Ring Monopole Antenna for DSC and UWB with Notch Suppression for 5.8GHz Applications," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

16. **Ali I. Hammoodi**, H. M. Al-Rizzo, Ayman A. Isaac, Haider R. Khaleel, " A Tunable Dual-Band Square Slot Antenna With Stub for DCS, ISM, and WiMAX Applications," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

17. Ayman A. Isaac, H. M. Al-Rizzo, **Ali I. Hammoodi**, Said Abushamleh, Haider R. Khaleel "Coupling Reduction of Two Planar Monopole Antennas for Modern Wireless Applications ," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

18. Ayman A. Isaac, H. M. Al-Rizzo, **Ali I. Hammoodi**, Said Abushamleh, Haider R. Khaleel "Isolation Enhancement of Two Planar Monopole Antennas for MIMO Wireless Applications," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

19. Ayman A. Isaac, H. M. Al-Rizzo, **Ali I. Hammoodi**, Said Abushamleh, Haider R. Khaleel "Isolation Enhancement of Two Closely Spaced Planar Monopole Antennas for Industrial, Scientific, and Medical Applications ," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

20. Ayman A. Isaac, H. M. Al-Rizzo, **Ali I. Hammoodi**, Said Abushamleh, Haider R. Khaleel "Mutual Coupling Reduction between Two Closely Spaced Inverted-F Antennas ," 2015 IEEE International Symposium Antennas and Propagation and North American Radio Science Meeting, Vancouver, BC, Canada, 19-25 July, 2015.

21. Seevan F. Abdulkareem, Ali J. Salim, Jawad K. Ali, **Ali I. Hammoodi**, Mahmood T. Yassen, Mohammed R. Hussan, "A Compact Peano-Type Fractal Based Printed Slot Antenna for Dual-band Wireless Applications, "IEEE International RF and Microwave Conference, pp. 329 - 332, Dec. 9 – 11, 2013, Penang, Malaysia

22. Seevan F. Abdulkareem, Ali J. Salim, **Ali I. Hammoodi**, and Jawad K. Ali , "A Fractal-based Printed Slot Antenna for Multi-band Wireless Applications", Progress In Electromagnetics Research Symposium Proceedings, Stockholm, Sweden, Aug. 12-15, 2013.

23. Jawad K. Ali, Ali J. Salim, **Ali I. Hammoodi**, and Hussam Alsaedi, "An Ultra-Wideband Printed Monopole Antenna with a Fractal Based Reduced Ground Plane", Progress In Electromagnetics Research Symposium Proceedings, Moscow, Russia, August 19–23, 2012.

References

- Prof. Dr. Mariofanna Milanova
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