

## PERSONAL

**Sex:** Male  
**Marital Status:** Married with three children  
**Citizenship:** Canadian, Iraqi, and US Green Card Holder

### **Residence:**

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### **Work:**

Dr. Hussain Al-Rizzo  
Systems Engineering Department, Office: EIT 520  
George W. Donaghey College of Engineering and Information Technology  
University of Arkansas at Little Rock  
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Little Rock, AR 72204-1099  
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## EDUCATION

### **Ph.D., Electrical Engineering (Highest Honors), 1992**

Department of Electrical and Computer Engineering, University of New Brunswick, Fredericton, NB, Canada. (Won the nomination by the University of New Brunswick as the *Best Doctoral Graduate in Science and Engineering*)

**Areas of Concentration:** Antennas and Propagation, Applied Computational Electromagnetics, Global Positioning System (GPS), and Wireless Communications Systems.

### **Graduate Courses:**

EE 3221 *Digital Systems II*, EE 6543 *Estimation and Adaptive Filtering*, EE 6553 *Satellite Communications*, EE 6823 *Advanced Antenna Theory*, EE 6833 *Optical Signal Processing*, EE 6863 *Radar Systems*, EE 6883 *Microstrip Antennas*, EE 6593 *EMI-EMC Engineering*, SE 4253 *GPS Positioning*, SE 3122 *Advanced Adjustment Calculus*, SE 3032 *Astronomy*, ENGL 1013 (**GPA 4.3/4.3**)

**Dissertation Title:** *Electromagnetic Wave Scattering from 3-D Coated and Homogeneous Objects Using the Generalized Point Matching Technique and Generalized Multipoint Technique: Numerical Modeling and Applications*

**Advisor:** Professor Tranquilla James Marcus, Jr.

**M.Sc., Electronics and Communications (Highest Honors), 1983**

Department of Electrical Engineering, University of Mosul, Mosul, Iraq.

**Areas of Concentration:** Microwave Communication Systems, Electromagnetic wave Propagation in Random Media, Measurements of the Constitutive Parameters at Microwave Frequencies.

**Graduate Courses:**

*Engineering Analysis, Micro-Electronics, Microwave Engineering, Advanced Digital Electronics, Advanced Numerical Analysis, Advanced Electronics Lab., Network Analysis & Synthesis, Applied Electromagnetic Fields, Advanced Communications Engineering, Advanced Communications Lab., Communication Theory (Cumulative Average 86.7%)*

**Master Thesis Title:** *Effects of Sand and Dust Storms on Iraqi National Microwave Communications Links.*

**Advisor:** Professor Al-Hafid Hafid Taha

**Postgraduate Diploma, Electronics and Communications (Highest Honors), 1981**

Department of Electrical Engineering, University of Mosul, Mosul, Iraq.

**Diploma Thesis Title:** *Investigation of the Solar Power Satellite System from the Perspective of Developing Countries.*

**B.Sc., Electronics and Communications (Highest Honors), 1979**

Department of Electrical Engineering, University of Mosul, Mosul, Iraq.

<b>RESEARCH INTERESTS</b>
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Design and Analysis of Flexible Artificial Magnetic Conductors, Electromagnetic Band Gap Structures, and Metamaterials, RF Carbon Nanotube-Based Antennas and Sensors, Antennas and Wireless Systems for Implantable/Wearable Medical Devices, GPS Antenna Design, Dynamic Channel Allocation and Load Balancing in WLAN, Advanced Engineering Electromagnetics, Computer-Aided Design (CAD) of Guided-Wave Components and Antennas, Electromagnetic Wave Propagation and Scattering in Complex Media.

<b>QUALIFICATIONS</b>
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- Excellent background in rigorous analytical and numerical techniques applied to engineering electromagnetic wave problems.
- In-depth knowledge of the design, characterization, and testing of passive microwave and millimeter wave devices.
- Excellent background in metamaterials, artificial magnetic conductors, and electromagnetic band gap structures applied to antenna design, EMI/EMC and SSN reduction.

- Extensive research and design experience in multi-mode and single-mode microwave cavity structures.
- Excellent background in anechoic chamber antenna testing.
- Excellent experience in CST's Microwave Studio and Ansoft's High Frequency Structure Simulator (HFSS).
- In-depth knowledge of GPS-related technologies: data processing and accuracy assessment.
- In-depth knowledge of Ground Penetrating Radars: signal processing, detection, and forward electromagnetic scattering models.
- In-depth knowledge of smart antenna technology; supervised and blind adaptive signal processing techniques.
- In-depth understanding of the various aspects of cellular and mobile wireless communication systems and networks: multi-user detection, interference suppression, multipath, RAKE, equalization, and space-time signal processing.
- Excellent experience in teaching, curriculum development, ABET accreditation, assessment, and student mentoring.
- Excellent organizational, management, supervision, and leadership capabilities.
- Continued high-level of research activities, publications, and funded contracts and grants.

<b>RESEARCH AND INDUSTRIAL EXPERIENCE</b>
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- Design and analysis of flexible antennas based on metamaterials, electromagnetic band gap structures, and artificial magnetic conductors.
- Design of miniaturized microstrip antennas and wireless systems for implantable/wearable devices.
- Design, analysis, and testing of RF antennas and sensors based on carbon nanotube technologies.
- Dynamic optimization of channels and access points to minimize congestion, adjacent and co-channel interferences for indoor WLAN.
- Design and analysis of linearly and circularly polarized microstrip antennas for aerospace, GPS, and MIMO systems.
- Use of modern electromagnetic computational techniques to simulate high-power microwave interaction and transient-temperature profiles within lossy dielectric and magnetic materials.
- Development of novel conformal Cartesian/cylindrical finite-difference time domain algorithms to analyze geometrically composite single and multimode microwave processing applicators with temperature dependent electromagnetic and thermal constitutive parameters.
- Design of full-scale, high-power microwave heating systems for processing a wide variety of minerals and wood products.
- Design, modeling, and testing of prototype and industrial high-power traveling-wave and resonant microwave heating applicators for extraction of minerals; processing of forest products; and in situ recovery of heavy oil and tar sands.

- Development of new technologies applied to pre-treatment processes for the recovery of precious metals from ores and concentrates utilizing high-power microwave heating technologies.
- Modeling and simulation of the effects of precipitation on dual-polarized microwave and millimeter wave terrestrial and satellite communications systems.
- Field operation of GPS receivers, data processing, and accuracy assessments.
- Theoretical and experimental evaluation of the effects of the ionosphere, troposphere, and multipath on the performance of GPS pseudo-range and carrier-beat phase observations.
- Measurements of the electromagnetic constitutive parameters at microwave and millimeter wave frequencies.
- Numerical modeling of electromagnetic wave scattering and absorption by arbitrarily shaped multilayered and homogeneous, perfectly conducting and dielectric objects using:
  - *Analytical Methods*
  - *Generalized Point-Matching Technique*
  - *Generalized Multipole Technique*
  - *Extended Boundary-Condition Method*
  - *Method of Moments*
  - *Finite Element Method*
  - *Finite-Difference Time Domain Method*

<b>PROFESSIONAL EXPERIENCE</b>
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### ACADEMIC

**August 2000-Present**

*Tenured Professor of Systems Engineering, Department of Systems Engineering*

*International Students' Advisor, EIT*

*Director of the Antennas and Wireless Systems Research Laboratory*

George W. Donaghey College of Engineering and Information Technology (EIT), University of Arkansas at Little Rock.

*Associate Editor, Journal of Online Engineering Education*

**August 1998 - July 2000**

*Assistant Professor (Equivalent to Associate Professor in the North American System)*

Electrical and Computer Engineering Department, Sultan Qaboos University, Muscat, Sultanate of Oman.

*(Sabbatical leave from the University of New Brunswick and EMR Microwave Technology Corporation, Fredericton, NB, Canada.)*

**February 1992- July 1998**

*Honorary Research Associate, Radiating Systems Research Laboratory, Department of Electrical and Computer Engineering, University of New Brunswick, Fredericton, NB, Canada.*

**November 1987- January 1992**

*Research and Teaching Assistant, Ph.D. Candidate, Radiating Systems Research Laboratory, Department of Electrical and Computer Engineering, University of New Brunswick, Fredericton, NB, Canada.*

Instructed labs and assisted in teaching courses in Electric Circuits, Electronics, Antennas, Microwave Engineering, and Electromagnetic Fields.

**June 1983- October 1987**

*Research Associate and Lecturer, Electromagnetic Wave Propagation Department, Space and Astronomy Research Center, Scientific Research Council, Baghdad, Iraq.*

**January 1980- May 1983**

*Research and Teaching Assistant, M.Sc. Candidate, Department of Electrical Engineering, University of Mosul, Mosul, Iraq*

Instructed labs and assisted in teaching courses in Computer Programming, Electric Circuits, Antennas, and Electromagnetic Fields.

**INDUSTRIAL**

**March 1993-July 1998**

*Senior Research Engineer, Patent Officer, and Manager of the Electromagnetic Modeling Group EMR Microwave Technology Corporation, Fredericton, NB, Canada.*

**May 1992- February 1993**

*Research Engineer, Ocean Mapping Group, Geomatics and Geodesy Engineering Department, University of New Brunswick, Fredericton, NB, Canada.*

Conducted research utilizing both digital signal processing and underwater acoustic modeling to assist in the development of a novel approach to infer the seabed characteristics (topography, texture, and composition) from acoustic measurements of these characteristics.

**TEACHING**

**UNDERGRADUATE**

**University of Arkansas at Little Rock**

**Courses Developed and Taught**

- SYEN 2315 *Circuits and Systems*
- SYEN 2115 *Circuits and Systems Laboratory*
- SYEN 3350 *Signals and Systems*
- SYEN 3150 *Signals and Systems Laboratory*
- SYEN 3154 *Communications Systems Laboratory*
- SYEN 3354 *Digital and Analog Communication*
- SYEN 3356 *Electromagnetic Fields and Waves*
- SYEN 4100 *Applications of Metamaterial in EMI/EMC and SSN Mitigation*
- SYEN 4353 *Advanced Digital Communications*

- SYEN 4356 *RF Techniques and Systems*
- SYEN 4357 *Advanced Antennas for Wireless Systems*
- SYEN 4358 *Cellular and Wireless Communications*
- SYEN 4385 *Systems Engineering Capstone Design I*
- SYEN 4386 *Systems Engineering Capstone Design II*
- SYEN 4399 *Mobile and Personal Communications Systems* (Elective)

### **Laboratory Development**

- Circuits and Systems Laboratory
- Signals and Systems Laboratory
- Communication Systems Laboratory
- Antennas and Wireless Systems Research Laboratory

### **Student Recruitment**

- Played a very active role in recruiting undergraduate students at the George W. Donaghey College of Engineering and Information Technology.
- Recruited several Ph.D. students and M.Sc. students in the graduate program of the EIT College.

### **Sultan Qaboos University**

- MATH 1106 *Pre-calculus*
- ELEC 3111 *Electric Circuits I*
- ELEC 3511 *Electromagnetics I*
- ELEC 3522 *Electromagnetics II*
- ELEC 4325 *Electronics and Measurements Laboratory*
- ELEC 4615 *Electronics Laboratory*
- Developed and taught two technical electives, ELEC 5522 *Microwave Engineering I* and ELEC 5622 *Microwave Engineering II*

### **University of New Brunswick**

- EE1713 *Electricity and Magnetism*
- EE2723 *Electrical Circuits, Systems, and Electronics*
- EE3811 *Electromagnetic Fields and Waves I*
- EE3822 *Electromagnetic Fields and Waves II*
- EE3833 *Electromagnetic Fields and Waves for Computer Engineering*

## **GRADUATE**

### **University of Arkansas at Little Rock**

#### **Courses Developed and Taught**

- SYEN 5353 *Advanced Digital Communications*
- SYEN 5356 *Electromagnetic Waves and Antennas*
- SYEN 5353 *RF Techniques and Systems*
- SYEN 7357 *Advanced Antennas for Wireless Systems*

- SYEN 5399 *Applications of Metamaterial in EMI/EMC and SSN Mitigation(Special Topics)*
- SYEN 5399 *Mobile and Personal Communications Systems (Special Topics)*
- ASCI 7399 *Computational Electromagnetic: The Finite- Difference Time Domain Technique (Special Topics)*
- ASCI 7399 *Modeling and Simulation*

#### **Sultan Qaboos University**

- ELEC 6220 *Wireless Communications Systems*

#### **University of New Brunswick**

- EE6873 *Advanced Field Theory and Numerical Modeling of Guided Wave Structures*

### **GRADUATE RESEARCH ADVISING**

#### **University of Arkansas at Little Rock**

##### **Students Supervised/Supervising as Major Professor**

- Dr. Amer Al Habsi: *Spectrally Efficient Modulation and Turbo Coding for Communication Systems*, Ph.D., graduated on December 2005, Assistant Professor, Sultan Qaboos University, Sultanate of Oman.
- Dr. Mohammad Haider: *Dynamic Channel Optimization and Access Point Selection for Wireless Local Area Networks*, Ph.D., graduated on December 2007, Wireless Network Simulations Specialist, University of Quebec: Ecole de Technologie Superieure, Montreal and Ultra Electronics Inc., QC.
- Rami Adada: *Design of Novel Antennas for Wireless Communications with Implantable Medical Devices*, Ph.D., December 2008, RF Systems Manager, Patriot Antenna System, Florida, USA.
- Yassin Abdul Rafiaa, *Design of Microstrip Antennas for WLAN and WiMax Networks*, M.Sc., graduated on January 2010, Computer System Administrator, Graduate Institute of Technology, University of Arkansas at Little Rock.
- Daniel Rucker: *A Systems Engineering Approach to the Design and Analysis of Implantable and Wearable Wireless Devices*, Ph.D. student, expected to graduate on December 2011.
- Taha A. Elwi, *Novel Antenna Designs based on Innovations in Nanoscale and Metamaterial Structures*, Ph.D. student, expected to graduate on December 2011.
- Haidar Khalil, *Design and Analysis of Flexible Artificial Magnetic Conductors for Wearable Wireless Systems*; Ph.D. student, expected to graduate on May 2012.
- Yhiea M.H Ai-Naiemy, *A Systematic Approach for the Design, Manufacturing, and Testing of Microstrip Antennas Using Ink-Jet Printing*; M.Sc. student, expected to graduate on December 2011.
- Said Abushamleh: *Applications of planar soft/hard surfaces and Artificial Magnetic Conductors in Antennas and EMI/EMC Problems*; Ph.D. student, started August 2010.

- Supervised postdoctoral visitor, Dr. Ahmed Shaheen, Associate Dean of Medical School, University, Iraq.
- Host the science, technology, and engineering cohort for the inaugural year of the Fulbright MENA Regional Short-Term Visiting Scholar Program in Science & Technology (MENA S&T), August 2011.

#### **Students Supervised /Supervising as Graduate Committee Member**

- Laura Stuart: *Underground Injection*, Applied Physics Program, Applied Science Department, M.Sc. Thesis, Major Advisor: Dr. Hayder Al-Shukri, Spring, 2003.
- Shoaib Shajaat: *A Novel Power Control Scheme for CDMA Systems Using a Stochastic Differential Equations Approach*, M.Sc. Thesis, Major Advisor: Dr. Sedick Djouadi, Spring 2004.
- Anindo Roy: *Robust Stabilization of Multi-Body Biomedical Systems: A Control Theoretic Approach*, Ph.D. Thesis, Major Advisor: Dr. Kamran Iqbal, January 2005.
- Abbas Sámí Eyuboglu: *Ground Penetrating Radar: A Tool for Environmental and Geo-Technical Applications*, Ph.D. Thesis, Major Advisor: Dr. Hayder Al-Shukri, December 2005.
- Ryan Seal, *Multi-Channel Digital Receiver Data Acquisition System for the Arecibo Radar*, M.Sc. Thesis, Major Advisor: Urbina Julio, August 2006.
- Zafar Taha: *Coding/OFDM Communications Systems*, Major Advisor: Dr. Xian Liu, graduated on May 2007.
- Gomathy Kumar: *Analysis of the Performance of IEEE 802.15.4 for Wireless Body Area Network*. M.Sc., Major Advisor: Dr. Seshadri Mohan, October 2008.
- Basil Miller: *Application of Geophysical Analysis for Environmental and Geotechnical Problems*, Ph.D. Thesis, Major Advisor: Dr. Hayder Al-Shukri, October 2009.
- Shayma Jabir: *Efficient Deployment of Large-Scale MANETS*, Major Advisor, Dr. Srinivasan Ramaswamy, PhD, November 2009.
- Okba R. Al Kadi: *Application of GPR for Archeological Exploration*, Ph.D. Thesis, Major Advisor: Dr. Hayder Al-Shukri, January 2011.
- Yasir Talib: *Peak-to-Average Power Ratio Reduction in OFDM Communications Systems*, Major Advisor: Dr. Seshadri Mohan, January 2011.
- Jerzy S Zielinski: *3D Digital Image Processing for Biofilm Quantification from Confocal Laser Scanning Microscopy*, Ph.D. Thesis, Advisor: Dr. Nidhal Bouaynaya.

#### **University of New Brunswick**

(Thesis Supervision Completed in Collaboration with Professor Jim Tranquilla)

- Kenneth G. Clark: *The Finite-Difference Time-Domain Technique Applied to the Drooped Microstrip Antenna*, Ph.D. Thesis, July 1996.
- H Y Zedan: *Design and Analysis of Rectangular Waveguide Applicators Using the Finite Difference Time Domain Method*, M.S. Thesis, August 1998.
- Feng Ma: *Electromagnetic Modeling of Composite Cylindrical Applicator Geometries Using a Novel Cartesian-Cylindrical Hybrid Finite-Difference Time Domain Method*, Ph.D. Thesis, September 1999.



## RESEARCH

### University of Arkansas at Little Rock

#### **Research Laboratory Development**

**Antennas and Wireless Systems Research Laboratory:** The laboratory is equipped with two Agilent network analyzers, spectrum analyzer, DMP-2831 materials deposition system printer, anechoic chamber (400 MHz-40 GHz), dosimetric testing equipment, dielectric probe, and phantom head model. In addition, the laboratory is equipped with multiprocessor server, powerful, state-of-the-art computer facilities and simulation tools: Zeland's IE3D and Fidelity; CST's Design Suite; Ansoft's HFSS, Optimetrics, ePhysics, Ansoft Designer, Maxwell 2-D, and Maxwell 3-D; Agilent's ADS and AMDS; SystemView by Elanix; EDX Tools for Wireless Systems; SEMCAD; IMTS's EMPIRE; CoWare; Wireless Insite; MultiSim; VisSim; Prop Lab; OPNET; and Qualnet.

**GPS/Remote Sensing (RS)/GIS Laboratory** (in collaboration with Drs. Yupo Chan, Kamran Iqbal, and Hayder Al Shukri): The laboratory includes near real-time satellite image processing, GPS tracking system for transportation, earth magnetic field measurements equipment, and GIS application capabilities.

#### **Ongoing Research Projects**

- Applications of Artificial Magnetic Conductors in Flexible Wireless Systems
- Applications of Metamaterials in EMI/EMC Problems
- Carbon Nanotube-Based RF Antennas and Wireless Sensors
- Circularly Polarized Microstrip Antennas for High Gain and Uniform Hemispherical Coverage
- Design of Compact Antennas and Wireless Systems for Implantable/Wearable Medical Devices
- Integration of Ground and Space-Based Observations to Detect and Identify Sources of Sand and Dust Storms in Iraq
- Smart Current Sensors
- Wireless Electroencephalogram Electrode
- Dynamic Optimization of Access Point Selection for Wireless Local Area Networks

### University of New Brunswick (Completed)

- Development of analytical and computer-aided numerical techniques for the analysis of electromagnetic wave radiation, propagation, and radar scattering.
- Design, analysis, and testing of drooped microstrip antennas and choke-ring ground planes for multipath control in GPS applications.
- Interaction of EM waves with biological media.
- Development of numerical techniques for the in situ the recovery of oil from tar sand using

High-power microwave heating technology.

**EMR Microwave Technology Corporation (Completed)**

- Development of new processes to enhance the extraction efficiency and processing costs of petroleum, minerals, refractory gold, and forest products utilizing high-power microwave energy.
- Modeling and design of microstrip antennas for GPS and aerospace applications.
- Design, testing, and implementation of a modern laboratory at the EMR commercial test facility including, in particular, the design of 2.5 to 75 kW, 915 MHz industrial microwave heating applicators as well as instrumentation and computer control equipment.
- Developed a full-wave computer code for the evaluation of the volumetric microwave-induced heating as a part of a modern multiphase heavy oil and oil sands reservoir model including a FDTD algorithm for a slotted waveguide applicator and the solution of the associated electromagnetic propagation/thermal problem.

**Space and Astronomy Research Center, Scientific Research Council (Completed)**

- Theoretical modeling and experimental investigation of the effects of sand and dust storms on the performance of terrestrial and satellite communications systems.
- Manager of the technical group responsible for the operation, maintenance, and development of the millimeter wave receiver's front end of the Iraqi National Radio Astronomical Observatory.

<b>GRANT PROPOSALS</b>
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**University of Arkansas at Little Rock**

**Curricula/Laboratory Development Grants (Granted)**

1. Principal Investigator: "Development of a Virtual Wireless Telecommunications Laboratory: A Systems Engineering Approach," Ansoft Corporation, \$5,000 summer stipend. Ansoft also donated their full software products for the design of high-frequency systems with a commercial value of \$3,483,928 of licenses, April 27, 2003.
2. Principal Investigator: "A Proposal for a Graduate Program in Systems Engineering at the Donaghey Cyber College," George W. Donaghey College of Engineering and Information Technology, October 2, 2004.
3. Principal Investigator: "An Innovative Virtual-Based Class in Undergraduate Electromagnetics Utilizing Computer-Based Simulations and Visualization Tools," University of Arkansas at Little Rock 2001 Faculty Grant Programs, March 23, 2001-April 23, 2002, \$6,800.
4. Principal Investigator: "Development of Applied Electromagnetics and Wireless Communications Laboratory in the Department of Systems Engineering," George W. Donaghey College of Engineering and Information Technology, February 2001, \$51,559.
5. Principal Investigator: (Co-PI's: Dr. Yupo Chan, Hayder Al Shukri, and Kamran Iqbal) "Development of GPS/RS/GIS Laboratory at the University of Arkansas at Little Rock,"

George W. Donaghey College of Engineering and Information Technology, February 2001, \$84,000.

6. Principal Investigator: "A Proposal to the Shortage of Graduate Students at Our College," George W. Donaghey College of Engineering and Information Technology, October 2000.
7. Principal Investigator: "A Proposal for Recruiting Undergraduate/Graduate Students from the United Arab Emirates (UAE) at Our College," George W. Donaghey College of Engineering and Information Technology, October 2000, \$5,000.

### **Curricula/Lab Development Grants (Unsuccessful)**

1. Principal Investigator: NSF CCLI-Adaptation and Implementation, "An Undergraduate Laboratory for Electromagnetics Fields and Waves, Antennas and Propagation, RF Circuits and Systems," December 2, 2004, \$199,999.
2. Co-Principal Investigator (PI: Dr. Mary Good, Co-PI's: Drs. Ningning Wu, Hussain Al-Rizzo, Steven Minisker, and Mr. Alfred Hampton), NSF CSEMS-CS, ENG&MATH SCHOLAR, "Rural Arkansas Information Technology Scholarships (RAITS) to Attend CyberCollege of Arkansas," January 28, 2004, \$400,000.
3. Principal Investigator: NSF CCLI-Adaptation and Implementation, "An Interdisciplinary Simulation-Based Laboratory for Systems Engineering: Electromagnetics, Antennas, and Wireless Communications Undergraduate Teaching and Learning," December 4, 2003, \$117,154.
4. Principal Investigator: NSF Combined Research and Curricula Development Grant, EEC-CRCD, "An Advanced Laboratory for the Simulation and Visualization of Experiments in Electromagnetic Waves and Antennas," July 7, 2003, \$99,917.
5. Principal Investigator: NSF Combined Research and Curricula Development Grant, EEC-CRCD, "An Innovative Curriculum in Telecommunications Systems Engineering Utilizing Computer-Aided Modeling and Simulations: A Systems Engineering Approach," July 7, 2003, \$965,991.
6. Principal Investigator: (Co-PI's: Drs. Yupo Chan, Kamran Iqbal, and Xian Liu), NSF Combined Research and Curricula Development Grant, EEC-CRCD, "Wireless Telecommunications and Networking: a Systems Engineering Approach," October 31, 2001, \$499,841.
7. Co-Principal Investigator: (PI: Dr. Rama Reddy, Co-PI: Yupo Chan), NSF CCLI, "Development of Systems Engineering Courses, Curriculum, and Laboratory Improvement," May 2001, \$500,000.
8. Principal Investigator: (Co-PI's: Drs. Yupo Chan, and Kamran Iqbal), University of Arkansas at Little Rock 2001 Faculty Grant Programs, "Enhancement of Undergraduate Instruction in Modern Telecommunications Systems Utilizing Computer-Aided Design and Visualization Tools," February 13, 2001, \$5,900.
9. Principal Investigator: (Co-PI's: Drs. Yupo Chan, and Kamran Iqbal), Course Development Plan, University of Arkansas at Little Rock, "Enhancement of Undergraduate Electromagnetics Instruction Utilizing Computer-Based Simulations and Visualization Tools," November 2000, \$19,500.

### **Research Grants (Granted)**

1. Science, Technology, and Engineering cohort for the inaugural year of the Fulbright MENA Regional Short-Term Visiting Scholar Program in Science & Technology (MENA S&T), August 2011-February 2012.
2. Principal Investigator, Co-PI: Dr. Abdulkareem Abd Ali Mohammed, Atmosphere and Space Science Center, Directorate of Space Technology & Communication, Ministry of Science and Technology, Baghdad, Iraq, "Integration of Ground and Space-Based Observations to Detect and Identify Sources of Sand and Dust Storms in Iraq," January 2011-January 2012, \$150,000.
3. Principal Investigator, Co-PI: Dr. Sabah Nasir Hussein, College of Electrical & Electronic Techniques, Foundation of Technical Education, Baghdad, Iraq, Smart Current Sensor, May 2011-August 2011, \$15,000.
4. Co-Principal Investigator (among six other faculty from UALR), Dr. Vijay Varadan (Principal Investigator, University of Arkansas, Fayetteville) NSF EPSCOR, "Infrastructure for Wireless, Nano-, Bio-, Info-Tech Sensors and Systems: Arkansas ASSET: Advancing and Supporting Science, Engineering and Technology," NSF RII, September 2007- August 2010, \$13,168,123.
5. Hussain Al-Rizzo, Remzi Seker, Mariofanna Milanova, Co-PIs, Srimi Ramaswamy, (Principal Investigator): NSF, "Development of an Interdisciplinary Arkansas Emulation Laboratory," Aug 2006 – July 2009, \$299,750.
6. Principal Investigator: Seed Grant, George W. Donaghey College of Engineering and Information Technology, "A Proposal for the Establishment of a Multidisciplinary Research in Antennas and Advanced Bio-Electromagnetic Modeling and Simulations Applied to Implantable Medical Devices," March, 2005, \$10,000.
7. Principal Investigator: (Co-PI's: Drs. Yupo Chan, and Gary Anderson), DoD/DEPSCoR, US Army Research Office, "Spatio-Temporal Modeling Techniques for High-Resolution Direction-of-Arrival Determination in Smart Antenna Systems," Pre-proposal, July 15, 2001.
8. Principal Investigator: ORSP Seed Grant, "Development of Applied Computational Research at UALR for the Simulations of GPR Systems," February 20, 2001-February 20, 2002, \$3,250.
9. Principal Investigator: (Co-PI: Dr. Kamran Equal), Arkansas Space Grant Consortium, Research Infrastructure Grant, "Smart Antenna Systems for Wireless Communications," October 2000-October 2001, \$5,300.

### **Research Grants (Unsuccessful)**

1. Co-Principal Investigator, PI Dr. Seshadri Mohan, "MRI: Development of a Novel Instrumentation for Nano-Structure Metamaterial Based Wearable and Virtual MIMO Wireless Systems", Proposal Number: 1040405, April 2010, NSF, MRI, \$250,000.
2. Co-Principal Investigator, PI Dr. Abhijit Bhattacharyya, "MRI: ACQUISITION OF A FABRICATION AND CHARACTERIZATION SYSTEM FOR MULTIFUNCTIONAL THIN FILMS AND NANOSTRUCTURED MATERIALS," Proposal No: 1040401, Co-PI, April 21 2010
3. Srimi Ramaswamy and Hussain Al-Rizzo, Senior Personnel, Remzi Seker, (Principal Investigator): NSF, "REU Site: Undergraduate Research in Information Assurance and Security," May 1 2007 – July 31 2009, \$299,996.

4. Co-Principal Investigator, PI Dr. Badeh Adada (Neurosurgeon): Seed Grant, University of Arkansas for Medical Sciences, "Wireless Subdural Electroencephalogram Electrode" University of Arkansas for Medical Sciences, \$15,000, September 2005.
5. Co-Principal Investigator, PI Dr. Abhijit Bhattacharyya (Principal Investigator), NSF EPSCOR, "Nanotechnology-Based Sensing and Actuation Systems," \$7,500,000, October 2005.
6. Principal Investigator: Seed Grant, George W. Donaghey College of Engineering and Information Technology, "Ultra Low-Power Wireless Radio Subtotal Electroencephalogram Electrode" November 29, 2005, \$10,000.
7. Principal Investigator: Seed Grant, George W. Donaghey College of Engineering and Information Technology, "A Proposal for the Establishment of a Multidisciplinary Research in Wireless Communications and Networking Applied to Wireless e-Health Technologies," November 29, 2004, \$10,000.
8. Principal Investigator: Seed Grant, George W. Donaghey College of Engineering and Information Technology, "A Proposal for the Establishment of a Multidisciplinary Research in High-Power Microwave Processing of Materials: System Design and Computer Simulation," November 29, 2004, \$10,000.
9. Principal Investigator: (Co-PI's Drs. Robert Akl, Melissa Tooley, and Yupo Chan), NSF Division of Civil and Mechanical Systems, Infrastructure System Management and Hazard Response, "Network-Based Cellular Geolocation Technologies for Rural America," June 11, 2003, \$99,917.
10. Principal Investigator: (Co-PI's: Drs. Yupo Chan, Kamran Iqbal, and Gary Anderson), "Adaptive Antenna Systems for Space-Time Portable Transceivers in Mobile Ad Hoc Networks," FY 2003 DoD/DEPSCoR Grant, US Army Research Office, 15 September, 2002, \$400,000.
11. Co-Principal Investigator: (PI: Dr. Kamran Iqbal), "A Proposal for a Center for Complex Systems Research," James McDonnell Foundation, 13 March, 2002, \$500,000.
12. Principal Investigator: (Co-PI's: Drs. Yupo Chan, and Gary Anderson), FY 2002 DoD/DEPSCoR Grant, US Army Research Office "Design of Smart Antenna Systems for Handheld and Vehicle-Mounted Mobile Handset," 13 September, 2001, \$ 333,000.
13. Principal Investigator: (Co-PI's: Drs. Yupo Chan, and Kamran Iqbal), NSF and U.S. Department of Transportation, CMS Information Technology and Infrastructure System, "Wireless Geo-Location Technologies for Rural America," July 20, 2001, \$99,893.
14. Co-Principal Investigator: (PI: Dr. Hayder Al Shukri), DoD/DEPSCoR, US Army Research Office, "Clutter Reduction in GPR Data due to 3-D Ground Surface Using the Finite-Difference Time-Domain Method," July 15, 2001.
15. Principal Investigator: ASTA, "Establishment of a Research Program in Microwave Processing of Materials at the University of Arkansas at Little Rock: Numerical Modeling, System Design and Computer Simulation," August 2001, \$95,728, Declined due to Budget cuts.

16. Principal Investigator: (Co-PI: Dr. Aicha El Shabini, Chair, Electrical Engineering Department, University of Arkansas at Fayetteville), ASTA, "Multidisciplinary Approach to High-Power Microwave Processing of Materials: Numerical Modeling, System Design and Computer Simulations," February 13, 2001, \$95,728.
17. Principal Investigator: ORSP Seed Grant, "Wide-Band Time Domain Electromagnetic Modeling of Objects under 3-D Randomly Rough Surfaces Using the Finite Difference Time Domain Method," October 16, 2000, \$4,000.
18. Principal Investigator: ORSP Seed Grant, "A Novel Finite-Difference Time-Domain Modeling of an Aperture-Coupled TE<sub>10n</sub> Rectangular Resonant Cavity Applicator for High-Power Microwave Processing," October 16, 2000, \$4,000.
19. Principal Investigator: (Co-PI's: Drs. Yupo Chan, and Kamran Iqbal), Arkansas Space Grant Consortium and NASA/EPSCoR, "Design, Modeling and Implementation of Sensor Arrays for Smart Antenna Systems in Third-Generation Wireless Communications," September 2000, \$325,141.

#### **Sultan Qaboos University (Granted)**

Principal Investigator: Sultan Qaboos University, "Survey of Electromagnetic Field Emissions in Close Proximity to Omani Broadcasting, Television and Mobile Base-Station Antennas," September 1999-July 2000, \$13,000.

#### **University of New Brunswick (Granted)**

1. Principal Investigator: (Co-PI's: Drs. K. G. Clark, and J.M. Tranquilla), EMR Microwave Technology Corporation, "Finite-Difference Time Domain (FD-TD) Modeling of an Aperture Coupled TE<sub>10n</sub> Resonant Cavity Applicator for High-Power Microwave Heating," April 1998- April 1999, \$10,000.
2. Principal Investigator: (Co-PI's: Dr. J.M. Tranquilla, and Ma Feng), EMR Microwave Technology Corporation, "Development of Novel Electromagnetic/Thermal Finite-Difference Time Domain (FD-TD) Algorithms for the Analysis and Design of Geometrically-Composite High-Power Microwave Heating Applicators," September 1996- September 1999, \$120,000.
3. Principal Investigator: (Co-PI's: Dr. J.M. Tranquilla, and H. Z. Younies), EMR Microwave Technology Corporation, "Electromagnetic Characterization of the Near-Field Radiation Characteristics of Slotted Rectangular Waveguides for High-Power Microwave Heating Using the Finite-Difference Time Domain (FD-TD) Method," May 1997- May 1998, \$60,000.
4. Principal Investigator: (Co-PI: Dr. J.M. Tranquilla), NSERC, "A Rigorous Analysis of 3-D Electromagnetic Wave Scattering from Electrically Large Objects using the Generalized Multipole Technique," January 1994- January 1995, \$25,000.
5. Co-Principal Investigator: (Co-PI: Dr. J.M. Tranquilla, PI: J. P. Carr), NSERC, "Design and Characterization of Ring Ground Planes for Multipath Control in Global Positioning System Applications," January 1993-January 1994, \$25,000.
6. Principal Investigator: (Co-PI: Dr. J.M. Tranquilla), NSERC, "Theoretical and Experimental Investigation of GPS Precise Static Relative Positioning During Ice Clouds and Snowfall Periods," April 1992-April 1993, \$50,000.
7. Principal Investigator: (Co-PI: Dr. J.M. Tranquilla), NSERC, "Three Dimensional Electromagnetic Wave Scattering from Dielectrically-Coated Axisymmetric Objects

Using the Generalized Point-Matching Technique," January 1992-January 1993, \$15,000.

8. Co-Principal Investigator: (PI: Dr. J.M. Tranquilla, Co-PI's: J.P. Carr, and K. G. Clark), NASA Jet Propulsion Laboratory, "Development of New Low-Cost GPS Antennas," April 1988- April 1990, \$14,000.
9. Co-Principal Investigator: (PI: Dr. J.M. Tranquilla, Co-PI's: J.P. Carr, and K. G. Clark), Magnavox Advanced Systems (California), "Experimental Study of Global Positioning Satellite Antenna/Backplane Configurations," April 1988-April 1989, \$20,000.

### **Scientific Research Council (Granted)**

Principal Investigator: (Co-PI: Dr. S. A Abdullah), Iraqi National Research Council, "Effects of Sand and Dust Storms on Dual Polarized Terrestrial and Satellite Microwave and Millimeter Wave Communications Systems," April 1984- April 1986, \$25,000.

<b>SERVICE ON COMMITTEES</b>
------------------------------

### **University of Arkansas at Little Rock**

#### **DEPARTMENTAL**

- Advisor for International Students and Faculty advisor/mentor for transfer undergraduate students
- ABET Task Force
- Curriculum Committee
- Annual Performance Evaluation
- Promotion and Tenure
- Systems Engineering Faculty Search

#### **COLLEGE**

- Secretary for the College Assembly
- Undergraduate Curriculum
- Faculty Excellence Award
- Project Management Certificate
- Leader of Education for the Working Professional
- Computational Science and Applied Computing Liaison
- Chair of the Computational Science Doctoral Program
- Telecommunications M.S. Concentration Committee Applied Science Department

#### **UNIVERSITY**

- Traffic
- Replacement member of the Graduate Council
- Academic Technology and Computing
- Ambassador for the Systems Engineering Department, Campus Campaign
- University-wide Wireless Networking Group
- Infrastructure Work Group of the Distance Education Advisory

### **Sultan Qaboos University**

- Chair, Ad-hoc for reply to external examiner's report
- Coordinator, Examination
- Coordinator, Curriculum
- Chair, Curriculum Evaluation and Development Committee, Royal Omani Technical Air Force College
- Chair, Student/Staff Liaison
- Faculty Advisor for Undergraduate and Graduate Students
- Seminar Series
- Coordinator, Graduate Admission

<b>RFEREEING/SERVICE TO THE PROFESSION</b>
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- Session Chair, Electromagnetic Band Gap Devices, 2011 IEEE Intern. Symp. Antennas and Propagation and USNC/URSI Nat. Radio Science Meeting, Spokane, Washington, USA, 5-8 July, 2011.
- Associate Editor, Journal of Online Engineering Education, January 2011.
- Member of the Technical Advisory Committee of the *International Microwave Power Institute*, three-year term starting on February, 2005.
- Chair of Track 2 (Algorithms, Methods, Simulation, and Software), *Wireless Telecommunications Symposium*, April 27 – 29, 2008, Cal Poly Pomona, elected for the same position for WTS 2009.
- Chair of Track 2 (Algorithms, Methods, Simulation, and Software), *Wireless Telecommunications Symposium*, April 27 – 29, 2007, Cal Poly Pomona.
- TPC member 2007 IEEE International Conference on Signal Processing and Communications ICSPC, Dubai, UAE, 24-27 November 2007.
- Reviewed papers for ICC 2007 Communications QoS, Reliability and Performance Modeling Symposium.
- TPC member and reviewer International Conference on Mobile Computing and Wireless Communications M-WCMC 2007.
- TPC member and reviewer WEMIC 2006 (Wireless Euro-Mediterranean International Conference).
- TPC member and reviewer CHINACOM-Wireless Conference, 2006.
- Reviewed papers for ICC 2007 Network Services and Operation Symposium.
- MCWC 2006 Mobile Computing and Wireless Communications International Conference IASTED International Conference on Communication Systems and Networks (CSN 2006).
- Chair of Track 2 (Algorithms, Methods, Simulation, and Software), *Wireless Telecommunications Symposium*, April 27 – 29, 2006, Cal Poly Pomona.
- Technical Program Committee, *Image and Speech Processing International Conference* (SISPIC 2007), Petra/Jordan, 5-7 March 2007.
- Technical Program Committee, *Communication Systems and Circuits International Conference* (CSCIC 2007), Aqaba/Jordan, 28-31 January 2007.
- Reviewed proposals to the 2005 Armenian-U.S. Bilateral Grants Program of the U.S. Civilian Research and Development Foundation (CRDF), August 2005.



- Reviewer, *IEEE International Conference on Communications ICC 2006*, Istanbul, Turkey, 11-15 June, 2006, *Symposium on Next Generation Mobile Networks*.
- Session Chair, Reviewer, and Member of the Technical Program Committee, *Wireless Euro-Mediterranean International Conference*, March 27 – 29, 2006, Amman, Jordan.
- Invited as a Chair Session in the 9<sup>th</sup> *IASTED International Conference on Signal and Image Processing SIP 2003*, August 13-15, 2003, Honolulu, Hawaii.
- Reviewed the book, *Engineering Electromagnetics*, 6<sup>th</sup> Edition, Hayt and Buck, McGraw Hill, 2000
- Member of the Editorial Board of the *Fifth International Symposium on Signal Processing and its Applications*, ISSPA 99, 23-25 August 1999, Brisbane, Australia.
- Member of the Editorial Board of the *Fifth International Conference on Communication, Computer and Power*, ICCCP'98, 7-10 December 1998, Sultan Qaboos University, Muscat, Sultanate of Oman.
- Member of the International Advisory Committee of the *International Wireless and Telecommunications Symposium*, Shah Alam, Malaysia, 14-16 May 1997.
- Reviewed papers for the *Journal of Communications Software and Systems* (JCOMSS).
- Reviewed the book: *Principles of Electrical Engineering 5/E*, Rizzoni, McGraw Hill.
- Reviewed the book, *Introduction to Wireless Communications*, Berry, Black, DiPiazza, Ferguson, and Voltmer, Pearson, October, 2005.
- Reviewed papers for the *Journal of Applied Optics*.
- Reviewed papers for the *Journal of Aerospace Engineering*.
- Reviewed papers for the *Journal of Microwave Power and Electromagnetic Energy*.
- Reviewed papers for the *J. Communications Software and Systems*.
- Reviewed papers for the *Iranian Journal for Electrical and Electronics Engineering*.
- Reviewed proposals for the *U.S. Civilian Research and Development Foundation (CRDF)*, U.S. State Department.
- Reviewed proposals for *NSF Course, Curriculum, and Laboratory Improvement (CCLI)* program, July 25-26, 2005.
- Delivered a seminar on *Advanced Channel Assignment and Load Balancing Techniques for WLAN*, Ajman University for Science and Technology, Ajman, UAE, December, 2007.
- Delivered a seminar on *The Design of Antennas for Ultra Low Power Wireless Body Area Networks*, Etisalat College and Ajman University for Science and Technology, United Arab Emirates, March, 2006.
- Developed a Joint Cooperative Bachelor Program between UALR and Al Ghurair University, Dubai, United Arab Emirates in Systems Engineering and Information Science, October, 2005.
- Participated in the 2004 ABET Commission, Nashville, TN, October 26, 2004.
- Delivered a short course on *Developing Undergraduate Wireless Communications Curriculum*, Dubai University College, Dubai, United Arab Emirates, November 30, 2004.
- Internationally selected by the United Nations among other *nine* experts to deliver Communications Engineering and Satellite Communications courses for the 2004 Summer Faculty Development Seminar in Iraq, Institute of International Education, UN, May 28, 2004.
- Organized Workshop on *Incorporating Computational Science Tools and Techniques into Undergraduate Courses*, National Computational Science Institute, The Shodor Education Foundation Inc., 22-28 June, 2003, University of Arkansas at Little Rock.

- Participated in the workshop on *3-D Visualization using CAVE Technology* at the Virtual Reality Environmental Technologies Center (VETC), September 14-15, 2000, Ontario, Canada.
- Attended three-month intensive training program on the operation and maintenance of radio telescopes at MBB and KRUPP companies, Germany, May -July, 1984.
- Attended an intensive course on radio astronomy, Max-Planck Institute for Radio Astronomy, Bonn, Germany, July-August, 1984.

### SHORT COURSES OFFERED

- Channel Assignment and Load Balancing for WLAN, Ajman University for Science and Technology, Ajman, UAE, December, 2007.
- Design of Antennas for Ultra Low Power Wireless Body Area Networks, Etisalat College and Ajman University for Science and Technology, United Arab Emirates, March, 2006.
- Developing Undergraduate Wireless Communications Curriculum, College of Information Technology, Dubai University College, Dubai, United Arab Emirates, November 30, 2004.
- The Global Positioning System, Sultan Qaboos University, Muscat, Sultanate of Oman, May 2000.
- Industrial Applications of High Power Microwave Heating, Sultan Qaboos University, Muscat, Sultanate of Oman, May 1999.
- The Global Positioning System, International Wireless and Telecommunications Symposium, Shah Alam, Malaysia, 14-16 May 1997.

### COMPUTER/SOFTWARE SKILLS

#### **Programming Languages:**

Basic, FORTRAN, Assembly, C, C++, JAVA

#### **Operating Systems:**

MS-DOS, Macintosh, UNIX, WINDOWS, IBM Mainframes

#### **Engineering Software Packages:**

- CST Design Suite (Microwave Studio, Design Studio, EM Studio), Computer Simulation Technology GmbH, Germany (Advanced level)
- High Frequency System Simulator (HFSS), High Frequency Designer, Maxwell 2-D, and Maxwell 3-D, Ansoft Corporation (Advanced level)
- SEMCAD by speag (Beginner's level)
- FEKO (Beginner's level)
- CoWare (Beginner's level)
- VisSim (Beginner's level)
- Zeland's Fidelity and IE3D (Beginner's level)
- SystemView by Elanix (Beginner's level)
- Agilent's Advanced Design System (Beginner's level)

- EMPIRE by IMST (Beginner's level)
- EDX Tools for Wireless Design (Beginner's level)
- DIPOP (Differential POsitioning Program), Geodetic Research Lab., Geomatics and Geodesy Engineering Department, University of New Brunswick (Advanced level)
- 2-D MMP, Two-Dimensional Multiple Multipole Analysis Software and User's Manual, Ch. Hafner, Artech House, 1990 (Advanced level)
- The 3-D Electrodynamics Wave Simulator, 3-D MMP Software and User's Guide, Ch. Hafner and L. Bomholt, John Wiley, 1993 (Advanced level)
- The Electromagnetic Wave Simulator, A Dynamic Visual Electromagnetic Laboratory based on the Two-dimensional TLM Method, Wolfgang JR Hofer and Poman P. M. So (Beginner's level)
- The T-Matrix (Extended Boundary-Condition Method) programs for determining the near-field and far-field scattering and absorption characteristics of general homogeneous and multi-layered dielectric particles, finite-thickness slab, and infinitely long dielectric circular cylinders, "Light Scattering by Particles: Computational Methods," P.W. Barber and S.C. Hill, Advanced Series in Applied Physics, World Scientific Publishing, 1990 (Advanced level)
- The Mini-Numerical Electromagnetic Code (MININEC) for analyzing the near-field and far-field radiation patterns of wire antennas (Beginner's level)
- The FORTRAN 3-D FDTD computer program of Karl S. Kunz and Raymond J. Lubbers, "Finite Difference Time Domain Method for Electromagnetic," CRC Press, 1993 (Advanced level)
- Ensemble, a software package based on an integral-equation/moment-method formulation for analyzing microstrip circuits and antennas on complex multilayered substrates, Boulder Microwave Technology, Inc., Colorado, USA (Advanced level)

<b>HONORS &amp; AWARDS</b>
----------------------------

- College-Level Excellence Award in Research, April 2009.
- **University of Arkansas at Little Rock Faculty Excellence Award in Research, May 2009.**
- Nominated for the ASEE Midwest Section Dean's Outstanding Research Award, May, 2007.
- College-Level Excellence Award in Teaching, April 2007.
- **Ted and Virginia Bailey Foundation, University of Arkansas at Little Rock Faculty Excellence Award in Teaching, May 2007.**
- Systems Engineering Department Teaching Award, April 2007.
- Teaching Distinction Award, Systems Engineering Department, May 2006.
- Teaching Distinction Award, Systems Engineering Department, May 2005.
- Listed in the *Marquis Who's Who in Science and Engineering*, 2005-2006, October, 2004.
- One-month research award, German Academic Exchange Service (DAAD), May 2000.
- Nominated by the University of New Brunswick as candidate for the Natural Sciences and Engineering Research Council (NSERC) doctoral prizes, 1992.
- Won the nomination by the University of New Brunswick as the best doctoral graduate in Science and Engineering, 1992.
- University of New Brunswick, Graduate Fellowship, 1990.

- Ministry of Higher Education and Scientific Research, Baghdad, Iraq, Graduate Scholarship, 1987.
- First Honors Award for Senior with Highest Cumulative Average in the postgraduate program, College of Engineering, University of Mosul, 1983.
- First Honors Award for Senior with Highest Cumulative Average in the undergraduate engineering program, College of Engineering, University of Mosul, 1979.

## PROFESSIONAL MEMBERSHIPS

- INCOSE, International Council for Systems Engineering
- Materials Research Society, USA
- International Microwave Power Institute

## PUBLICATIONS

### **Patents:**

1. **Hussain Al-Rizzo**, Alexandru Biris, Taha Elwi, Daniel Rucker, *Nano and micro based antennas and sensors and methods making same*, Assignees: BOARD OF TRUSTEES OF THE UNIVERSITY OF ARKANSAS, IPC8 Class: AH01Q136FI , USPC Class: 343700 R , Class name: ANTENNAS, Publication date: 04/22/2010, Patent application number: 20100097273
2. Rami Adada, **Hussain Al-Rizzo**, *High gain circularly polarized microstrip antenna*, 12/754172, Publication Date: 02/03/2011, Filing Date: 04/05/2010, Assignee: Board of Trustees of the University of Arkansas (Little Rock, AR, US), Primary Class: 343/770, Other Classes: 29/600, International Classes: H01Q13/10; H01P11/00

Work in progress on the following three patents:

1. **Hussain Al-Rizzo**, *Single-Port Single Mode Cavity Resonators for Microwave Assisted Material Processing without the Use of a Short Circuiting Plunger*, January 2008.
2. **Hussain Al-Rizzo**, *Adjustable Slotted Waveguide Antennas by a Virtual Short Circuit*, January 2008.
3. **Hussain Al-Rizzo**, *A Novel Approach to Accelerate the Convergence of Commercial Time Domain Solvers of Maxwell's Equations for Highly Resonant Structures by Using Dual Excitation*, January 2008.

Submitted and executed the design, modeling, simulations, and experimental results, and wrote draft with a patent attorney for the following two patents submitted by James Tranquilla:

1. Microwave Treatment of Metal Bearing Ores and Concentrates, Canadian Patent 2248889, EMR Microwave Technology Corporation, September 11, 1998.
2. Method For Microwave Induced Oxidation of Sulphidic Ore Material in Fluidized Bed Without Sulphur Dioxide Emissions, Canadian Patent 2263497, EMR Microwave Technology Corporation, March , 1998.

### **Technical Reports** (Submitted to Ansoft Corporation, May 2004)

1. **H. M. Al-Rizzo**, and R. Seal: Design and optimization of wire antennas using HFSS,.
2. **H. M. Al-Rizzo**, and R. Seal: TE<sub>10n</sub> single-mode cavity resonator V1.0.
3. **H. M. Al-Rizzo**, and M. Haidar: Team benchmark problem 19: The TM<sub>010</sub> cavity resonator: Parameterization and optimization.
4. **H. M. Al-Rizzo**, and M. Haidar: The rectangular patch antenna.
5. **H. M. Al-Rizzo**, and M. Haidar: The horn antenna.
6. **H. M. Al-Rizzo**, and M. Haidar: Design of a strip-line fed microstrip antenna using HFSS.
7. **H. M. Al-Rizzo**, and S. James: Ansoft's High Frequency Structure Simulator (HFSS) beginner's guide: Cylindrical cavity resonators (Parts A and B).
8. **H. M. Al-Rizzo**, R. Adada, and M. Haidar: Numerical modeling of an octagonal waveguide applicator for high-power microwave heating applications using Ansoft's HFSS.
9. **H. M. Al-Rizzo**, and R. Adada: Simulation of a realistic domestic microwave oven loaded with pizza and potato.
10. **H. M. Al-Rizzo**, and R. Adada: Longitudinally slotted rectangular waveguide.

### **Refereed Journals Publications**

#### **IN PROGRESS**

1. **H.M. Al-Rizzo**, K. G. Clark, and J. M. Tranquilla, "A novel finite difference time-domain modeling of an aperture-coupled TE<sub>10n</sub> rectangular resonant cavity applicator for high-power microwave processing," *IEEE Transactions of Microwave Theory and Techniques*.
2. **H. M. Al-Rizzo**, J. M. Tranquilla, and Ma Feng, "Finite-Difference Time Domain (FDTD) modeling of waveguide-coupled cylindrical microwave heating cavities using locally conformal overlapping grids," *IEEE Transactions of Microwave Theory and Techniques*.
3. **H. M. Al-Rizzo**, R. Adada, and D. Rucker, "Design and optimization of miniaturized microstrip antennas for wireless communications with implantable medical devices," *IEEE Transactions on Biomedical Engineering*.
4. **H. M. Al-Rizzo**, "An Interdisciplinary Simulation-Based Laboratory for Systems Engineering: Electromagnetics, Antennas, and Wireless Communications Undergraduate Teaching and Learning," *IEEE Transactions Education*.
5. **H. M. Al-Rizzo**, "An Integrated Modeling and Simulation Paradigm for Teaching design in Electromagnetic Waves and Antennas: A Systems Engineering Approach," *INCOSE Systems Engineering Journal*.
6. **H. M. Al-Rizzo**, "Transforming Instructor's Industry Skills into the Teaching of Microwave Cavity Resonator," *IEEE Transactions Education*.

#### **UNDER REVIEW**

1. D.G. Rucker, R.F. Babiceanu, **H.M. Al-Rizzo**, S. Mohan. "Automated Airport Information Management System for Small and Medium-Sized Airports," *Systems Research Forum*, Under Review, Submitted September 2011.

2. **H.M. Al-Rizzo**, Ken Clark, Jim Tranquilla, Rami Adada, Daniel Rucker, Taha El Elwi,, “Drooped Microstrip Antennas with Uniform Phase Response and Wide Angular Coverage for Dynamic GPS Applications, ” *IEEE Trans. Aerospace and Electronic Systems*, August 15, 2010.
3. Haider Khaleel, **H. M. Al-Rizzo**, and Daniel Rucker , “AMC Based Antenna for Telemedicine Applications,” Submitted to *Journal of Applied Computational Electromagnetics Society*.
4. Haider Khaleel, **H. M. Al-Rizzo**, and Daniel Rucker , “Bending Effects on the Performance of Split Ring Resonators,” Submitted to *IEEE Letters on Microwave and Wireless components*.
5. Haider Khaleel, Hussain Al-Rizzo, and Daniel Rucker, "On the Effect of Bending on Artificial Magnetic Conductors," Submitted to *IEEE letters on Antennas and Wireless Systems*.

#### **PUBLISHED**

6. D.G. Rucker, **H.M. Al-Rizzo**, M.J. Wolverson, H.R. Khaleel. "A Miniaturized Dual Band Bow-Tie Microstrip Antenna for Implantable and Wearable Telemedicine Applications," *Microwave and Optical Technology Letters*, Wiley Periodicals, Inc, Accepted for Publication, September 2011.
7. Taha A. Elwi, **H. M. Al-Rizzo**, “Electromagnetic wave interactions with 2-D arrays of single wall carbon nanotubes,” Accepted in *Journal of Nanomaterials*, September, 2011.
8. Taha A. Elwi, **H. M. Al-Rizzo**, Nidhal Bouaynaya, M. M. Hammood, and Y. Al-Naiemy, “Theory of gain enhancement of UC–PBG antenna structures without invoking Maxwell’s equations: an array signal processing approach,” *Progress In Electromagnetics Research B*, vol. 34, pp. 15-30, August 2011.
9. Taha A. Elwi, **H. M. Al-Rizzo**, “Fresnel lenses based on nano shell-silver coated silica array for solar cells applications,” *Progress In Electromagnetics Research B*, vol. 32, pp. 263-282, 2011.
10. Haider Khaleel, **H. M. Al-Rizzo**, "Numerical Investigation on the Effect of Bending on UC-PBG," *Progress In Electromagnetics Research M*, vol. 20, pp. 95-105, 2011.
11. Haider Khaleel, **H. M. Al-Rizzo**, "Compact Polyimide Based Antennas for Flexible Displays," Accepted for publication in *IEEE/OSA Journal of Display Technology*, June 2011.
12. Ahmed Al-Shaheen, **H. M. Al-Rizzo**, "An Ultra Wide Band Antenna Design for Indoor Geolocation Applications," *World Applied Sciences Journal*, vol. 12, no. 8, pp. 1321-1326, 2011.

13. Taha A Elwi, **H. M Al-Rizzo**, Daniel G Rucker, Enkeleda Dervishi, Zhongrui Li, Alexandru S Biris, "Multi-walled carbon nanotube-based RF antennas," *Nanotechnology* vol. 21, no. 4, pp. 1-10, Jan. 2010.
14. **H. M. Al-Rizzo**, Sehsadri Mohan, Wayne Crolley, Dwayne Kinley, Zak Hemphill, Chris Finley, Melissa Reed, Amanda Pope, Doug Osborn, "Directional-Based Cellular e-Commerce: An Undergraduate Systems Engineering Capstone Design Project," *International Journal of Engineering Education*, vol. 26, pp. 1285-1304, 2010.
15. Taha A. Elwi, **H. M. Al-Rizzo**, Daniel G. Rucker, Haider R. Khaleel, "Effects of twisting and bending on the performance of a miniaturized truncated sinusoidal printed circuit antenna for wearable biomedical telemetry devices," *AEU - International Journal of Electronics and Communications*, vol. 13, no. 1, pp 1-12, Mar. 2010.
16. M. Haidar, **H.M. Al-Rizzo**, R. Akl, Z. Elbazzal, "The Effect of an Enhanced Channel Assignment Algorithm in an IEEE 802.11 WLAN," *World Scientific and Engineering Academy and Society Transactions on Communications*, WSEAS, Vol. 8, Issue 12, Dec 2009.
17. **H. M. Al-Rizzo**, Ken Clark, Jim Tranquilla, Rami Adada, Daniel Rucker, Taha El Elwi, "Enhanced low-angle GPS coverage using solid and annular microstrip antennas on folded and drooped ground planes," *IEEE Trans. Antennas and Propagation*, vol. 57, no. 11, pp. 3668-3672, Nov. 2009.
18. T. A. Elwi, **H. M. Al-Rizzo**, D. G. Rucker, and F. Song, "Numerical simulation of a UC - PBG lens for gain enhancement of microstrip antennas", *International Journal of RF and Microwave Computer-Aided Engineering*, vol. 19, issue 6, pp. 676 – 684, July 31, 2009.
19. M. Haidar, **H. M. Al-Rizzo**, R. Akl, Y. Chan, "User-based channel assignment in a load-balanced IEEE 802.11 WLAN," *International Journal of Interdisciplinary Telecommunications and Networking*, IJITN, vol. 1, no. 2, pp. 66-81, April-June 2009.
20. **H. M. Al-Rizzo**, R. Adada J. M. Tranquilla, Ma Feng, "A finite difference thermal model of a cylindrical microwave heating applicator using locally conformal overlapping grids, Part II: Numerical results and experimental validation," *Journal of Microwave Power and Electromagnetic Energy*, vol. 4, Issue 2, pp. 78-100, January 2006.
21. **H. M. Al-Rizzo**, J. M. Tranquilla, Ma Feng, "A finite difference thermal model of a cylindrical microwave heating applicator using locally conformal overlapping grids, Part I: Theoretical formulation," *Journal of Microwave Power and Electromagnetic Energy*, vol. 40, no. 1, pp. 17-29, 2005.
22. A. Al-Badi, **H. M. Al-Rizzo**, "Simulation of electromagnetic coupling on pipelines close to overhead transmission lines: A parametric study," *J. Communications Software and Systems*, vol. 1, No. 2, pp. 116-125, December 2005.

23. **H. M. Al-Rizzo**, Zedan H. Y., Clark K. G., Tranquilla J. M., "FDTD analysis of dielectric-loaded longitudinally slotted rectangular waveguides," *Journal of Microwave Power and Electromagnetic Energy*, vol. 38, no. 3, pp. 171-187, 2003.
24. **H. M. Al-Rizzo**, Al-Hafid H.T., Tranquilla J.M., "Electromagnetic modeling of the propagation characteristics of satellite communications through composite precipitation layers, Part I: Mathematical formulation, " *Journal for Scientific Research, Science and Technology*, Sultan Qaboos University, Sultanate of Oman, vol. 5, pp. 47-54, December 2000.
25. **H. M. Al-Rizzo**, Al-Hafid H.T., Tranquilla J.M., "Electromagnetic modeling of the propagation characteristics of satellite communications through composite precipitation layers, Part II: Results of computer simulation, " *Journal for Scientific Research, Science and Technology*, Sultan Qaboos University, Sultanate of Oman, vol. 5, pp. 55-75, December 2000.
26. **H. M. Al-Rizzo**, Ma Feng, J. M. Tranquilla, "Incorporation of waveguide feeds and cavity wall losses in a Cartesian/cylindrical hybrid Finite-Difference Time Domain (FD-TD) analysis of microwave applicator," *Journal of Microwave Power and Electromagnetic Energy*, vol. 35, no.2, pp. 110-118, December 2000.
27. J.M. Tranquilla, Ma Feng, **H. M. Al-Rizzo**, "A Cartesian-cylindrical hybrid FD-TD analysis of composite microwave applicator structures," *Journal of Microwave Power and Electromagnetic Energy*, vol. 34, no. 2, pp. 97-105, 1999.
28. **H. M. Al-Rizzo**, J. M. Tranquilla, "Application of the Generalized Multipole Technique (GMT) to high-frequency electromagnetic scattering from perfectly conducting and dielectric bodies of revolution," *Journal of Computational Physics*, vol. 136, pp. 1-18, 1997.
29. J. M. Tranquilla, **H. M. Al-Rizzo**, K. G. Clark, "An overview of electromagnetic modeling of single- and multi-mode applicators at EMR Microwave Technology Corporation," *Microwave Processing of Materials V*, Material Research Society, Eds. M. F. Iskander, J.O. Kiggans, Jr., and J. C. Bolomey, vol. 430, pp. 309-317, 1996.
30. **H. M. Al-Rizzo**, J. M. Tranquilla, "Electromagnetic scattering from dielectrically coated axisymmetric objects using the Generalized Point-Matching Technique (GPMT) Part I: Theoretical formulation," *Journal of Computational Physics*, vol. 119, pp. 342-355, 1995.
31. **H. M. Al-Rizzo**, J. M. Tranquilla, "Electromagnetic scattering from dielectrically coated axisymmetric objects using the Generalized Point-Matching Technique (GPMT) Part II: Numerical results and comparisons," *Journal of Computational Physics*, vol. 119, pp. 356-373, 1995.
32. **H. M. Al-Rizzo**, J. M. Tranquilla, "Electromagnetic (EM) wave scattering by highly elongated and geometrically composite objects of large size parameters: The Generalized Multipole Technique (GMT)," *Applied Optics*, vol. 34, no. 18, pp. 3502-3521, 20 June 1995.



33. J. M. Tranquilla, **H.M. Al-Rizzo**, "Electromagnetic scattering from dielectric-coated axisymmetric objects using the generalized point-matching technique," *IEEE Transactions on Antennas and Propagation*, vol. 43, no. 1, pp. 63-71, January, 1995.
34. J. M. Tranquilla, J. P. Carr, **H. M. Al-Rizzo**, "Analysis of a choke ring ground plane for multipath control in Global Positioning System (GPS) applications," *IEEE Transactions on Antennas and Propagation*, vol. 42, no. 7, pp. 905-911, 1994.
35. J. M. Tranquilla, **H. M. Al-Rizzo**, "Range errors in global positioning system during ice cloud and snowfall periods," *IEEE Transactions of Antennas and Propagation*, vol. 42, no. 2, pp. 157-165, Feb. 1994.
36. **H. M. Al-Rizzo**, H.T. Al-Hafid, B.R. Vishvakarma, "Effects of sand and dust storms on terrestrial microwave links," *J. Institution of Engineers (India) Electronics and Telecommunications Engineering Division*, vol. 47, pp. 26-30, 1993.
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