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# Vignesh Rajamani. Ph.D.

**Research**

Electromagnetic Interference and Compatibility Testing, Probability models for Failures due to EMI/C, Reverberation Chambers, Statistical Electromagnetics, CEM models Validation and Verification

**Dissertation**

Establishing Probability of Failure of Electronic Systems due to Electromagnetic Interference

**Work Experience**

**Visiting Assistant Professor, Oklahoma State University (Present)**

- Instructor for ECEN 4013 (Design of Engineering Systems)
- Instructor for ENSC 2613 (Introduction of Electrical Science)
- Researching on current distributions on wire bundles under different mode distributions inside avionics boxes due to EMI/C
- Researching on Material Characterization using Reverberation Techniques
- Researching EMC problems in Unmanned Aerial Systems

**Vice President of Member Services (2015-2016), IEEE EMC Society**

**Distinguished Lecturer (2013-2014) IEEE EMC Society**

**Senior Member IEEE**

**Research Engineer, Oklahoma State University (Aug 2011 to July 2013)**

**Post-Doctoral Research Fellow (July 2010 – June 2011)**

- Worked on Validation between measurements and simulations of current distributions on cable bundles due to external EMI/C

**Co-Op, IBM, Research Triangle Park, NC (Summer '07)**

- Was responsible for getting a reverberation chamber operational (including partial calibration and measurement)
- Worked with procurement quality engineering department in testing to identify EMC design problems on high speed data cables and connector assemblies at a very early stage of the product

**Teaching**

- Serving as an instructor for "Reverberation Chamber Theory/Experiment Short Course" offered at Oklahoma State University. (Offered both on OSU campus and in Industries)
- Serving as an instructor for "Reverberation Chamber Technician Training Course" offered at Oklahoma State University. (Offered both on OSU campus and in Industries)
- Serving as an instructor for "High Intensity Radiated Fields Course (RC techniques)" offered at Oklahoma State University

**Services**

- Technical Program Chair for the "Reverberation Chamber, Anechoic Chamber and Open Area Test Site Users Group Meeting," Seattle, WA, Mar 18-21, 2014
- Technical Chair for Applied Electromagnetics Conference 2013, Bhubaneswar, India
- Serving as a vice-chair for Technical Committee 9 (Computational Electromagnetics) of the IEEE EMC Society
- Serving as an active contributor and one of many co-authors to the CEM validation standard (1597)
- Serving as an active contributor to the TC9, TC-3, TC-2, SSC and ESAC committees of IEEE EMC Society
- Serving as a reviewer for EMC papers (TC-9 and TC-2 committee) and EMC Transactions
- Serving as a reviewer for Proceedings in Electromagnetics Research Journal (PIER)
- Serving as a reviewer for Asia Pacific Microwave Conference
- Serving as a reviewer for RF and Microwave Computer-Aided Engineering Journals
- Serving as a reviewer for International Journal of Antennas and Propagation
- Sister Society Co-coordinator (effective 10/2009)
- Sister Society Coordinator (effective 01/2013)
- Book Review first edition of Kang's Electric Circuits

***Past Research and Teaching Experiences***

**Research Assistant and Teaching Assistant, REFTAS, Oklahoma State University (Jan '06 – May '10)**

- Served as a research assistant for the REFTAS lab working on reverberation chamber characterization and measurements
- Served as the head teaching assistant for ECEN 2613 (Electric circuits) and maintaining a group of 4 other TA's
- Served as a research assistant for the RFID program from Industrial Engineering department at OSU

**Research Associate, REFTAS and IEM, Oklahoma State University (Jan '05 – Dec '05)**

- Served as a antenna engineer for the RFID group in industrial engineering
- Served as the head teaching assistant for ECEN 2613 (Electric circuits) and was maintaining a group of 6 others
- Served as a technical point of contact for a senior design project of constructing a reverberation chamber and lead a group of 4 undergraduate students
- Served as an officer of CEM validation working group and TC9 committee
- Served as a teaching assistant for ECEN 3613 – Electromagnetic Fields course.
- Served as a mentor for a Senior design team (Fall 06), developing various devices to be used in reverberation chamber experiments

**Research Assistant, REFTAS, Oklahoma State University (Jan '04 – Dec '04)**

- *Thesis* - "Validation and Extension of Modal/MoM in Shielding Effectiveness Studies of Metallic Enclosures with Apertures.*"*
  Validated Modal/MoM a popular moment method code used in the studies of shielding effectiveness with a commercial code, FEKO. This work is funded under NASA Grant NCC-1-01032
- Clearly sketched the limitation of the Modal/MoM code for certain applications.
- Worked on a project of establishing wireless links in harsh environments. This work is funded by Halliburton.

**Teaching Assistant, Electromagnetic fields Course, Oklahoma State University (Aug '03 – Dec '03)**

- Served as a Teaching assistant for ECEN3613- Electromagnetic fields.
- Graded papers and set Question papers for in class projects (Analytical and Computational) and helped the students with their questions and doubts.
- Served as a evaluator for ECEN 3613 – Fall 2004 posters

Helped many students with antenna design and simulation for projects in Senior design I and II.

**Awards / Scholarships**

- Winner of the IEEE EMC Presidential Memorial Award 2006
- Winner of the IEEE EMC Presidential Memorial Award Second Year Extension, 2007
- Winner of the Lynn Miller Scholarship for graduate studies awarded at Oklahoma State University
- Winner of Incentive award from the ECEN department of Oklahoma State University
- Winner of ECEN departmental Scholarship 2008-2009
- Winner of ECEN departmental Scholarship 2009-2010

**Papers**

1. Vignesh Rajamani and Gus Freyer, "Feasibility Study of Multi-Frequency Test in a Single Rotation of Mode Stirred Reverberation Chamber," IEEE Symposium on Electromagnetic Compatibility 2015, Dresden, Germany (Submitted)
2. Corey Vyhlidal, Vignesh Rajamani, Charles F. Bunting, Praveen Damarchala and Vijay Devabakhtuni, "Estimation of Absorber Performance Using Reverberation Techniques and Artificial Neural Network Models," IEEE Symposium on Electromagnetic Compatibility 2015, Dresden, Germany (Submitted)
3. Eric Drake, Vignesh Rajamani, James C. West, Charles F. Bunting, Sam Connor and Bruce Archambeault, "Extension and Verification of Absorbing Material Effectiveness on Reducing Electromagnetic Emissions," IEEE Symposium on Electromagnetic Compatibility 2015, Santa Clara, CA, USA
4. Logan Washbourne, Vignesh Rajamani, James C. West, Charles F. Bunting, Sam Connor and Bruce Archambeault, "Effectiveness of Absorbing Materials on Reducing Electromagnetic Emissions from Cavities Measured Using a Nested Reverberation Chamber Approach," IEEE Symposium on Electromagnetic Compatibility 2014, Raleigh, NC, USA
5. James C. West, Vignesh Rajamani and Charles F. Bunting, "Simulation of Stirred Fields within a Reverberation Chamber Using a Refined Spectral-Domain-Factorization Moment Method," IEEE Symposium on Electromagnetic Compatibility 2014, Raleigh, NC, USA

6. Vignesh Rajamani, Charles F. Bunting and James C. West, “Effect of Loading on Independent Samples and Uniformity of a Reverberation Chamber,” IEEE Symposium on Electromagnetic Compatibility 2013, Denver, CO, USA
7. James C. West, Vignesh Rajamani and Charles F. Bunting, “Practical Consideration for the Evaluation of the 3-D Green’s Function in a Rectangular Cavity Moment Method at High Frequency,” IEEE Symposium on Electromagnetic Compatibility 2013, Denver, CO, USA
8. David L. Green, Vignesh Rajamani, Charles F. Bunting, Sam Connor and Bruce Archambeault, “One-Port Time Domain Measurement Technique for Quality Factor Estimation of Loaded and Unloaded Cavities,” IEEE Symposium on Electromagnetic Compatibility 2013, Denver, CO, USA
9. J. C. West, V. Rajamani, and C. F. Bunting, "An examination of the accuracy of integral equation based modeling of the fields within a reverberation chamber," to be presented at the 29th International review of Progress in Applied Computational Electromagnetics, March 24th-28th, Monterey California, 2013.
10. Assefa Endegena, James C. West, Vignesh Rajamani and Charles F. Bunting, “Numerical Study of Currents Induced on a Partially Shielded Wire Within an Ideal Reverberation Test,” IEEE Symposium on Electromagnetic Compatibility 2012, Pittsburgh, PA, USA
11. Vignesh Rajamani, Gus Freyer and Charles F. Bunting, “Considerations for Performing Immunity Testing with Frequency Stirring,” IEEE Symposium on Electromagnetic Compatibility 2012, Pittsburgh, PA, USA
12. Vignesh Rajamani, Charles F. Bunting and James C. West, “Difference in Quality Factor Estimation in Frequency and Time Domain,” IEEE Asia Pacific Symposium on Electromagnetic Compatibility 2012, Singapore
13. Charles F. Bunting, James C. West and Vignesh Rajamani, “Operational Process for Characterizing Below Deck Electromagnetic Compatibility,” Proc. 2011 IEEE Int. RF and Microwave Conf. (RFM2011), 12 - 14th. Dec. 2011, Seremban, Malaysia.
14. J. C. West, C. F. Bunting, and V. Rajamani, “Optimal plane-wave representation of random fields in a reverberation chamber,” in Proceedings of the 2011 IEEE International Symposium on Electromagnetic Compatibility, 14-19 August, Long Beach, CA, USA.
15. Vignesh Rajamani and Gus Freyer, “Impact of Statistical Parameter Options on Reverberation Chamber Test Environment,” IEEE Symposium on Electromagnetic Compatibility 2011, Long Beach, CA, USA
16. Vignesh Rajamani and Charles F. Bunting, “On RS Testing of Highly Directive Devices,” IEEE Symposium on Electromagnetic Compatibility 2010 Ft. Lauderdale, USA
17. Vignesh Rajamani and Charles F. Bunting, “Determination of Reverberation Distance Using Frequency and Time Domain,” IEEE Symposium on Electromagnetic Compatibility 2010, Ft. Lauderdale, USA
18. Vignesh Rajamani, Charles F. Bunting and James C. West, “Calibration of a Numerically Modeled Reverberation Chamber,” IEEE Symposium on Electromagnetic Compatibility 2009, Austin, USA
19. Vignesh Rajamani and Charles. F. Bunting, “On The Performance of Wireless Systems in Moderate/Harsh Multipath Environments,” International Conference on Sensors, Security, Software and Intelligent Systems, Coimbatore, India. Jan 2009
20. Vignesh Rajamani, Charles. F. Bunting and Gustav Freyer, “Why Consider EMC Testing in a Reverberation Chamber,” 10th International Conference on Electromagnetic Interference & Compatibility, Bangalore, India. Nov 2008
21. Vignesh Rajamani, Charles F. Bunting and James C. West, “Sensitivity analysis of reverberation chambers with respect to tuner speeds,” IEEE Symposium on Electromagnetic Compatibility 2007, Hawaii, USA
22. Vignesh Rajamani, Charles F. Bunting, Prof. Antonio Orlandi and Alistair Duffy, “Introduction to Feature Selective Validation,” IEEE Symposium on Antennas and Propagation 2006, Albuquerque, USA.
23. Vignesh Rajamani and Charles F. Bunting, “Validation of Modal/MoM in shielding effectiveness studies of metallic enclosures with apertures,” IEEE Symposium on Electromagnetic Compatibility 2005, Chicago, USA.

**Journals**

1. Vignesh Rajamani, James C. West and Charles F. Bunting, “Measurement and Simulation of the Induced Current on a Wire Using S –Parameter Method.” IEEE Transactions on Electromagnetic Compatibility, April 2014.
2. Vijay Devabhaktuni, , Charles Bunting, David Green, David Kvale, Lakshman Mareddy, Vignesh Rajamani, “A New ANN Based Modeling Approach for Rapid EMI/EMC Analysis of PCB and Shielding Enclosures” IEEE Transactions on Electromagnetic Compatibility, May 2013
3. Vignesh Rajamani, Charles F. Bunting and James C. West, “Stirred-mode Operation of Reverberation Chambers for EMC Testing,” IEEE Transactions on Instrumentation and Measurement, May 2012
4. J. C. West, Charles F. Bunting and Vignesh Rajamani, “Accurate and Efficient Numerical Simulation of the Random Environment Within a Reverberation Chamber” IEEE Transactions on Electromagnetic Compatibility, February, 2012.
5. J. M. Govardhan, S. Bukkapatnam, Y. Bhamare, P. Rao, and V. Rajamani, "Statistical Analysis and Design of RFID Systems for Monitoring Vehicle Ingress/Egress in Warehouse Environments," International Journal for Radio Frequency Identification Technology and Apllications (IJRFITA), 2006.
6. Vignesh Rajamani, Charles F. Bunting, M. D. Deshpande and Z. A. Khan, “Validation of Modal/MoM in shielding effectiveness studies of metallic enclosures with apertures.” IEEE Transactions on Electromagnetic Compatibility, May 2006.

**Invited Talks**

- "EMC Test Challenges of Unmanned Aerial Systems Why Drones Matter to an EMC Test Engineer and Antenna Designer," IEEE EMC Society Seattle Chapter, Seattle, Washington, Sep 28, 2015
- "Rationale for Reverberation Chamber Testing," Vignesh Rajamani, 13th International Conference On Electromagnetic Interference & Compatibility, Vishakhapatnam, India, July, 2014
- "A Practitioners approach to EMC testing using Reverberation Chambers," Università Politecnica delle Marche, Ancona, Italy IEEE EMC, L'Aquila, Italy, Dec 9, 2014
- "A Practitioners approach to EMC testing using Reverberation Chambers," University of L'Aquila, Italy IEEE EMC, L'Aquila, Italy, Dec 9, 2014
- "Comparison of Radiative Test Facilities," Bangalore Chapter of IEEE EMC Society, Bangalore, Nov 3, 2014.
- "A Practitioners approach to EMC testing using Reverberation Chambers," IEEE EMC/APS/MTT Joint Chapter, Hyderabad, India, Nov 1, 2014
- "A Practitioners approach to EMC testing using Reverberation Chambers," IEEE EMC Society Japan Chapter, Tokyo, Japan, May 15, 2014
- "A Practitioners approach to EMC testing using Reverberation Chambers," IEEE Shanghai EMC Chapter, Shanghai, China, May 11, 2014
- "Comparison of Radiative Test Facilities," Singapore Chapter of IEEE EMC Society, Singapore, May 9, 2014.
- "Comparison of Radiative Test Facilities," IEEE Rock River Valley Section, Rockford, IL, Mar 27, 2014.
- "A Practitioners approach to EMC testing using Reverberation Chambers," EMC Chapter of Eastern North Carolina, Raleigh, NC, Feb 5, 2014.
- "Importance of Electromagnetic Compatibility in Today's World," Keynote at the International Conference on Advances in Electrical Engineering, Vellore Institute of Technology (Vellore Campus), Vellore, India. Jan 2014.
- "Importance of Electromagnetic Compatibility in Today's World," International Workshop on Control Commination and Clean Energy, SKP Engineering College, Tiruvannamalai, India. Jan 2014.
- "Engineering Design – Teaching Methodology," Workshop at the International Conference on Advances in Electrical Engineering Vellore Institute of Technology (Vellore Campus), Vellore, India. Jan 2014.
- "A Practitioners approach to EMC testing using Reverberation Chambers," EMC Chapter of Chicago, IL Oct 23, 2013
- "A Practitioners approach to EMC testing using Reverberation Chambers," EMC Chapter of New Jersey, Hazlet, NJ, Sep 25, 2013
- "A Practitioners approach to EMC testing using Reverberation Chambers," EMC Chapter of Germany, Hannover, Germany, Sep 12, 2013

  "A Practitioners approach to EMC testing using Reverberation Chambers," BeNeLux EMC Chapter, Amsterdam, Nederland's, Sep 10, 2013
- "Connectors and Cable Assemblies Shielding Effectiveness Measurements Using Reverberation Chambers," The TechAmerica G46 Committee on Electromagnetic Compatibility, 2013 IEEE International Symposium on EMC, Denver, CO
- "Importance of Engineering Design," Vellore Institute of Technology (Vellore Campus), Vellore, India. July 2013.
- "A Practitioners approach to EMC testing using Reverberation Chambers," Madras EMC Chapter in Chennai, India, July 12, 2013
- "A Practitioners approach to EMC testing using Reverberation Chambers," Santa Clara EMC Chapter in Santa Clara, CA, May 14, 2013
- "A Practitioners approach to EMC testing using Reverberation Chambers," Ottawa EMC Chapter in Ottawa, Canada, April 17, 2013
- "A Practitioners approach to EMC testing using Reverberation Chambers," West Michigan EMC Chapter in Grand Rapids, MI, March 22, 2013
- "A Practitioners approach to EMC testing using Reverberation Chambers," EMC Chapter of Southeastern Michigan (Detroit) Section, March 21, 2013
- "Teaching Engineering Design," Vellore Institute of Technology (Chennai Campus), Chennai, India. Jan 2013.
- "Electromagnetic Interference and Compatibility," IEEE and HKN student chapter meeting, Oklahoma State University, 2012.
- "Computational Electromagnetic Simulation of Reverberation Chambers," EMSS USA, Hampton, VA, August 2007.
- "Reverberation Chambers: Statistically Deterministic Chaos," IEEE EMC Chapter Raleigh, NC, August 2007.

**Invited Papers**

- Vignesh Rajamani, Gustav Freyer and Charles F. Bunting, "Some Thoughts on Independent Samples," *Reverberation Chambers, Open Area Test Site and Anechoic Chambers Users Group Meeting, June 2009, Sandusky,OH.*
- Vignesh Rajamani, Charles F. Bunting and Gustav J. Freyer, "Rationale for Reverberation Chamber Testing," National Radio Science Meeting, Boulder, CO Jan 9-12, 2013