

Edward Wheeler

Professor, Electrical and Computer Engineering Department

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Education

Ph.D., Electrical Engineering, University of Missouri-Rolla (1996)

M.S., Electrical Engineering, University of Missouri-Rolla (1993)

B.S., Electrical Engineering, Rose-Hulman Institute of Technology (1982)

Academic Experience

2011 – professor of electrical and computer engineering, *RHIT*

electromagnetics fields, electromagnetic waves, microwave/millimeter wave engineering, advanced electromagnetics, electromagnetic metamaterials, introduction to micro-electromechanical systems (MEMS), advanced MEMS

2011 – adjunct professor, *Missouri University of Science and Technology*

signal integrity, use of metamaterial-inspired structures in communications and signal integrity, EM modeling and measurement, applications

2004–2011 associate professor of electrical and computer engineering, *RHIT*

electromagnetics fields, electromagnetic waves, introduction to micro-electromechanical systems (MEMS), advanced MEMS, electrical systems, junior and senior design

Student advisees regularly publish their work – see below

- Joseph M. Faia, Yujie He, Edward Wheeler and Sun K. Hong, "Detection and Location of Nonlinear Scatterers using DORT applied with Pulse Inversion" Progress in Electromagnetic Research (PIER) Letters (accepted)
- Yujie He, Joseph M. Faia, Michael Cracraft and Edward Wheeler, "Common-Mode Suppression in Broadside-Coupled Coplanar Waveguides" Progress in Electromagnetic Research, to be submitted 2018.
- John Blauert, Joseph M. Faia, Yujie He, Sun K. Hong, Benjamin S. Cook and Edward Wheeler, "Improving the Radiation Characteristics of an Antipodal Vivaldi Antenna using a Spatially Variant Metamaterial Lens," *2018 URSI Conference*, Boulder, CO.
- Yujie He, Zach Silva, Zach Bergstedt, Joseph Faia, Shelby Van Hoosier, Sang Goo Kang, Garrett Shaffer, Edward Wheeler and Michael Cracraft, "Common-Mode Filtering in Multilayer Printed Circuit Boards," *2017 IEEE EMC SIPI Symposium*, Washington DC
- Joseph M Faia, Kyle W. McClintick, and Sun K. Hong, "Application of DORT and Pulse Inversion to Detection and Selective Electromagnetic Focusing on Nonlinear Elements," *2017 URSI GASS Conference*, Montreal, Canada

- Tyler Nuanes, Brian Dieckman, Tony New, Benjamin S. Cook and Edward Wheeler, "Low-Cost, High-Resolution Printing of Planar Microwave Structures for Rapid Design Iterations" *2016 IEEE European Microwave Conference*, London, England.
- Leihao Wei, Liang Li, Ketan Shringarpure, Albert Ruehli, Jun Fan, Bruce Archambeault, Edward Wheeler and James Drewniak, "Plane-pair PEEC Model for Power Distribution Networks with Sub-meshing Techniques" *IEEE Trans. Microw. Theory Tech.*, **64**, 733-741.
- Sang Goo Kang, Garrett Schaffer, Christopher Kodama, Christopher O'Daniel, and Edward Wheeler, "CSRR Common-Mode Filtering Structures in Multilayer Printed Circuit Boards," *2015 IEEE EMC Symposium*, Dresden, Germany
- Christopher Kodama, Christopher O'Daniel, Joshua Cook, Francesco de Paulis, Michael Cracraft, Samuel Connor, Antonio Orlandi and Edward Wheeler, "Mitigating the Threat of Crosstalk and Unwanted Radiation when using Electromagnetic Bandgap Structures to Suppress Common Mode Signal Propagation in PCB Differential Interconnects," *2015 IEEE EMC Symposium*, Dresden, Germany
- Leihao Wei, Ketan Shringarpure, Albert Reuhli, Edward Wheeler and James Drewniak, "Plane-Pair PEEC Models for PDN Using Sub-meshing," *2014 IEEE EPEPS Conference*, Portland, Oregon
- Evan Sawyer, Christopher Kodama, Christopher O'Daniel, Joshua Cook and Edward Wheeler, "Using Common-Mode Filtering Structures with Microstrip Differential Lines in a Multilayer Printed Circuit Board Environment," *2014 IEEE European Microwave Conference*, Rome, Italy.
- Ketan Shringarpure, Biyao Zhao, Albert Ruehli, Bruce Archambeault, James Drewniak, Jun Fan, Leihao Wei, Edward Wheeler, Matteo Cocchini and Michael Cracraft, "On Finding the Optimal Number of Decoupling Capacitors by Minimizing the Equivalent Inductance of the PCB PDN," *2014 IEEE International Electromagnetic Compatibility Symposium*, Raleigh, North Carolina.
- Honorable Mention for student paper at *2014 ASEE IL/IN section conference*: Christopher Kodama, Christopher O'Daniel, Joshua Cook, "Causes of Radiation in Electromagnetic Bandgap Structures."
- Honorable Mention for student paper at *2014 ASEE IL/IN section conference*: Shantanu Sanyal, Dakota Wealing and Leihao Wei, "Computationally Efficient Inductance Calculations in a Power Distribution Network."
- Poster at *2014 ASEE IL/IN section conference*: Evan Sawyer, Christopher Kodama, Christopher O'Daniel and Joshua Cook, "Metamaterial Common-Mode Filtering using CSRRs."
- Michael Ausserer, David Voltmer, Eric Wandel and Edward Wheeler, "Design and Measurement of a Metamaterial-Inspired Broadband High Impedance Surface," *2013 Antenna Measurement Techniques Association Symposium*, Dayton, OH

- Honorable Mention for student poster at *2013 ASEE IL/IN section conference*: Billy Clarke, Brian Lackey, Brittany Lake, Kaleb Kleine, and Leihao Wei, *"EMI Profile of High Speed Interfaces."*
- First Place in Student Paper Competition at *2012 IEEE-USA Conference*: Michael Ausserer, Matthew Hein, Ian Stevenson, *"Simulation and Fabrication of a Wideband Planar Antenna."*
- First Place in Student Paper Competition at *2012 EIT-IEEE Conference* held at Indiana University Purdue University at Indianapolis (IUPUI): Michael Ausserer, Matthew Hein, Ian Stevenson, *"Simulation and Fabrication of a Wideband Planar Antenna."*
- Poster at *2012 ASEE IL/IN Section Conference* : Michael Ausserer, Matthew Hein, Ian Stevenson, *"Simulation and Fabrication of a Wideband Planar Antenna."*
- Outstanding Student Paper Prize in *2011 Joint Conference between the ASEE North Central Section and IL/IN Section at Central Michigan University*: Josh Manore, Seth Hendrickson, Kyson Mathieu, Jon Klein, *"Characterization of Blind, Buried, and Through Hole Vias at High Frequencies."*
- *2011 Joint Conference between the ASEE North Central Section and IL/IN Section at Central Michigan University*: Ben Hopf, Andrew Kimbell, David Silwanowicz, Alex Wolf, *"Affecting electronic and wireless devices using low-energy wave-shaped pulses."*

The above two papers report on two collaborative projects; the first with Seagate Technologies, Missouri S&T and Rose-Hulman; and the second with Air Force Research Laboratory and Rose-Hulman. Jon Klein and Kyson Mathieu are pursuing graduate work.

- *2011 RF Workshop at Indiana-Purdue Fort Wayne* "Affecting electronic and wireless devices using low-energy wave-shaped pulses." David Silwanowicz and Alex Wolf.
- *2011 RF Workshop at Indiana-Purdue Fort Wayne* "Characterization of Blind, Buried, and Through Hole Vias at High Frequencies." Jon Klein and Kyson Mathieu.
- *2009 RF Alliance meeting at Ohio State University*: Andrew Anderson, Ben Cook, Blake Marshall, Ryan White, Cliff Bullmaster, Vasu Chakravarthy, James Drewniak and Ed Wheeler, "Low-Energy Intentional Electromagnetic Interference."
- *2010 RF Alliance meeting at Purdue University*: Andrew Anderson, Ben Cook, Blake Marshall, Ryan White, Matt Halligan, Matt Schepers, Cliff Bullmaster, Vasu Chakravarthy, James Drewniak and Ed Wheeler, "Low-Energy Intentional Electromagnetic Interference."

The above two posters concern work administered by the Air Force Research Laboratory and is being pursued in collaboration with Missouri S&T EMC

Laboratory. Ben Cook and Blake Marshall are pursuing graduate work, Ben at Kaust University, Georgia Tech and U. of Cal.-Berkeley and Blake at Georgia Tech

- *2009 RF Alliance meeting at Ohio State University: Michael Fiedeldey, Michael Fuson, Morgan Roddy, Jonathan Turpen, Eric Wandel, Chris Holloway, Azad Siahmakoun and Ed Wheeler, "Incident angle-independent reflection from metamaterial film."*
- *2010 RF Alliance meeting at Purdue University: Michael Fiedeldey, Michael Fuson, Morgan Roddy, Jonathan Turpen, Eric Wandel, Chris Holloway, Azad Siahmakoun, and Ed Wheeler, "Incident angle-independent reflection from metamaterial film."*

The above two posters concern work to confirm published theoretical predictions by Chris Holloway of the National Institute of Standards and Technology and represents a collaboration between Electrical and Computer Engineering and Physics and Applied Optics. Morgan Roddy is pursuing graduate work at U. of Arkansas

- *2009 IL/IN ASEE Section Conference: Russell Jackson and Brandon Finan "EMC Measurement and Modeling"*
- *2009 GWEC Summit: "EMC and Signal Integrity" Russell Jackson and Brandon Finan*

The above three papers concern work with IBM Research Triangle Park and Missouri S&T EMC Laboratory. Partial funding provided by NSF. Russell Jackson is a Ph.D. candidate at Case Western.

- *2009 IEEE EMC Symposium: Amendra Koul, Andrew Conrad, Russell Jackson, Alex Packard, Jianjian Song, Edward Wheeler, and James L. Drewniak, "Developing an SI tool set for engineering design discovery, physical insight, and education."*
- *2008 EMC Consortium Meeting: Russell Jackson and Brandon Finan on "EMC Measurement and Modeling in PCBs"*
- *2007 and 2008 EMC Consortium Meetings: Chris Valenta, Gareth Shields, Dan Baker on "EMI Control in IGBT Motor Starters,"*
- *2nd prize in 2008 IL/IN ASEE Section Conference: Chris Valenta, Gareth Shields, Dan Baker on "EMC Modeling of AC Motor Drive"*
- *2008 Indiana RF Alliance student poster: Chris Valenta, Gareth Shields, Dan Baker on "EMC Modeling of PCB Parasitics"*

The above three papers concern work with Rockwell Automation and Missouri S&T EMC Laboratory to reduce EMI on IGBT motor drives. Partial funding provided by NSF. Chris Valenta obtained a Ph.D. at Georgia Tech, currently section leader in RFID at Georgia Tech Research Institute

- 3rd prize in *2008 IL/IN ASEE Section Conference*: Victor Sung on "Lumped Parameter Modeling of the Ideal Railgun: Examining Maximum Electromechanical Energy Conversion Efficiency"

Victor Sung is received his Ph.D. in advanced design of railguns at Virginia Tech.

- *2007 ICONIC Conference*: "Contactless method of measuring resistivity and loss," Edward Wheeler, Thomas Werne, and Azad Siahmakoun.

1999–2004 assistant professor of electrical and computer engineering, *RHIT*

- electromagnetics fields, electromagnetic waves, introduction to micro-electromechanical systems (MEMS), advanced MEMS, electrical circuits, electrical systems, engineering systems
- a student team under my direction co-authored a paper presented in the *2002 International TIROS Operational Vertical Sounder Conference*

1996–1999 assistant professor of electrical engineering, *Virginia Military Institute*

- electromagnetics, solid state materials & devices, optoelectronics, electrical circuits.
- 1999, 3rd Prize in the *IEEE VMS Project Night* at Virginia Tech; 1998, poster presentation at the *Blue Ridge Mountain Section of the American Chemical Society Undergraduate Research Symposium*; 1998, *First Prize* in the *VMS IEEE* student paper competition; and, 1997 a paper in the *VMS IEEE* student paper competition

1993 - 1995 taught lecture courses in semiconductor devices, linear systems, and electrical circuits at the University of Missouri-Rolla

- nominated by department chair and engineering school dean for an award from ASEE recognizing excellence in teaching as a graduate assistant

1991 - 1994 research fellowship from the U.S. Department of Education

1989 - 1991 linear systems and electrical circuits at the University of Missouri-Rolla

Rose-Hulman and Local Community Service

- committees: 1) *admissions & standing*, 2) *graduate studies*, 3) *employee relations*, 4) *athletic Hall-of-Fame*, 5) *computer use*, 6) *departmental communications*, 7) *departmental curriculum*, 8) *career achievement awards committee*, 9) *departmental electromagnetics area committee chair*, 10) *faculty affairs (elected)*, 11) *patents, licensing, and copyrights (elected)*
- Information collection, analysis and synthesis team (iCAST), appointed by RHIT president

- search committees: 1) *director of career services (chair)*, 2) *reference librarian*, 3) *VP for development*, 4) *institute librarian*, 5) *ECE department head*, 6) *mechanical engineering department head consultant*
- served on several graduate thesis committees
- member of Rose-Hulman team for *Special Olympics* (2000, 2001)
- Rose-Hulman's *United Way* campaign (2003-2005)
- *Wabash Valley United Way* funding panels (2003-2005, 2007, 2009, 2016), panel co-chair (2005, 2007, 2009)
- member of *Wabash Valley United Way* fund distribution committee (2005, 2007, 2009)
- Memorial United Methodist – trustees (2005-2007), endowment (2006-2009), staff-parish relations (2009-), staff-parish relations chair (2011-2015)
- reviewer for RHIT Lilly faculty success proposals (2006, 2009)
- reviewer for RHIT faculty summer professional development grants (2009, 2011-chair)
- *IEEE Student Chapter* faculty advisor (2000-2004)
- Sigma Nu faculty co-advisor, *invited by student members* (2001 – 2012)

Awards and Honor Society Memberships

- *RHIT Lawrence J. Giacoletto Endowed Chair in Electrical Engineering* (2015-2018)
- *RHIT Board of Trustee's Outstanding Scholar Award* (2011)
- *IEEE Third Millennium Medal* (2000)
- *VMI Distinguished Teaching Award* (1999)
- *Blue Key*, by invitation of RHIT student chapter
- *RHIT Athletic Hall of Fall*
- *Tau Beta Pi*, *Eta Kappa Nu*, *Phi Kappa Phi*

Professional Service, Activities and Memberships

- Reviewer for book titled "*Fundamentals of Applied Electromagnetics*" by Fuwwaz Ulaby and Umberto Ravaioli, Pearson, 2018.
- Reviewer for book titled "*Electromagnetic Bandgap Structures*" edited by Antonio Orlandi, Wiley publishers, 2015.
- member of the planning committee for the 2008 IEEE EMC Symposium, served as experiments and demonstrations co-chair
- session chair at *ICONIC 2007*, an international conference on near-field scanning of electromagnetic fields

- IEEE EMC Society education and student activities committee (2002-2011), Experiments chair (2005- 2011)
- instructor for course on electromagnetic compatibility (EMC) at University of Missouri-Rolla (2002, 2003)
- reviewer for *NSF Review Panel*, Electronics, Photonics, and Device Technologies program in the Electrical and Communications Systems Division of NSF
- reviewer in *NSF Review Panels* for the CCLI program in the Division of Undergraduate Education of NSF (2001, 2003, 2005)
- reviewer in *NSF Review Panel* for the TUES program in the Division of Undergraduate Education of NSF (2011, panel chair)
- reviewer for 2001 *National Science Foundation* proposal on the use of advanced technology in engineering education
- reviewer for *IEEE EMC Symposia* (2008, 2009)
- reviewer for the *Journal of Engineering Education*
- reviewer for *Inverse Problems in Science and Engineering*
- reviewer for the *Journal of Applied Physics*
- reviewer for book proposal on micro-machined devices, *Springer-Verlag* (2006)
- reviewer for book proposal on RF MEMS switches, *Springer-Verlag* (2006)
- reviewer for *McGraw-Hill* (2003, 2008)
- reviewer for book entitled "Fundamentals of Wave Behavior," *SciTech Publishing* (2009)
- reviewer for "Electromagnetic Fields and Waves" by E. Nefyodov and S. Smolskiy *Springer-Verlag* (2018)
- reviewer for *ASEE Annual Conference & Exposition* (many times, latest for the 2018 conference)
- reviewer for *ASEE/IEEE Frontiers in Education Conference*
- 1999-2000 chair, 1998-1999 vice-chair, 1997-1998 secretary/treasurer, and 1997-2000 executive committee member of the *Virginia Mountain Section of IEEE*
- 1997-1999 treasurer and 1999-2001 secretary of the *IEEE Virginia Council*
- 1998-1999 member of the *IEEE Virginia Coordinating Council*
- participant in the 1998 *National Effective Teaching Institute (NETI)* held in Seattle, Washington
- reviewer and technical program committee member for the 1997 *IEEE Region 3 Conference* held in Blacksburg, Virginia
- senior member *IEEE*, *IEEE MTT Society*, *IEEE EMC Society*, *American Society for Engineering Education (ASEE)*

Industrial Experience

1982 - 1988 Marathon Oil Company:
 Associate Engineer (1982-1984)
 Engineer (1984-1985)
 Project Engineer (1986-1988)

Project Totals

Total grants: \$2,879,575 \$1,006,329 (EDW credit)

Project Descriptions

- With Azad Siahmakoun, NSF proposal *Integrated Silicon Photonic Data Converters* submitted November 2018 (2018-2020, \$331,147, PI)
- With Mario Simoni on grant from Skyworks to include fabrication and measurement in our IC courses (2015, \$30K, PI).
- With Azad Siahmakoun on internal RHIT grants supplying seed money for HiSHiP (2013, \$20K), (2014, \$20K), (2016, \$40K), (2017, \$25K), (2018, \$25K)
- Collaborative research with Missouri University of Science & Technology on NSF CCLI Phase II grant to integrate electromagnetic compatibility, signal integrity, and high-speed design into engineering education (2006-2011, \$494,627, co-PI)
- Low-energy intentional electromagnetic interference, a RAPCEval/NEWSTARS project administered by the *Air Force Research Laboratory* (2008-2011, \$139,560, PI)
- With Azad Siahmakoun, Scott Kirkpatrick, Tom Adams, Elaine Kirkpatrick, and Dan Morris on DOE project to establish a center at Rose-Hulman for MEMS and nanotechnology (\$855,000 Azad Siahmakoun PI)
- With Jianjian Song and Dave Voltmer on the *NSF CCLI A&I project DUE-0410845* to introduce electromagnetic compatibility and signal integrity into undergraduate education (2004 – 2006, \$101,994, PI)
- With Cliff Grigg of the Rose-Hulman and Don Millard of Rensselaer Institute of Technology on an *NSF CCLI EMD project DUE-0088904* to bring effective practices to the engineering service course. (2000-2004, \$218,194, PI)
- With several colleagues on a project funded by the Keck Foundation for an undergraduate course on micro-electromechanical system (MEMS) at Rose-Hulman. (2002, \$400,000, Azad Siahmakoun PI)
- With Cliff Grigg on grant from Caterpillar to include data acquisition, measurement, and control systems in ECE 207. (2002, \$100,000, PI)
- With Cliff Grigg and Zac Chambers on a supplemental grant from NSF's *Foundation Coalition*. (Summer 2001, \$42,000, PI)

- Served as research consultant on *NSF research project DMR-9633107* investigating compensation mechanisms in wide bandgap semiconductors. (1996-2000, \$340,000, Jack Boone PI)
- With colleagues in chemistry and electrical engineering in an investigation of applications for transparent, conductive films. This project involved the deposition of ZnO and ITO layers on a glass petri dish to allow adherent cells to be electrostatically removed in order to minimize cell damage. (1998-2000, \$9,850, Co-PI)
- With colleagues in psychology at VMI investigating the treatment of ADHD via neuro-feedback. Extended previous work performed at the University of Tennessee-Knoxville. (1999-2001, \$15,350, PI)

Book and Journal Publications

- Joseph M. Faia, Yujie He, Edward Wheeler and Sun K. Hong, "Detection and Location of Nonlinear Scatterers using DORT applied with Pulse Inversion" submitted to Progress in Electromagnetic Research (PIER) Letters.
- Yujie He, Joseph M. Faia, Michael Cracraft and Edward Wheeler, "Common-Mode Suppression in Broadside-Coupled Coplanar Waveguides" Progress in Electromagnetic Research, to be submitted 2018.
- Michael Cracraft, Edward Wheeler and Jianjian Song, "*Signal Integrity in Digital Systems: Principles and Practice*" CRC Press, Taylor & Francis publishers to be published in 2018.
- Leihao Wei, Liang Li, Ketan Shringarpure, Albert Ruehli, Jun Fan, Bruce Archambeault, Edward Wheeler and James Drewniak, "*Plane-pair PEEC Model for Power Distribution Networks with Sub-meshing Techniques*" IEEE Trans. Microw. Theory Tech., **64**, 733-741.
- Edward Wheeler, Jianjian Song and David R. Voltmer, "Transmission line time-domain analysis and signal integrity," *Fundamentals of Industrial Electronics*, volume 1 in the *IEEE Industrial Electronics Handbook*, 2nd edition, J. David Irwin and Bogdan M. Wilamowski editors, 2011.
- Jianjian Song, Keith Hoover, and Edward Wheeler, Effectiveness of PCB Simulation in Teaching High-Speed Digital Design, *EMC Newsletter*, **Winter 2008**, pp. 80-84 (INVITED)
- J.W. Farmer, Jack L. Boone, Nickolas L. Brakensiek, E.D. Wheeler, C.H. Chandrasekhar, and C.M. Martin, "Incorporation of As_{Se} centers in ZnSe far-from-equilibrium," *J. Phys. Chem. Solids* **63**, 1921 (2002)
- Edward Wheeler and Robert L. McDonald, "Writing in Engineering Courses," *J. Engineering Education* **89**, 481 (2000)

- E.D. Wheeler, Jack L. Boone, J.W. Farmer, and H.R. Chandrasekhar, "Incorporation of Cu_{Zn} centers in ZnSe far from equilibrium," *J. Phys. Chem. Solids* **58**, 79 (1997)
- E.D. Wheeler, Jack L. Boone, J.W. Farmer, and H.R. Chandrasekhar, "Neutron transmutation doping as an experimental probe for Cu_{Zn} in ZnSe," *J. Appl. Phys.* **81**, 524 (1997)
- E.D. Wheeler, Jack L. Boone, J.W. Farmer, and H.R. Chandrasekhar, "Neutron transmutation doping as an experimental probe for As_{Se} in ZnSe," *Phys. Rev. B* **53**, 15617 (1996)
- Edward D. Wheeler, Jack L Boone, and James L. Drewniak, "A contactless method for measuring the bulk resistance of II-VI compound semiconductors," *Rev. Sci. Instrum.* **65**, 3844 (1994)

Conference Publications

- John Blauert, Joseph M. Faia, Yujie He, Sun K. Hong, Benjamin S. Cook and Edward Wheeler, "Improving the Radiation Characteristics of an Antipodal Vivaldi Antenna using a Spatially Variant Metamaterial Lens," 2018 URSI Conference, Boulder, CO.
- Yujie He, Zach Silva, Zach Bergstedt, Joseph Faia, Shelby Van Hoosier, Sang Goo Kang, Garrett Shaffer, Edward Wheeler and Michael Cracraft, "Common-Mode Filtering in Multilayer Printed Circuit Boards," 2017 IEEE EMC SIPI Symposium, Washington DC
- Sang Goo Kang, Garrett Schaffer, Christopher Kodama, Christopher O'Daniel, and Edward Wheeler, "CSRR Common-Mode Filtering Structures in Multilayer Printed Circuit Boards," 2015 IEEE EMC Symposium, Dresden, Germany
- Christopher Kodama, Christopher O'Daniel, Joshua Cook, Francesco de Paulis, Michael Cracraft, Samuel Connor, Antonio Orlandi and Edward Wheeler, "Mitigating the Threat of Crosstalk and Unwanted Radiation when using Electromagnetic Bandgap Structures to Suppress Common Mode Signal Propagation in PCB Differential Interconnects," 2015 IEEE EMC Symposium, Dresden, Germany
- Bruce Archambeault, Michael Varner, Sam Connor, Jiawei Zhang and Edward Wheeler, "Using Simulation & Joint Time/Frequency Domain Analysis to Evaluate Absorber/Lossy Material Performance in Resonant Cavities," 2015 IEEE EMC Symposium, Dresden, Germany
- Leihao Wei, Ketan Shringarpure, Albert Reuhli, Edward Wheeler and James Drewniak, Plane-Pair PEEC Models for PDN Using Sub-meshing," 2014 IEEE EPEPS Conference, Portland, Oregon.
- Evan Sawyer, Christopher Kodama, Christopher O'Daniel, Joshua Cook and Edward Wheeler, "Using Common-Mode Filtering Structures with Microstrip Differential Lines in a Multilayer Printed Circuit Board Environment," 2014 IEEE European Microwave Conference, Rome, Italy.

- Ketan Shringarpure, Biyao Zhao, Albert Ruehli, Bruce Archambeault, James Drewniak, Jun Fan, Leihao Wei, Edward Wheeler, Matteo Cocchini and Michael Cracraft, "On Finding the Optimal Number of Decoupling Capacitors by Minimizing the Equivalent Inductance of the PCB PDN," *2014 IEEE International Electromagnetic Compatibility Symposium, Raleigh, North Carolina*.
- Michael Ausserer, David Voltmer, Eric Wandel and Edward Wheeler, "Design and Measurement of a Metamaterial-Inspired Broadband High Impedance Surface," *2013 Antenna Measurement Techniques Association Symposium*
- David Voltmer, Edward Wheeler and Eric Wandel, "Wideband Performance for Planar Antenna-PMC Configuration," *2011 Antenna Measurement Techniques Association Symposium*
- Amendra Koul, Andrew Conrad, Russell Jackson, Alex Packard, Jianjian Song, Edward Wheeler, and James L. Drewniak, "Developing an SI tool set for engineering design discovery, physical insight, and education." *2009 IEEE International Electromagnetic Compatibility Symposium*
- Jianjian Song, Edward Wheeler, David Pommerenke and James L. Drewniak, "Development of a Concept Inventory Test for Signal and Power Integrity in Electronic Design," *2009 ASEE/IEEE Frontiers in Education*
- Keith Hoover, Jianjian Song, Edward Wheeler and James L. Drewniak, "Three Practical and Effective RF and EMC Experiments for a Computer Engineering Course on Electromagnetics and EMC," *2009 ASEE Annual Conference and Exposition*.
- Jianjian Song, Edward Wheeler and Keith Hoover, "Effectiveness of PCB simulation in teaching high-speed digital design," *2007 IEEE Electromagnetic Compatibility Symposium*
- Edward Wheeler, Thomas Werne, and Azad Siahmakoun, "Contactless method of measuring resistivity and loss," *2007 ICONIC Conference*
- Edward Wheeler, Jianjian Song, and David Voltmer, "Effective integration of electromagnetic compatibility and signal integrity in electrical and computer engineering curricula," *2006 ASEE Annual Conference & Exposition*
- Jianjian Song and Edward Wheeler, "Teaching Signal Integrity for High-Speed Digital Systems with Hyperlynx," *2006 IEEE Electromagnetic Compatibility Symposium*
- Deckert, M., Kirkpatrick, S., Adams, T., Wheeler, E. and Siahmakoun, A., (2006), "SMA Energy-Scavenger MEMS Device," *Proceedings of SEM 2006*, St Louis, MO, June 4-7, 2006
- Siahmakoun, A., Adams, T. Wheeler, E. and Kirkpatrick, S., (2006), "Undergraduate MEMS-Nano Courses for Everyone," *Proceedings of MRS 2006 Conference*, San Francisco, CA, April 17-21, 2006

- Ed Wheeler, Dave Voltmer and Jianjian Song, "Effective Integration of Electromagnetic Compatibility and Signal Integrity in Electrical and Computer Engineering Curricula," 2005 *EEC NSF Grantees Conference*
- Jianjian Song, Dave Voltmer, and Ed Wheeler, "A Required EMC Course for Computer Engineering Undergraduates," 2005 *IEEE Electromagnetic Compatibility Symposium*
- Tina Hudson and Ed Wheeler, "Interdisciplinary Laboratory-Based Advanced MEMS Course for Undergraduates," 2004 *Frontiers in Education Conference*
- Edward Wheeler and Cliff Grigg, "Improving the electrical engineering service course," 2003 *ASEE Annual Conference & Exposition* in Nashville
- E.D. Wheeler, Jack L. Boone, Nickolas L. Brakensiek, J.W. Farmer, C.H. Chandrasekhar, and C.M. Martin "A study of far-from-equilibrium doping in ZnSe, extended abstracts 2002 *U.S. Workshop on the Physics and Chemistry of II-VI Materials*, San Diego, CA
- Edward Wheeler, Cliff Grigg, Zachariah Chambers, and Richard A. Layton, "Effective Practices in the Electrical Systems Service Course," 2002 *ASEE Annual Conference & Exposition* in Montreal
- Edward Wheeler and Cliff Grigg, "Improving the Effectiveness of the Electrical Engineering Service Course," 2002 *ASEE Annual Conference & Exposition* in Montreal
- Julia M. Williams and Edward Wheeler, "Using Audience Accommodation for Effective and Ethical Communication," *Proceedings of the 2000 ASEE/IEEE Frontiers in Education Conference*, IEEE catalog number 00CH37135
- Jack L. Boone, Nickolas L. Brakensiek, J.W. Farmer, H.R. Chandrasekhar, Shu-Chun Yang, and E.D. Wheeler, "An investigation in ZnSe via far-from-equilibrium dopant incorporation," *Bulletin of the American Physical Society*, ISSN number 3-0503, March 1999
- Edward Wheeler and Robert L. McDonald, "Using writing to enhance collaborative learning in engineering courses," *Proceedings of the 1998 ASEE/IEEE Frontiers in Education conference*. IEEE catalog number 98CH36214, page 236
- Robert Johnson and Edward Wheeler, "Detailed assessment of engineering curricula," *Proceedings of the 1998 ASEE/IEEE Frontiers in Education Conference*, IEEE catalog number 98CH36214, page 778
- H.R. Chandrasekhar, Shu-Chun Yang, Nickolas L. Brakensiek, Jack L. Boone, J.W. Farmer, and E.D. Wheeler, "Photoluminescence of homoepitaxial films grown from non-stoichiometric mixtures of Zn and Se," *Bulletin of the American Physical Society*, ISSN number 3-0503, March 1998, page 378

- Nicholas L. Brakensiek, Shu-Chun Yang, Jack L. Boone, J.W. Farmer, H.R. Chandrasekhar, and E.D. Wheeler, "Transmutation doping of ZnSe homoepitaxial films using the single isotope Se-74," *Bulletin of the American Physical Society*, ISSN number 3-0503, March 1998, page 718
- E.D. Wheeler and Jack L. Boone, "The Origin of the I_1^d excitonic emission in ZnSe," *Proceedings of the 1998 IEEE Southeastcon*, IEEE catalog number 98CH36170, page 275
- E.D. Wheeler, G.G. Balazs, and Robert L. McDonald, "Writing as a teaching and learning tool in engineering courses," *Proceedings of the 1997 ASEE/IEEE Frontiers in Education Conference*, IEEE catalog number 97CH36099, page 1538
- Nickolas L. Brakensiek, Jack L. Boone, E.D. Wheeler, J.W. Farmer, and H.R. Chandrasekhar, "Homoepitaxial growth of ZnSe by PVT of the elements in a sealed ampoule," *Bulletin of the American Physical Society*, ISSN number 3-0503, March 1997, page 515
- E.D. Wheeler, Nicholas L. Brakensiek, Jack L. Boone, and Gene Cantwell, "Doping ZnSe far from equilibrium," *Proceedings of the 1997 IEEE Southeastcon*, IEEE catalog number 97CH36044, page 267
- E.D. Wheeler, Jack L. Boone, J.W. Farmer, and H.R. Chandrasekhar, "Neutron transmutation doping as an experimental probe for As_{Se} in ZnSe," *Bulletin of the American Physical Society*, ISSN number 3-0503, March 1996, page 715

Conference Presentations

- "CSRR Common-Mode Filtering Structures in Multilayer Printed Circuit Boards," *2015 IEEE EMC Symposium, Dresden, Germany*
- "Using Common-Mode Filtering Structures with Microstrip Differential Lines in a Multilayer Printed Circuit Board Environment," *2014 IEEE European Microwave Conference, Rome, Italy.*
- "Wideband Performance for Planar Antenna-PMC Configuration," *2011 Antenna Measurement Techniques Association Symposium*, Englewood, Colorado.
- "Transmission line fundamentals," EMC Fundamentals Workshop at *2009 IEEE EMC Symposium*, Austin, Texas. (INVITED)
- "Contactless method of measuring resistivity and loss," *2007 ICONIC Conference*, St. Louis, Missouri
- "A study of far-from-equilibrium doping in ZnSe, *2002 U.S. Workshop on the Physics and Chemistry of II-VI Materials*, San Diego, California
- "Using audience accommodation for effective and ethical engineering," Session **S1F**, *2000 ASEE/IEEE Frontiers in Education Conference*, Kansas City, Kansas

- “An investigation in ZnSe via far-from-equilibrium dopant incorporation,” Session **JC22**, *1999 American Physical Society March Meeting*, Atlanta, Georgia
- “Using writing to enhance collaborative learning in engineering courses,” Session **T2H**, *1998 ASEE/IEEE Frontiers in Education Conference*, Tempe, Arizona
- “Writing as a teaching and learning tool in engineering courses,” Session **S4F**, *1997 ASEE/IEEE Frontiers in Education conference*, Pittsburgh, Pennsylvania
- “The origin of the I_1^d excitonic emission in ZnSe,” Session **18**, *1998 IEEE Southeastcon*, Orlando, Florida
- “Doping ZnSe far from equilibrium,” Session **B7**, *1997 IEEE Southeastcon*, Blacksburg, Virginia
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