

Edward Wheeler

Associate Professor
Electrical and Computer Engineering Department
Rose-Hulman Institute of Technology

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

2004- associate professor of electrical and computer engineering, *RHIT*

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 devices and materials, optoelectronics, and electrical circuits.
- students under my direction regularly presented papers in various student research activities—1999, 3rd Prize in the *IEEE VMS Project Night* at Virginia Tech, in 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, in 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

Service

Rose-Hulman

- committees: 1) *admissions & standing*, 2) *graduate studies*, 3) *employee relations*, 3) *athletic Hall-of-Fame*, 4) *computer use* 5) *departmental communications*, 6) *departmental curriculum*
- search committees: 1) *director of career services*, 2) *reference librarian*, 3) *VP for development*, 4) *institute librarian*
- serve on several graduate thesis committees
- member of Rose-Hulman team for *Special Olympics* (2000, 2001)
- serve on *United Way* funding panels and on Rose-Hulman's *United Way* campaign (2003-2005, 2007, 2009)
- member of *United Way's* fund distribution committee (2005, 2007, 2009)
- reviewer for Lilly faculty success proposals (2006)
- past *IEEE Student Chapter* faculty advisor (2000-2004)
- Sigma Nu chapter faculty co-advisor

VMI

- committees: 1) *research*, 2) *writing-across-the-curriculum*, 3) *career services*
- IEEE and Tau Beta Pi faculty advisor
- initiated 1) annual departmental newsletter, 2) annual awards ceremony, 3) annual Engineer's Week Convocation

Awards and Membership in Honor Societies

- *IEEE Third Millennium Medal* (2000)
- *VMI Distinguished Teaching Award* (1999)
- *Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, Blue Key*

Professional Activities and Memberships

- member of the planning committee for the 2008 IEEE EMC Symposium, experiments 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
- instructor for course on electromagnetic compatibility (EMC) at University of Missouri-Rolla
- reviewer for *NSF Review Panel* for the Electronics, Photonics, and Device Technologies program in the Electrical and Communications Systems Division of NSF
- 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 resonant devices, *Springer-Verlag* (2006)
- reviewer for book proposal on RF MEMS switches, *Springer-Verlag* (2006)
- reviewer for *McGraw-Hill* (2003, 2008)
- reviewer for *ASEE Annual Conference & Exposition*
- reviewer for *ASEE/IEEE Frontiers in Education Conference*
- reviewer in *NSF Review Panels* for the CCLI program in the Division of Undergraduate Education of NSF.
- reviewer for 2001 *National Science Foundation* proposal on the use of advanced technology in engineering education.
- 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*, member *IEEE EMC Society* member *American Physical Society* (APS) and the *American Society for Engineering Education* (ASEE).

Industrial Experience

1982 - 1988 Marathon Oil Company

Project Summary

Total grants: \$2,726,575 \$863,329 (EDW credit)

Project Descriptions

- Low-energy intentional electromagnetic interference, a RAPCEval/NEWSTARS project with the *Air Force Research Laboratory* (2008-2009, \$139,560, PI)
- Working with faculty from MST on NSF CCLI Phase II grant to effectively integrate electromagnetic compatibility, signal integrity, and high-speed design into engineering education (2006-2010, \$494,627, co-PI)
- Working 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)
- Working 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)
- Worked 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)
- Worked with 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)
- Worked with Cliff Grigg on grant from Caterpillar to include data acquisition, measurement, and control systems in ECE 207. (2002, \$100,000, PI)
- Collaborated 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. We employed neutron transmutation to decouple doping and growth in ZnSe in order to probe doping processes in ZnSe far-from-equilibrium. (1996-2000, \$340,000, Dr. J.L. Boone PI)
- Collaborated 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).

- Collaborated with colleagues in psychology at VMI investigating the treatment of ADHD via neuron-feedback. Extending previous work performed at the University of Tennessee-Knoxville, this project resulted in significant improvements in subject EEG beta/theta ratio. (1999-2001,\$15,350,PI).

Journal Publications

- Jianjian Song, Keith Hoover, and Edward Wheeler, Effectiveness of PCB Simulation in Teaching High-Speed Digital Design, *EMC Newsletter*, Winter 2008, pp. 80-84.
- 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

- Jianjian Song, Edward Wheeler and Keith Hoover, "Effectiveness of PCB Simulation in Teaching High-Speed digital design," *2007 IEEE EMC 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 EMC Symposium*.
- Deckert, M., Kirkpatrick, S., Adams, T., Wheeler, E. and Siahmakoun, A., (2006), "SMA Energy-Scavenger MEMS Device," In 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," In 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 EMC 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

- "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.

- “Neutron transmutation doping as an experimental probe for As_{Se} in ZnSe,” Session **Q26**, *1996 American Physical Society March Meeting*, St. Louis, Missouri.