

Robert M. Nelson
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A. Academic Background

- Doctor of Philosophy (Ph.D.) 1987.
School: North Dakota State University, Fargo, ND
Major: Engineering
Specialty: Electrical Engineering
Dissertation: Rectangular Microstrip Patch Resonators on Several Anisotropic Substrates

- Master of Science in Electrical Engineering (M.S.E.E.) 1981.
School: Washington State University, Pullman, WA
Major: Electrical Engineering
MS Project: Application of the Boundary Condition on Total Charge in Solving Axially Symmetric, Electrostatic Problems by Means of Integral Equations

- Bachelor of Arts (B.A.) 1977.
School: Northland College, Ashland, WI
Major: Mathematics
Minor: Physics
Certified: Teach mathematics grades 7-12

B. Academic Experience/Employment History

- Associate Prof. of Engineering 8/18-present
Iron Range Engineering / Minnesota State University – Mankato

- Professor - Computer Engineering 1/15-5/18.
University of Wisconsin-Stout
Engineering & Technology Department

- Program Director and Full Professor - Computer Engr. 8/08-12/14.
University of Wisconsin-Stout
Engineering & Technology Department

- Full Professor 9/06-8/08.
North Dakota State University
Department of Electrical/Computer Engineering

- Associate Professor 9/95-8/06.
North Dakota State University
Department of Electrical/Computer Engineering
- Assistant Professor 8/89-9/95.
North Dakota State University
Department of Electrical Engineering
- Assistant Professor 9/87-8/89.
University of Idaho
Dept of Electrical Engineering
- Predoctoral Lecturer 9/83-6/87.
North Dakota State University
Department of Electrical Engineering
- Member of Technical Staff 6/81-8/83.
Bell Telephone Laboratories
Indianapolis, IN
- Teaching/Research Assistant 9/77-6/81.
Washington State University
Departments of Mathematics and Electrical Eng.

C. Consulting Experience

- *NDSU Center for Nanoscale Science and Engineering (CNSE)*

1/08 – 8/08. Project entitled “Electrically Small Antennas for UHF RFID using Metamaterials”. Investigating the use of metamaterials in the design of RFID antennas. Support involved partial summer salary for Nelson, and salary for graduate students.

1/06 – 12/07. Project entitled “High Frequency RFID Eartag” which is a sub-project of “Agrosecurity: Disease Surveillance and Public Health” funded by the U.S. Department of Agriculture. Developing antenna designs and measurement facilities to optimize RFID performance when used with cattle. Support involved partial summer salary for Nelson, and salary for graduate students.

11/04 - 12/05. Project entitled “RFID Sensor Backscattering: Development and Application of Analytical Tools for Determination of Backscatter Characteristics”. Developing new computational methods to model the EM (electromagnetic) effects in RFID circuits. Support involved partial summer salary for Nelson, and salary for graduate student.

- *Sverdrup Technology, Eglin Air Force Base, Florida*

8/03 - 10/04. Developed new computational methods to model EM (electromagnetic) effects for military aircraft. Support involved partial academic year and summer salary for Nelson (reduced NDSU appointment), and salary for graduate student.

- *Otter Tail Power Company, Fergus Falls, MN.*

Summers of 1999-2001. System modeling and testing of high voltage power line carrier system. Support involved summer salary.

- *Naval Undersea Warfare Center, New London, CT.*

6/94-8/94. Review of computational electromagnetics as appropriate for submarine environment. Support involved summer salary.

D. Graduate Students – Major Professor for:

Student	School	Degree	Graduation	Disquisition Title
Douglas Lorenzen	UW-Stout	M.S.	Fall 2013	The Effect of Powder Flow on a High-Speed Form Fill Seal Packaging
Benjamin Braaten	NDSU	Ph.D.	Spring 2009	Modeling Multiple Printed Antennas Embedded in Stratified Uniaxial Anisotropic Dielectrics
Michael Reich	NDSU	Ph.D.	Fall 2008	A Transverse Shift Correlation Algorithm for Use in a Gigahertz Transverse Electromagnetic (GTEM) Cell
Cherish Baeur-Reich	NDSU	M.S.	Summer 2008	An Investigation into Antennas for Use in UHF RFID Cattle Tags
Dustin Vaselaar	NDSU	M.S.	Summer 2008	Passive UHF RFID Design and Utilization in the Livestock Industry
Anupama Sadasiva	NDSU	M.S.	Summer 2008	An Analysis of the Role of Water on the Effective Permittivity of Biological Materials Using Mixing Formulas
Jinmei Guo	NDSU	M.S.	Spring 2006	Antenna Factor Calculation Using Time-Domain Numerical Methods
Shiqiang Dai	NDSU	M.S.	Spring 2006	Numerical Simulation of Tri-plate Antenna
Benjamin Braaten	NDSU	M.S.	Spring 2005	An Integral Equation Technique for Solving EM Problems
Doaa Abouzeid	NDSU	M.S.	Spring 2004	Analysis of Electric Field Strengths from Prairie Public Broadcasting Transmitters
Yuxin Feng	NDSU	M.S.	Fall 2003	PLC Carrier System Analysis and Self-Tuner Project

Sharif Islam	NDSU	M.S.	Spring 2002	MES – A Web Based Design Tool for Microwave Engineering
Ke Wang	NDSU	M.S.	Fall 2000	Numerical Simulation of Antenna Factors
Daniel Ortmann	NDSU	M.S.	Summer 1998	Engineering Glue Code Software Development: Analysis and Design
Lincoln Davidson	NDSU	M.S.	Fall 1997	A Rational Function Curve Fitting Technique
Darren Boehm	NDSU	M.S.	Spring 1997	Geometric Optics
Joel Aslakson	NDSU	M.S.	Spring 1996	A High Precision Local Area Radio Positioning System
Ahmad Mahinfallah	NDSU	M.S.	Summer 1995	Studies of ESD of a Human and Its Effects on Timing Circuits
Jianxiong Mu	NDSU	M.S.	Fall 1994	Application of the Moment Method to Determine Charge Distribution for Finite Conducting Structures
Hualiang Ji	NDSU	M.S.	Fall 1993	Studies of EMI from ESUs in Hospital Operating Rooms

E. Publications

Book Chapters

- 1.) C. Bauer-Reich, M. Reich and R M. Nelson, "The Interaction of Electrostatic Discharge and RFID", *Advanced Radio Frequency Identification Design and Applications*, Stevan Preradovic (Ed.), INTECH Publishing, ISBN 978-953-307-168-8, March 2011. (available at <http://www.intechopen.com/articles/show/title/the-interaction-of-electrostatic-discharge-and-rfid>)
- 2.) B. D. Braaten, G. J. Owen and R M. Nelson (2010), "Design of Space-Filling Antennas for Passive UHF RFID Tags," *Radio Frequency Identification Fundamentals and Applications: Design Methods and Solutions*, Cristina Turcu (Ed.), INTECH Publishing, ISBN 978-953-7619-72-5, Feb. 2010. (available at <http://www.intechopen.com/articles/show/title/design-of-space-filling-antennas-for-passive-uhf-rfid-tags>)

Journal Papers and Conference Proceedings

- 1.) A. Peng, L. Zhan, B. Eickhoff, R. Nelson, "Experiences in Developing a Computer Engineering Capstone Design Course with a Startup Company", *Proceedings of the 2016 ASEE Annual Conference & Exposition*, Paper number 16020, June 26-29, 2016, New Orleans, LA.
- 2.) B. D. Braaten, D. A. Rogers and R. M. Nelson, "On the Numerical Integration of Spectral Domain Immittance Functions for Multiple Printed Dipoles in Layered Uniaxial Anisotropic Dielectrics," presented at the *2015 IEEE*

International Symposium on Antennas and Propagation, Jul. 19 - 25, 2015, Vancouver BC, Canada, pp. 1812-1813.

- 3.) A. Peng, R. Nelson, C. Liu, L. Meredith, L. Stradins, "Hybrid teaching vs. Traditional teaching in computer engineering courses: what works and what does not work?", *Proceedings of the 2014 ASEE North Midwest Section Meeting*, Iowa City, IA, October 17, 2014.
- 4.) B. D. Braaten, D. A. Rogers and R. M. Nelson, "On the Spectral Domain Moment Method Solution of Electric Field Integral Equations for the Analysis of Printed Dipoles in Anisotropic Layers," *Proceedings of the 2014 IEEE International Symposium on Antennas and Propagation*, Memphis, TN, July 2014.
- 5.) B.D. Braaten, R.M. Nelson, R.G. Olsen, M. Mohammed, "On the Numerical Implementation of EFIEs for Problems with both Quasi-static and Full-wave Regions" *Proceedings of the 2014 Applied Computational Electromagnetics Symposium*, Jacksonville, Florida, March 2014.
- 6.) A. Peng, R. Nelson, C. Liu, A. Turkmen, W. Shi, J. Lin, "Design and Development of a Hybrid Instructional Model for a Computer Engineering Course", *Proceedings of the 2013 ASEE North Midwest Section Meeting*, Fargo, ND, October 18, 2013.
- 7.) W. Shi, A. Turkmen, C. Liu, R. Nelson, J. Bumblis, D. Olson, "Project-Based & Active Learning in Computer Engineering Education", *Proceedings of the 2012 ASEE North Midwest Section Meeting*, St. Cloud, MN October 5, 2012.
- 8.) A. Turkmen, C. Liu, W. Shi, R. Nelson, J. Bumblis, D. Olson, "Technical and Pedagogical Issues with Embedded System Engineering Education", *Proceedings of the 2012 ASEE North Midwest Section Meeting*, St. Cloud, MN October 5, 2012
- 9.) B.D. Braaten, D.A. Rogers and R.M. Nelson, "Multi-Conductor Spectral Domain Analysis of the Mutual Coupling Between Printed Dipoles Embedded in Stratified Uniaxial Anisotropic Dielectrics," *IEEE Transactions on Antennas and Propagation*, vol. 60, No. 4, April 2012, pp. 1886-1898.
- 10.) R. Nelson, J. Bumblis, C. Liu, A. Turkmen, N. Zhou, D. Olson and R. Rothaupt, "What is Involved in Establishing a New Engineering Program? An Update on the New Computer Engineering Program at UW-Stout", *Proceedings of the 2011 ASEE North Midwest Section Meeting*, Duluth, MN October 13-15, 2011.
- 11.) B.A. Mork, R.M. Nelson, B. Kirkendall, N.M. Stenvig, "Determination of High-Frequency Current Distribution Using EMTP-Based Transmission

Line Models with Resulting Radiated Electromagnetic Fields,” *ISPLC 2010 - 14th IEEE International Symposium on Power Line Communications and its Applications*, Paper No. 1569270424, Rio de Janeiro, Mar 28-31, 2010. This paper is also available as Lawrence Livermore Labs Conference Paper number 420840 via the U.S. Dept. of Energy’s Information Bridge at www.osti.gov/servlets/purl/975225-lhK8w2/ .

- 12.) B. D. Braaten, R. P. Scheeler, R. M. Reich, R. M. Nelson, C. Bauer-Reich, J. Glower and G. J. Owen, “Compact Metamaterial Based UHF RFID Antennas: Deformed Omega and Split-Ring Resonator Structures,” *The Applied Computational Electromagnetics Society Journal*, vol. 25, no. 6, 2010.
- 13.) B. D. Braaten, D. A. Rogers and R. M. Nelson, “Current Distribution of a Printed Dipole with Arbitrary Length Embedded in Layered Uniaxial Anisotropic Dielectrics,” *Proceedings of the 2009 International Microwave and Optoelectronics Conference*, Belem, Brazil, November, 2009, pp. 72-77 (**invited paper**).
- 14.) B. D. Braaten, R. M. Nelson and D. A. Rogers, “Input Impedance and Resonant Frequency of a Printed Dipole with Arbitrary Length Embedded in Stratified Uniaxial Anisotropic Dielectrics,” *IEEE Antennas and Wireless Propagation Letters*, vol. 8, 2009, pp. 806-810.
- 15.) M.J. Schroeder, A. Kottsick, J. Lee, M. Newell, J. Purcell and R.M. Nelson , “Experiential Learning of Electromagnetic Concepts by Designing, Building and Calibrating a Broad-spectrum Suite of Sensors in a Capstone Course,” *International Journal of Electrical Engineering Education*, 46(2):198-210, April 2009.
- 16.) G. J. Owen, B. D. Braaten, D. Vaselaar, R. M. Nelson, C. B.-Reich, J. Glower, M. Reich and A. Reinholz, “On the Effect of Mutual Coupling on LF and UHF Tags Implemented in Dual Frequency RFID Applications,” *Proceedings of the 2009 IEEE International Symposium on Antennas and Propagation*, Charleston, SC, June 2009.
- 17.) B. D. Braaten, R. M. Nelson and D. A. Rogers, “Mutual Coupling Between Broadside Printed Dipoles Embedded in Stratified Anisotropic Dielectrics,” *Proceedings of the 2009 IEEE International Symposium on Antennas and Propagation*, Charleston, SC, June 2009.
- 18.) M. Reich, C. Bauer-Reich and R. Nelson, “The Effect of EUT Position on Gigahertz Transverse Electromagnetic (GTEM) Cell Correlation Algorithms”, *Proceedings of the 2008 IEEE International Symposium on Electromagnetic Compatibility*, Detroit, MI, Aug. 2008.

- 19.) B.D. Braaten, R.M. Nelson and Y. Feng, "A New Equivalent Circuit Extraction Method for Quasi-static Regions," *Proceedings of the 2008 IEEE International Symposium on Antennas and Propagation*, San Diego, CA, July 2008.
- 20.) B.D. Braaten, G.J. Owen, D. Vaselaar, R.M. Nelson, C. B.-Reich, J. Glower, B. Morlock, M. Reich and A. Reinholz, "A Printed Rampart-Line Antenna with a Dielectric Superstrate for UHF RFID Applications," *Proceedings of the 2008 IEEE International Conference on RFID*, Las Vegas, NV, April 2008, pp. 74-80.
- 21.) M. Schroeder, A. Sadasiva, R. Nelson, "An Analysis on the Role of Water Content and State on Effective Permittivity Using Mixing Formulas," *Journal of Biomechanics, Biomedical and Biophysical Engineering*, Vol. 2, No. 1, 2008.
- 22.) B.D. Braaten and R.M. Nelson, "An RGF Delta Gap Source for Thin Wire EFIE," *IEEE Transactions on Electromagnetic Compatibility*, vol. 50, No. 1, February 2008, pp. 212-215.
- 23.) B.D. Braaten, R.M. Nelson, and M.A. Mohammed, "Electric Field Integral Equations for Electromagnetic Scattering Problems with Electrically Small and Electrically Large Regions," *IEEE Transactions on Antennas and Propagation*, vol. 56, No. 1, January 2008, pp. 142-150.
- 24.) R.M. Nelson and B.D. Braaten, "Computational Electromagnetics in Electrical Engineering at NDSU" *Proceedings of the 2007 ASEE North Midwest Regional Conference*, Michigan Technological University, Houghton, MI, September 2007.
- 25.) C. Bauer-Reich, R.M. Nelson, D. Vaselaar, "The Effects of ESD in Multiple Testing Environments on Adhesive-Label RFID Tags," *Proceedings of the 2007 IEEE International Symposium on Electromagnetic Compatibility*, Honolulu, HI, July 2007.
- 26.) R.M. Nelson, "'Electromagnetics is Fun!' – Is this an Oxymoron?", *Proceedings of the 2006 ASEE North Midwest Regional Conference*, University of Wisconsin–Stout, Menomonie, WI, October 2006.
- 27.) Y. Feng, B. Braaten and R. Nelson, "Analytical Expressions for Small Loop Antennas – With Application to EMC and RFID Systems," *Proceedings of the 2006 IEEE International Symposium on Electromagnetic Compatibility*, Portland, OR, August 2006.
- 28.) B. Braaten, Y. Feng and R. Nelson, "High-Frequency RFID Tags: An Analytical and Numerical Approach for Determining the Induced Currents

and Scattered Fields,” *Proceedings of the 2006 IEEE International Symposium on Electromagnetic Compatibility*, Portland, OR, August 2006.

- 29.) ANM S. Islam and R.M. Nelson , “MES - A Web-Based Design Tool for Microwave Engineering,” *IEEE Transactions on Education*,. Vol. 49, No. 1, February 2006, pp. 67-73.
- 30.) R. Nelson, F. Heather, “University / DoD Interaction Via Senior Design Projects,” *Proceedings of the 2005 ASEE North Midwest Regional Conference*, Brookings, SD, October 2005, paper number NMW05-141, pp. 1-10.
- 31.) Y. Feng, R. Nelson, M. Pavicic and A. Fallah, “Using Measured Characteristics of Surface Mount Components in Time-Domain Simulation of High Speed Analog Circuit,” *Proceedings of the 2004 IEEE International Symposium on Electromagnetic Compatibility*, Santa Clara, CA, August 2004, pp. 315-320.
- 32.) A. Sadasiva, M.J. Schroeder, R.M. Nelson, “Effective Permittivity of Biological Materials: an Analysis on the Role of Water Content Using Mixing Formulas,” *Proceedings of the 26th Annual BEMS (Bioelectromagnetics Society) Meeting*, Washington, DC, June 2004, pp. 298-299.
- 33.) A. Sadasiva, M.J. Schroeder, R.M. Nelson, “The Effect of Fluid Levels on the Distribution of Electromagnetic Fields in the Body,” *Proceedings of the 26th Annual BEMS (Bioelectromagnetics Society) Meeting*, Washington, DC, June 2004, pp. 299-300.
- 34.) A. Mahanar, A.M. Fallah and R.M. Nelson, “On Characterizing the Impedance of Power/Ground Planes - Including the Effect of Anti-Pads,” *Proceedings of the 2003 IEEE International Symposium on Electromagnetic Compatibility*, Boston, MA, August 2003, pp. 869-874.
- 35.) ANM S. Islam and R.M. Nelson, “Scripting Complex Arithmetic in a Web Application: Microwave Engineering Solutions,” *Journal of Engineering and Technology*, Vol. 2, No. 1, January-June 2003, pp.1-8.
- 36.) R. Nelson and Y. Feng, “Power Line Carrier Research Project,” *Proceedings of the 38th Annual (2002) Minnesota Power Systems Conference (MIPSYCON)*, St. Paul, MN, November 2002, pp. 193-202.
- 37.) R.M. Nelson and L. Davidson, “Electrical Noise Generated from the Microphonic Effect in Capacitors,” *Proceedings of the 2002 IEEE International Symposium on Electromagnetic Compatibility*, Minneapolis, MN, August 2002, pp. 855-860.

- 38.) A.M. Fallah and R.M. Nelson, "Analytical and Experimental Analysis of Decoupling Capacitor Interactions with Plane and Interconnect Inductance – a Placement Topology," *Proceedings of the 2002 IEEE International Symposium on Electromagnetic Compatibility*, Minneapolis, MN, August 2002, pp. 871-876.
- 39.) B. Boeshans, D. Farden and R.M. Nelson, "Design, Testing and Computer Modeling of a Tunable Loop Antenna," *Proceedings of the 2002 IEEE International Symposium on Electromagnetic Compatibility*, Minneapolis, MN, August 2002, pp. 705-710.
- 40.) L. Davidson, A.M. Fallah, R.M. Nelson, D.A. Rogers, "Evaluating and Choosing Decoupling Capacitors," *Proceedings of the 2001 IEEE International Symposium on Electromagnetic Compatibility*, Montreal, Canada, August 2001, pp. 448-452.
- 41.) K. Wang, and R. Nelson, "Effect of Scattering Object on a Dipole Antenna Factor – An Initial Investigation," *Proceedings of the 2001 IEEE International Symposium on Electromagnetic Compatibility*, Montreal, Canada, August 2001, pp. 611-615.
- 42.) K. Wang, R. Nelson, "Numerical Simulation of the Antenna Factor of a Broadband Dipole Antenna," *Proceedings of the 2001 IEEE International Symposium on Electromagnetic Compatibility*, Montreal, Canada, August 2001, pp. 616-619.
- 43.) A.M. Fallah, L. Davidson, D. Banerjee, R.M. Nelson, D.A. Rogers, "An Inexpensive and Simple Method for Characterizing Passive Component," *Proceedings of the 2001 IEEE International Symposium on Electromagnetic Compatibility*, Montreal, Canada, August 2001, pp. 1141-1145.
- 44.) D. Carr, J. Jorgenson, R. Nelson, J. Glower, "A Comparison of Methods to Reduce Radiated Emissions," *Proceedings of the 2001 IEEE International Symposium on Electromagnetic Compatibility*, Montreal, Canada, August 2001, pp. 1169-1173.
- 45.) D.A. Rogers, R.M. Nelson, J.A. Jorgenson, O.F. Swenson, "Developing Instruction in Applied Electromagnetics to Foster Economic Development," *Proceedings of the 2001 International Microwave and Optoelectronics Conference*, Belem, Brazil, August 2001.
- 46.) A.. Burnham, D. Heizelman, R. Nelson, J. Glower, J. Jorgenson, and F. Heather, "The Design of an Internal Current Strike Demonstrator," *Proceedings of the 2000 IEEE International Symposium on Electromagnetic Compatibility*, Washington, D.C., August 2000, pp. 415-419.

- 47.) C. Douglas, J. Feist, G. Loerzel, R. Nelson, J. Glower, J. Jorgenson, and F. Heather, "The Design of a Lightning Attachment Simulator," *Proceedings of the 1999 IEEE International Symposium on Electromagnetic Compatibility*, Seattle, WA, August 1999, pp. 640-642.
- 48.) A.M. Fallah and R.M. Nelson, "Effect of Lead Length on the Response of ESD Protection Devices," *Proceedings of the 1999 IEEE International Symposium on Electromagnetic Compatibility*, Seattle, WA, August 1999, pp. 998-1003.
- 49.) R. M. Nelson, and H. Ji, "Electric and Magnetic Fields Created by Electrosurgical Units," *IEEE Trans., Electromagnetic Compatibility*. Vol. 41, No. 1, February 1999, pp. 55-64.
- 50.) B. Garry and R. Nelson, "Effect of Impedance and Frequency Variation on Insertion Loss for a Typical power Line Filter," *Proceedings of the 1998 IEEE International Symposium on Electromagnetic Compatibility*, Denver, CO, August 1998, pp. 691-695.
- 51.) R.M. Nelson, "Designing for EMC - A Case Study for Developing a Course in Electromagnetic Compatibility," *IEEE Trans. on Education*, Vol. 40, No. 4, Nov. 1997, pp. 283-286.
- 52.) R. Nelson, J. Mu, and S. Jalil, "Using Image Theory for Finite Electrostatic Problems - Some Observations and Guidelines," *Proceedings of the 1997 IEEE International Symposium on Electromagnetic Compatibility*, Austin, TX, August 1997, pp. 527-532.
- 53.) D.A. Rogers and R.M. Nelson, "Showcasing Electromagnetics and Optoelectronics: EMC and Fiber Optics in the BSEE Curriculum," *Proceedings of the 1997 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference*, (Invited Paper, Panel Session on Education and Technology in Microwaves and Optoelectronics), Natal, Brazil, August 1997, p. 585.
- 54.) R. M. Nelson, "Research Results Used as Motivational Examples in Undergraduate Electromagnetics Courses," *Proceedings of the 1996 North Midwest Section Meeting of ASEE*, North Dakota State University, Fargo, North Dakota, October 1996, p. I.A.-4.1 to I.A.-4.9.
- 55.) A. Mahinfallah and R.M. Nelson, "Simulated and Experimental Effects of ESD on CMOS Timing Circuit," *Proceedings of the 1996 IEEE International Symposium on Electromagnetic Compatibility*, Santa Clara, CA, August 1996, pp. 418-423.

- 56.) S. Yuvarajan, R. Nelson and D. Quek, "A Study of the Effects of Snubber on Switching Loss and EMI in an MCT Converter," *Proceedings of the 1994 IEEE International Symposium on Industrial Applications*, Denver, Colorado, October 1994, p. 1344-1349.
- 57.) R. Nelson, and H. Ji, "Electric Field Strengths Created by Electrosurgical Units," *Proceedings of the 1994 IEEE International Symposium on Electromagnetic Compatibility*, Chicago, Illinois, August 1994, pp. 366-370.
- 58.) R.M. Nelson, "Electromagnetic Environment of Operating Rooms," *Proceedings of the North Dakota Academy of Science*, Vol. 48, North Dakota Academy of Science Meeting, North Dakota State University, Fargo, ND, April 1994, p. 29.
- 59.) R.M. Nelson, "EMC Education at North Dakota State University," *Proceedings of the 1992 IEEE International Symposium on Electromagnetic Compatibility* (invited paper) Anaheim, California, August 1992, pp. 164-167.
- 60.) R.M. Nelson, "'Designing for EMC' - A Course Enhanced by Partnership with Industry," *Proceedings of the 1991 North Midwest Section Meeting of ASEE*, University of Wisconsin - Platteville, Platteville, Wisconsin, October 1991, p. 13.15 - 13.19.
- 61.) R.M. Nelson, "The EMC Course: Bridging the Gap Between Academic Preparation and Industrial Needs," *Proceedings of the 1991 IEEE International Symposium on Electromagnetic Compatibility*, Cherry Hill, New Jersey, August 1991, pp. 319-320.
- 62.) R.M. Nelson, "EMC - A Frequently Overlooked Design Specification," *Proceedings of the 1990 North Midwest Section Meeting of ASEE*, Michigan Technological University, Houghton, Michigan, October 1990, p. 8.8-8.12
- 63.) R.M. Nelson, D. A. Rogers, and A. G. d'Assuncao, "Resonant Frequency of a Rectangular Microstrip Patch on Several Uniaxial Substrates," *IEEE Trans. Antennas and Propagation*, Vol. 38, No. 7, July 1990, pp. 973-981.
- 64.) D.A. Rogers and R.M. Nelson, "Organizing the Advanced Electronics Design Course," *Proceedings of the North Dakota Academy of Science*, Vol. 44, Grand Forks: University of North Dakota Press, North Dakota Academy of Science Meeting, North Dakota State University, Fargo, ND, April 1990, p. 36.
- 65.) R.M. Nelson, D.A. Rogers and A. G. d'Assuncao, "Resonant Frequency of Microstrip Patches over Anisotropic Dielectrics," *Annals of the Third*

Brazilian Microwave Symposium, The Federal University of Rio Grande do Norte, Natal, RN, Brazil, July 1988, pp. 348-351.

- 66.) A. G. d'Assuncao, A. J. Giarola, R.M. Nelson, and D. A. Rogers, "On the Properties of Microstrip Lines on Double Anisotropic Layers," *Proceedings of the International Conference on Electromagnetic Interference and Compatibility (INCEMIC)*, Bangalore, India, September 1987, pp. 225-227.
- 67.) R.M. Nelson, D. A. Rogers, and A. G. d'Assuncao, "Effect of Dielectric Anisotropy on the Resonant Frequency of Rectangular Resonators with Several Dielectric Layers," *1987 IEEE AP-S International Symposium Digest*, Vol. II, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, June 1987, pp. 1032-1035.
- 68.) R.M. Nelson, D. A. Rogers and A. G. d'Assuncao, "Microstrip Antennas on Multilayer Anisotropic Substrates," *Proceedings of the North Dakota Academy of Science*, Vol. 41, Grand Forks: University of North Dakota Press, Joint Minn.-ND Academies of Science Meeting, Moorhead State University, Moorhead, MN, April 1987, p. 83.
- 69.) R.M. Nelson, D.A. Rogers, and A.G. d'Assuncao, "Resonant Frequency of Rectangular Microstrip Patch on Several Anisotropic Layers," *Abstracts of the 1987 National Radio Science Meeting*, Commission B, University of Colorado, Boulder, Colorado, January 1987, p. 228.
- 70.) R.M. Nelson and D.A. Rogers, "Using MININEC to Solve Antenna Theory Problems," *Proceedings of the 1985 Frontiers in Education Conference*, Colorado School of Mines, Golden, Colorado, October 1985, pp. 8-11.
- 71.) R.M. Nelson and R. G. Olsen, "Potential Calculations for Floating Conductors With Axial Symmetry," *Proceedings of the North Dakota Academy of Science*, Vol. 38, Grand Forks: University of North Dakota Press, North Dakota Academy of Science Meeting, North Dakota State University, Fargo, ND, April 1984, p. 33.

Technical Reports

- 1.) R. Nelson, Y. Feng and M. Maassel, *Further EM Characteristics of High Speed Subcircuits*, Final Report, Dakota Technologies, Inc., Fargo, ND., September 2005. (127 pages).
- 2.) R. Nelson, Y. Feng and M. Maassel, *Handbook of Components Models Useful for High Speed Circuit Designs*, Submitted to Dakota Technologies, Inc., Fargo, ND., September 2005. (75 pages).

- 3.) R. Nelson and B. Braaten, *Electromagnetic Characterization of Manned and Unmanned Air Vehicles and Weapon Combinations*, Final Report, Sverdrup Technology, Eglin Air Force Base, September, 2004. (81 pages).
- 4.) R.M. Nelson, *Use of Prediction Tools for Below Decks EMC: A Review of Past and Present Efforts and a Look at Future Possibilities*, NUWC-NPT Technical Document, Naval Undersea Warfare Center Division, Newport, Rhode Island, August 18, 1995. (31 pages).
- 5.) R.M. Nelson, *Effect of Capacitance on Threshold Trigger Voltage of Zero Static Systems ESD Event Sensors*, Final Report, Zero Static Systems, Inc., June 1992, (13 pages).
- 6.) R.M. Nelson, *Determination of Immittance Matrix Using Both Hertz Potentials and the Spectral Domain Immittance Approach for a Rectangular Microstrip Patch Resonator on Several Anisotropic Layers*, Technical Report, Department of Electrical Engineering, North Dakota State University, Fargo, ND, June 1989, (62 pages).
- 7.) R.M. Nelson, *Theoretical and Measured Radiated Field Strength for a 49.8 MHz Cordless Telephone*, Technical Memorandum, American Consumer Products Engineering Design and Development, Indianapolis, Indiana, August, 1983, (31 pages).
- 8.) R.G. Olsen and R.M. Nelson, *Further Development of Two and Three Dimensional Numerical Techniques for Computing the Electric Potential and Field*, Final Report, Bonneville Power Administration, September 1981, (195 pages).
- 9.) R.G. Olsen and R.M. Nelson, *Techniques for Calculating and Plotting Electric Potential Distributions in Two and Three Dimensional Geometries*, Final Report, Bonneville Power Administration, January, 1980, (220 pages).

F. Presentations at professional meetings

- 2013 ASEE North Midwest Regional Conference, October 2012.
 - Paper Presenter.
- 2012 ASEE North Midwest Regional Conference, October 2012.
 - Paper Presenter.
- 2011 ASEE North Midwest Regional Conference, October 2011.
 - Paper Presenter.
- Invited Speaker, Twin Cities Chapter, IEEE EMC, April 2010

- 2007 ASEE North Midwest Regional Conference, October 2007.
 - Paper Presenter.
- 2007 IEEE Int. Sym. on Electromagnetic Compatibility, July 2007.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 2006 ASEE North Midwest Regional Conference, October 2006.
 - Paper Presenter (2 papers).
- 2006 IEEE Int. Sym. on Electromagnetic Compatibility, August 2006.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 2005 ASEE North Midwest Regional Conference, October 2005.
 - Paper Presenter.
- 2005 IEEE Int. Sym. on Electromagnetic Compatibility, August 2005.
 - Invited presentation “RFID and EMC: A Brief Introduction” for the Workshop on the Fundamentals of EMC Design.
 - Fulfilled committee responsibilities (see EMC committees below)
- 2004 IEEE Int. Sym. on Electromagnetic Compatibility, August 2004.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 2002 Minnesota Power Systems Conference, November 2002.
 - Paper Presenter.
- 2002 IEEE Int. Sym. on Electromagnetic Compatibility, August 2002.
 - Paper Presenter (3 papers).
 - Invited presentation “Summary of EM Environment for Medical Devices” for the Workshop on the Fundamentals of EMC Design.
 - Fulfilled committee responsibilities (see EMC committees below)
- 2001 IEEE Int. Sym. on Electromagnetic Compatibility, August 2001.
 - Paper Presenter (5 papers).
 - Co-Chair of Workshop on the Fundamentals of EMC Design.
 - Fulfilled committee responsibilities (see EMC committees below)
- 2000 IEEE Int. Sym. on Electromagnetic Compatibility, August 2000.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)

- 1999 IEEE Int. Sym. on Electromagnetic Compatibility, August 1999.
 - Paper Presenter (2 papers).
 - Fulfilled committee responsibilities (see EMC committees below)
- 1998 IEEE Int. Sym. on Electromagnetic Compatibility, August 1998.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 1997 IEEE Int. Sym. on Electromagnetic Compatibility, August 1997.
 - Paper Presenter.
 - Invited presentation “Synergism of System Design and Test – An Analytical Approach” for the Workshop on the Fundamentals of EMC Design.
 - Fulfilled committee responsibilities (see EMC committees below)
- 1996 IEEE Int. Sym. on Electromagnetic Compatibility, August 1996.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 1996 ASEE North Midwest Regional Conference, October 1996.
 - Paper Presenter.
- 1994 IEEE Int. Sym. on Electromagnetic Compatibility, August 1994.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 1994 North Dakota Academy of Science April 1994.
 - Co-Chair of two technical sessions.
 - Paper Presenter.
- 1992 IEEE Int. Sym. on Electromagnetic Compatibility, August 1992.
 - Paper Presenter.
 - Fulfilled committee responsibilities (see EMC committees below)
- 1991 IEEE Int. Sym. on Electromagnetic Compatibility, August 1991.
 - Paper Presenter.
- 1991 ASEE North Midwest Regional Conference, October 1991.
 - Paper Presenter.
- 1990 ASEE North Midwest Regional Conference, October 1990.
 - Paper Presenter.
- 1990 North Dakota Academy of Science April 1990.

- Paper Presenter.
- 1987 IEEE Inter. Sym. On Antennas and Propagation, June 1987.
 - Paper Presenter.
- 1987 North Dakota Academy of Science April 1987.
 - Paper Presenter.
- 1987 National Radio Science Meeting January 1987.
 - Paper Presenter.
- 1984 North Dakota Academy of Science April 1984.
 - Paper Presenter.

G. Grants and contracts

Funded Research Grants (also see “C. Consulting Experience”)

- 1.) “Modeling of Domestic Electric Systems for High-Frequency Performance”, 2/26/09 - 12/31/10, R. Nelson, subcontract with Michigan Technological University for \$45,960 (as a as part of a \$160,000 sponsored research project from Lawrence Livermore National Laboratory to Michigan Tech).
- 2.) “Where Does Current Flow in the Heart?” 6/03-4/15/04, R.M. Nelson, EPSCoR (NSF), \$18,330.
- 3.) “Further EM Characterization of High Speed Subcircuits”, 9/1/03-12/31/04, R.M. Nelson, Dakota Technologies, Inc., \$42,639.
- 4.) “Near-field Antenna Factor: An Oxymoron?” 6/02-11/05, R.M. Nelson, National Science Foundation, \$82,870.
- 5.) “EM Characterization of High Speed Subcircuits”, 9/02-12/02, R. Nelson and J. Jorgenson, Dakota Technologies, Inc., \$2020.
- 6.) “Continuously Adjustable PLC Tuners for Improved PLC Performance”, 1/01-12/02, R. Nelson, D. Stuehm and J. Glower, Otter Tail Power Company (Fergus Falls, MN), \$15,158.
- 7.) “Dynamic Ratings of Transmission Lines, Transformers, Traps, and Current Transformers”, 1/01-12/02, D. Stuehm, J. Mitra, J. Jorgenson, and R. Nelson, Otter Tail Power Company (Fergus Falls, MN), \$15,158.

- 8.) “Electromagnetic Interference in Hospital Operating Rooms – an Initial Look at How it Gets There, and How to Get Rid of it”, 1/01-12/01, R.M. Nelson, NDSU Research Foundation (RDSP), \$7,500.
- 9.) “Time Domain Antenna Measurements in Complex Environments – An Initial Investigation”, 4/00-3/01, R.M. Nelson, EPSCoR (NSF), \$6,000.
- 10.) “Quad Offset Stripline Characterization”, 11/99 – 3/00, J. Jorgenson, R. Nelson and J. Glower, Mayo Foundation \$5,375.
- 11.) “Influence of Hospital Operating Room Characteristics on Antenna Performance”, 7/98-6/99, R.M. Nelson, EPSCoR (NSF), \$14,000.
- 12.) “Measurement of Electromagnetic Emissions from Hospital Equipment”, 10/92 - 6/95, R.M. Nelson, EPSCoR (NSF), \$36,000.
- 13.) “Bringing World-Class EMC Industrial Facilities to NDSU Students”, 7/90 - 6/91, R.M. Nelson, NDSU Faculty Development Institute, \$1200.

Funded Senior Design Projects

- 1.) “Electromagnetic Environmental Effects Demonstrator”, 2/02, R.M. Nelson and J. Jorgenson, Naval Air Warfare Center Aircraft Division (Patuxent River, MD), \$2,000.
- 2.) “Stripline Antenna Design”, 1/01, R.M. Nelson, J. Glower and J. Jorgenson, TUV Product Services (New Brighton, MN), \$1,000.
- 3.) “Internal Current Strike Demonstrator”, 6/99, R.M. Nelson and J. Glower, Naval Air Warfare Center Aircraft Division (Patuxent River, MD), \$1,000.
- 4.) “Rusty Bolt Demonstrator”, 6/99, R.M. Nelson and J. Glower, Naval Air Warfare Center Aircraft Division (Patuxent River, MD), \$1,000.
- 5.) “Power Supply Components for Senior Design”, 4/98, J. Jorgenson, G. Glower and R. Nelson, Vicor Corporation, \$1442.
- 6.) “Aircraft Lightning Simulator Device”, 3/98, R.M. Nelson and J. Glower, Naval Air Warfare Center Aircraft Division (Patuxent River, MD), \$1,000.

** Note that funding was also obtained via consulting activities (see above). For some research projects, Nelson was not a PI, but was very actively involved in university research.*

H. Service

Committee/University involvement

University Level

UW-Stout

- Program Director Advisory Committee, Member, 8/2015-5/2015.
- Faculty Senate, Member, 8/12 – 5/13.
- Graduate Faculty, Member, 11/10 – present.

NDSU

- NDSU University Senate, Member, 8/95-5/98.

College Level

UW-Stout

- Program Director for Computer Engineering Program, 8/08 – 12/15.
- STEM Council (advisory committee for College), Member, 8/08 – 12/15.
- STEM College Full-Professor Promotion/Tenure Committee, 8/13-12/13 (Member) and 8/15-12/15 (Member).
- STEM College Workload Committee, Member, 8/13-12/13.

NDSU

- CEA Faculty Secretary, 5/05 – 5/08.
- Served on a special PTE (Promotion, Tenure and Evaluation) Committee for the Mechanical Engineering Dept. (10/06-5/07).
- Public Events and College Relations Committee, Member, 8/97–5/00.
- CEA Advisory Council on Freshman English, Member, 8/96-5/99.
- Ph.D. Program Committee, Member, 8/94-5/97.
- Graduate Committee, Member and Secretary, 8/92-5/93.
- Provided Electrical Engineering section of EIT review, 10/90-5/91.

Departmental Level

UW-Stout

- Departmental Executive Committee, Member, 8/12-present.
- Departmental Personnel Committee, Member, 8/15-present.
- Faculty Search Committee for new Computer Engineering faculty. Committee Chair, Member, 10/08 – 5/09, 10/10-3/11(as Chair), 9/12-5/13 (as Chair), 9/14-5/15 (as Chair).
- Faculty Search Committee for new Electrical Lab Manager, Member, 1/16-5/16.

- Faculty Search Committee for new Engineering Technology (Electrical) faculty, Member, 10/12 – 5/13, 10/10 - 5/11(as Chair).
- Advisor for Computer Engineering students, 8/08 – present.
- Advisor for Engineering Technology students (Electrical Option) 8/08 – 5/09.

NDSU

- ECE PTE (Promotion, Tenure and Evaluation) Committee, 10/06 – 5/08.
- ECE/ME Faculty Search Committee, Member, 1/08 – 5/08.
- Graduate Admissions Committee, Member, 8/97–5/02.
- Faculty Search Committee, Member, 8/89-5/90, 8/94-5/95, 1/99 – 5/02.
- ECE Seminar Series, Coordinator, 8/98 – 5/02.
- Wireless Communications Committee (with representatives from ECE Dept and Phoenix International), Chair, 10/01 – 8/02.
- Recording secretary at faculty meetings, 8/91-5/97.

Other Service to the Profession

IEEE Electromagnetic Compatibility Society (IEEE EMC Society)

- Member of the Twin Cities Chapter of the IEEE EMC Society, 8/11-present.
- Served as Chair of the Education and Student Activities Committee, 8/06–6/09.
- Served as Vice-Chair of the Education and Student Activities Committee, 8/03 – 8/06.
- Served as Secretary of the Education and Student Activities Committee, 7/92 – 8/03.
- Served as Member of the Education Grant Committee, 7/96 – present.
- Served as Chair of the Education Nominations Committee, 7/97 – present.
- Served as Member of the Education Student Design Committee, 7/01 – present.
- Member of the Education and Student Activities Committee, 8/90-present

American National Standards Institute (ANSI) Committee C63, SC 8 – Medical Devices and Electromagnetic Compatibility

- Member, Fall 1999-Spring 2002.

Reviewer for National Science Foundation

- SBIR Phase I Panel Review, Sept 2005.
- SBIR Phase II Panel Review, April 2005.
- SBIR Phase II Panel Review, October 2004.
- SBIR Phase II Panel Review, May 2004.
- SBIR Phase I Panel Review, Sept 2003.
- Sensors and Sensor Networks, June 2003.
- SBIR Phase I Panel Review, April 2003.
- SBIR Phase I Panel Review, March 2002.
- SBIR Phase I Panel Review, April 2001.

IEEE Red River Valley Section

- Chair, 1/94-12/94.
- Vice-Chair, 1/93-12/93.
- Member, 10/90-present.

Reviewer for Refereed Articles

- “Transmission Line Fault Analysis Using a Matlab-Based Virtual Time Domain Reflectometer Tool” for Journal of Microwaves, Optoelectronics and Electromagnetics Applications, Fall 2011.
- “Transmission Line Fault Analysis Using a Matlab-Based Virtual Time Domain Reflectometer Tool” for IEEE Electromagnetic Compatibility Magazine, Fall 2005.
- “Rigorous Gain Measurements on Wide Band Ridge Horn” for IEEE Transactions on Electromagnetic Compatibility, Fall 2004.
- “High-Capacity, Self-Assembled Metal-Oxide-Semiconductor Decoupling Capacitors” for IEEE Electron Device Letters, Summer 2004.
- “Performance Analysis of DS-SS WLAN Systems Interfered with Microwave-Oven Noise Using Time-Domain Noise Model” for IEEE Transactions on Electromagnetic Compatibility, Spring 2004.
- “A Time-Domain Microwave Oven Noise Model for the 2.4-GHz Band” for IEEE Transactions on Electromagnetic Compatibility, Spring 2003.
- “High Electric Conduction Property of Composite Copper-clad Steel Wire” for IEEE Transactions on Electromagnetic Compatibility, Fall 1998.

- “Rectangular Patch Resonator with Laminated Ground Plane” for IEEE Transactions on Antennas and Propagation, Fall 1994.
- “Resonance Frequency of a Rectangular Microstrip Patch” for IEEE Transactions on Antennas and Propagation, Spring 1988.
- “Optimum Range Estimation using Angle Measurements from Multiple Sensors” for IEEE American Control, Fall 1996.
- “Resonant Frequency of a Microstrip Patch in the Vicinity of an Identical Radiator” for IEEE Transactions on Antennas and Propagation, Spring 1989.

I. Awards and Honors

- Co-winner of the 2012 Edward F. Mikol Award, ASEE North Midwest Region, for best paper (W. Shi, A. Turkmen, C. Liu, R. Nelson, J. Bumblis, D. Olson, “Project-Based & Active Learning in Computer Engineering Education”, ASEE North Midwest Section Meeting, St. Cloud, MN October 5, 2012). The award was presented at the 2013 ASEE North Midwest Section Meeting, Fargo, ND, October 2103.
- Award for “Achieving the Highest Percentage of Faculty Membership During the Annual Membership Promotion Program, 2011-2012” (*national award*) awarded by the American Society of Engineering Education (ASEE), June 2012.
- Award for “Outstanding Achievement in Achieving the Highest Percentage of Faculty Membership in the North Midwest Section During the 2011-2012 Membership Promotion Program” awarded by the American Society of Engineering Education (ASEE), June 2012.
- Award for “Outstanding Achievement in Recruiting the Most New Professional Members in the North Midwest Section During the 2011-2012 Membership Promotion Program” awarded by the American Society of Engineering Education (ASEE), June 2012
- “Certificate of Appreciation” awarded by the IEEE Electromagnetic Compatibility Society for “Outstanding Service to the IEEE EMC Society as Education and Student Activities Chair”, Awarded August 2009.
- “Teacher of the Year”, College of Engineering and Architecture, NDSU, 5/01.
- “Apple Polisher Award” presented by NDSU Bison Ambassadors, 3/94.

- “Preferred Professor Award” presented by NDSU Mortar Board, 2/94.
- “Senior Challenge Inspirational Award” presented by NDSU Development Foundation, 6/92 and 1/91.
- “Outstanding Academic Advisor for College of Engineering and Architecture”, presented by NDSU Mortar Board, 5/90.