

# ECE Connections

## Letter From the Chairman

*Daniel L. Ewert*



This will be my last letter as department chair of Electrical and Computer Engineering. I will be stepping down to pursue another opportunity. It has truly been my privilege to work with the faculty members, staff, and students throughout my 19 years at NDSU. I treasure the opportunities I've had to get to know so many students. This aspect of the job is truly one of its greatest rewards.

The department is on a strong footing with many talented faculty members and staff. Our student numbers and quality remain high. Our faculty research is going strong with many publications and new grants – and the credit belongs to them. Our department is engaged in a number of service learning projects to aid persons with disabilities. All-in-all I believe we make a positive impact on the lives of people within the university and those outside the university as well.

Take a look at this newsletter and see what's been going on this past year. We've had some great new additions to the department and we've had some valued people decide to try new opportunities.

Thanks for the all the memories,  
~Dan



### Also included ...

- Enrollment Statistics
- Faculty and Staff Listings
- Scholarship News
- Hails and Farewells
- Remodeling Projects
- NDSU Power Engineering Group Receives \$240,001 Grant
- A Message from Dr. Roger Green
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- Green Computing and Communications
- Capstone Design Projects
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- A Message from Dr. David Rogers
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**ENROLLMENT AND DEGREES AWARDED**

**Enrollment Statistics**

**Fall 2009**

**Electrical and Computer Engineering**

Doctor of Philosophy - 15  
 Master of Science - 23  
 Bachelor of Science - 350



**Computer Engineering**

Bachelor of Science - 117

**Degrees Awarded**

**2008-2009**

**Electrical and computer Engineering**

Doctor of Philosophy - 2  
 Master of Science - 5  
 Bachelor of Science - 54

**Computer Engineering**

Bachelor of Science - 12

**ECE STAFF AND FACULTY**

**Faculty**

Dr. Dan Ewert, Professor, Chairman

Dr. David Farden, Professor

Dr. Rajendra Katti, Professor

Dr. Bapeswara Rao, Professor

Dr. David Rogers, Professor

Dr. Subbaraya Yuvarajan, Professor

Dr. Jacob Glower, Associate Professor

Dr. Roger Green, Associate Professor

Dr. Rajesh Kavasseri, Associate Professor

Dr. Cristinel Ababei, Assistant Professor

Dr. Benjamin Braaten, Assistant Professor

Dr. Samee Khan, Assistant Professor

Dr. Hongxiang Li, Assistant Professor

Dr. Ivan Lima, Assistant Professor

Dr. Mark Schroeder, Assistant Professor

Dr. Sudarshan Srinivasan, Assistant Professor

Dr. Chao You, Assistant Professor

**Visiting Faculty**

Dr. Prabhat Gupta, Visiting Professor

**Staff**

Laura Dallmann, Administrative Secretary

David DuShane, Information System Specialist

Jeffrey Erickson, Electronic Technician

Priscilla Schlenker, Administrative Secretary

**Emeritus Professors**

William Bares, Ph.D.

Robert Gammill, Ph.D.

Daniel Krause, Ph.D.

Bob Longhenry, MSEE

Donald E. Peterson, Ph.D.

Donald Smith, Ph.D.

Don Stuehm, Ph.D.

Val Tareski, MSEE

**2009-2010 SCHOLARSHIP RECIPIENTS**

Congratulations to the students listed for their achievements and thank you to the scholarship who promote and reward academic achievement in Electrical and Computer Engineering.

Scholarship	Recipient	Hometown
Aas, Eugene	Brandon Froberg	Fargo, ND
Anderson Ed & Kay	Derek Schmidt	Williston, ND
Anderson Ed & Kay	Erick Larson	Atwater, MN
Anderson, Ernest	Micah Tangesdal	Esko, MN
Bakken, Ashley Keith Memorial	Stephanie Erickson	Fargo, ND
Bushey, Robert R.	Xing Xu	Casselton, ND
Caterpillar Global Paving Scholarship	Thomas Carpenter	Bismarck, ND
Caterpillar Global Paving Scholarship	Vidura Wijayasekara	Fargo, ND
Caterpillar Global Paving Scholarship	Jeff Miller	Lake Elmo, MN
Caufield, Jack Scholarship	Christopher Baumler	Wheatland, ND
EE Scholarship	Christopher Pickett	Lakeville, MN
Nagle, Duane	Jesse Morrirt	Somers, MT
Ottertail Power Electrical Engineering Scholarship	Sandeep Singh	Fargo, ND
Ottertail Power Electrical Engineering Scholarship	James Leingang	Fargo, ND
Ottertail Power Electrical Engineering Scholarship	Jamie Hegland	Bismarck, ND
Ottertail Power Electrical Engineering Scholarship	Kayla Helseth	Minot, ND
Ottertail Power Electrical Engineering Scholarship	Cameron Novak	Lindstrom, MN
Ottertail Power Electrical Engineering Scholarship	Joshua Adamek	Lakeville, MN
Ottertail Power Electrical Engineering Scholarship	Mark Jund	Beulah, ND
Ottertail Power Electrical Engineering Scholarship	Garrett Kropp	Driscoll, ND
Saharieff, Jordan	Joshua Anderson	Fargo, ND
Skarphol Scholarship	Jeffrey Betterman	St. Louis Park, MN
Trambley, Garber	Layne Berge	Fargo, ND
Ulteig, Mel	Kirk Jensen	West Fargo, ND
XCEL Energy Scholarship	Erik Ryen	Bismarck, ND
XCEL Energy Scholarship	Sheyann Dunn	Fargo, ND

**EWERT BIOMEDICAL ENGINEERING SCHOLARSHIP**

In recognition of all the contributions the departing chairperson Daniel Ewert has made to the Department of Electrical and Computer Engineering and university, a scholarship has been started in his name. The Ewert Biomedical Engineering Scholarship was established this year in honor of Dr. Daniel L. Ewert. The scholarship goes to a deserving student who

demonstrates a balance of scholarship, innovation, hands-on ability, and commitment to improving society. Friends and alumni who wish to help support this scholarship should direct contributions to the NDSU Development Foundation to the “Daniel Ewert Biomedical Engineering Scholarship.”

**HAILS AND FAREWELLS**



**Jeff Erickson** has a degree in Electronics Technology, and has been employed in the Home Consumer Electronics field for twenty-seven years. He has taught as an Electrical Technology Instructor at NDSU and has been self-employed for the last twenty-three years. Recently he has

joined the staff at NDSU in the Electrical & Computer Engineering Technical Services department.

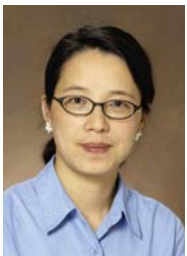
Jeff is a lifelong resident of Minnesota. He currently resides in Underwood with his wife, Wendy and his son, Daniel. He also has a daughter, Melissa and two grandchildren. Jeff is also an avid sportsman.



**Benjamin D. Braaten** joined NDSU in the fall of 2009. Dr. Braaten received his B.S., M.S. and Ph.D. degrees in Electrical Engineering from North Dakota State University, Fargo, in 2002, 2005 and 2009, respectively. In the fall of 2009, Dr. Braaten was a post doctoral research assistant at the South Dakota School of Mines and Technology in Rapid City, SD where he worked on modeling printed antennas embedded in artificial anisotropic dielectrics (and returned to his favorite hobby of fly fishing). He is

currently an assistant professor in the electrical and computer engineering department at North Dakota State University.

His research interests include printed antennas, radio frequency identification, complex radiation problems, methods in computational electromagnetics, source modeling and electromagnetic compatibility. Dr. Braaten is a member of the Applied Computational Electromagnetic Society (ACES), Institute of Electrical and Electronics Engineers (IEEE) and the national mathematics honor society Pi Mu Epsilon.



Dr. **Lingling Fan** has left NDSU to take a position as an assistant professor in the Department of Electrical Engineering at the University of South Florida. Dr. Fan leaves North Dakota to go to Tampa with her husband, Zhixin Miao, and her two sons. Dr. Fan was at North Dakota State

University from August 2007 until August 2009 as an assistant professor focussing on power system dynamics and control, reliability and economics. While at NDSU, Dr. Fan worked on developing controllers to interface wind generators to the electrical grid.

Prior to her work at NDSU, she worked at Midwest ISO for six years in expansion planning.



**Bart Kent** has left the Department of Electrical and Computer Engineering this summer. Bart joined the department as the electronics technician in 2006.

Bart leaves the department to retire and stay in the area with his wife, Becky and his daughter, Abigail.

**REMODELING EE 113 (THE SHIELD ROOM) AND EE 205 (ELECTROMAGNETICS LAB)**

Currently, the applied electromagnetics laboratories of the Electrical and Computer Engineering Department are getting a much needed update.

This fall the students voted to use \$75,000 of their student program fee money to remodel the undergraduate electromagnetics lab in EE room 205.

This money will be used to purchase new test equipment, computers for a new CAD portion

being added to existing courses, new ESD benches, chairs and storage for various lab components.

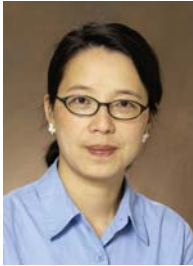


Room 205 - Electromagnetics Lab

In parallel with the remodel of EE room 205, the shield room in EE room 113 is being finished into an anechoic chamber.

The anechoic chamber will be used extensively for ongoing research and design in the area of applied electromagnetics.

**NDSU POWER ENGINEERING GROUP RECEIVES \$240,001 GRANT**



Fan

The NDSU power engineering group from the Department of Electrical and Computer Engineering won a National Science Foundation grant in the amount of \$240,001 for their project titled “Control of Wind

Oscillation Damping.” Group members include Lingling Fan, principal investigator; Rajesh Kavasseri, co-principal investigator; and Subbaraya Yuvarajan, co-principal investigator.

The project addresses stability enhancements in power systems, given the increasing presence of and unique challenges in wind farms. The focus lies in developing



Kavasseri

robust damping controllers through a novel concept of real and reactive power modulation in wind farms to help mitigate instability concerns in the overall interconnected power system. The project also will help convey the benign effects of stability enhancements if grid interconnected systems are

equipped with such controllers.

According to investigators, the project will help reduce some of the barriers to grid integration of wind farms. If successful, the research will facilitate penetration of large scale wind power into the year.



Yuvarajan

**A MESSAGE FROM DR. ROGER GREEN**



In collaboration with a co-author in California, Dr. Roger Green completed the draft of a new digital signal processing textbook. This text, which has been approximately three years in the making, targets an undergraduate audience and is approximately 700 pages in length. The book contains nearly 200

worked examples, around half a thousand high-quality figures, hundreds of drill exercises including full solutions, many hundreds of end-of-chapter problems, and integrated use of MATLAB throughout. During 2010, peer reviews, corrections, solution manual creation, and other final activities will be conducted with the target of having the first edition of this book available to schools for the 2010 Fall semester.

Throughout 2009, Dr. Green also taught courses in random processes (ECE 341), signals and systems (ECE 343), and applied digital signal processing (ECE 444/644). Dr. Green and student Karan Batra presented “A Practical Investigation into Multi-Tone Electrochemical Impedance Spectroscopy” at the 215<sup>th</sup> meeting of the Electrochemical Society. Further, Dr. Green and Ph.D. candidate Michael Schmitz submitted a paper on the “Optimization of Multisine Excitations for Receiver Undersampling” to the 2010 IEEE International Conference on Acoustics, Speech, and Signal Processing.

Working with colleague Dr. Victoria Gelling in the department of Coatings and Polymeric Materials, Dr. Green secured approximately \$12,000 through an Army Research Laboratory subcontract to fund undergraduate student Kai Johnson for the “Development of an Improved Hand-Held EIS Health Monitor”. In fall 2009, the National Science Foundation awarded a \$124,910 grant for a proposal entitled “Enhancing Entrepreneurialism through Design Projects to Aid Persons with Disabilities”. This work, lead by Dr. Mark Schroeder and including Dr. Jacob Glower, Dr. Green, and Dr. Chao You, will provide funding and research opportunities for NDSU ECE senior design students over the next five years.

During 2009, Dr. Green participated in various activities as part of a \$3.75 million grant to improve gender equity and climate at NDSU, referred to as NDSU Advance FORWARD. Following an application process, Dr. Green was selected as an Advocate for the NDSU Advance FORWARD team. Further, Dr. Green was appointed to the NDSU Commission for the Status of Women Faculty, which works to improve NDSU policies. A team of Dr. Green, Dr. Bilen-Green, Dr. Birmingham, and Dr. Burnett will present two papers at next year’s American Society of Engineering Educators (ASEE) Annual Conference and Exposition on the NDSU Advance FORWARD program as well as enhancing recruitment, retention, and advancement of women faculty in engineering at NDSU.

**RESEARCH EXPERIENCE FOR UNDERGRADUATES**

To better prepare ECE seniors for competitive job market and graduate studies, two senior design teams, SD0903 (PMU Power Grid Coverage group) and SD0904 (Energy-aware Data Centers group), undertook research projects on making power grids robust and data centers energy-efficient, respectively. The sheer enthusiasm, talent, and perseverance of the students made these two research projects a success.

The research finding of the students of SD0903, Joshua Adamek, Brady Brodsho, and Garrett Kropp was submitted as a journal paper to the IEEE Transactions on Power Systems.

The students of SD0904, James Leingang, Peder Lindberg, and Daniel Lysaker submitted a research

paper to the Journal of Supercomputing and another paper to the Computer Journal.

We are hopeful that the excellent research conducted by the ECE seniors will be appreciated by the research community and all three research papers will be accepted.

More information about SD0903 can be obtained by visiting: [http://saturn.ece.ndsu.nodak.edu/ecewiki/index.php/Group\\_SD0903](http://saturn.ece.ndsu.nodak.edu/ecewiki/index.php/Group_SD0903).

More information about SD0904 can be obtained by visiting: [http://saturn.ece.ndsu.nodak.edu/ecewiki/index.php/Group\\_SD0904](http://saturn.ece.ndsu.nodak.edu/ecewiki/index.php/Group_SD0904).



Joshua Adamek Peder Lindberg Garrett Kropp James Leingang Brady Brodsho Daniel Lysaker

**GREEN COMPUTING AND COMMUNICATIONS**

Computing service providers are continually upgrading their infrastructures to high-performance systems that can meet the increasing demands of powerful newer applications. In parallel, almost in concert, high-performance computing manufacturers have consolidated and moved from stand-alone servers to rack mounted blades. The above mentioned trends alone are increasing electricity usage in large-scale computing systems, such as data centers, computational grids, and cloud computing. This increase in electricity utilization has reached to a point that many researchers have embarked on the journey to find practical and applicable solutions to make high-performance computing system green, which can: (a) reduce electricity consumption of large-scale computing systems and (b) simultaneously improve upon or maintain the current throughput of the system.

The Electrical and Computing Engineering (ECE) Department faculty Samee U. Khan along with colleagues from the University of Luxembourg (UL) are performing cutting-edge research on making high-performance systems green. In the year 2009, the

collaboration resulted in the publication of 2 journal articles and 6 conference papers on the topic. Moreover, Dr. Khan along with UL collaborators is: (a) guest editing a special issue of the Journal of Supercomputing on green computing, (b) guest editing a special issue of the International Journal of Communication Networks and Distributed Systems on green communications, and (c) organizing a workshop on optimization issues in energy efficient distributed systems (OPTIM 2010), Caen, France. Furthermore, their efforts were recently appreciated with a €432K grant from the Fonds National de la Recherche Luxembourg (FNR) to make cloud computing infrastructures energy-efficient.

The research community in 2009 also acknowledged the efforts of Dr. Khan by appointing him the associate editor of two journals and to the editorial boards of seven journals. Moreover, he also was invited to be member of the technical program committees of 8 conferences.

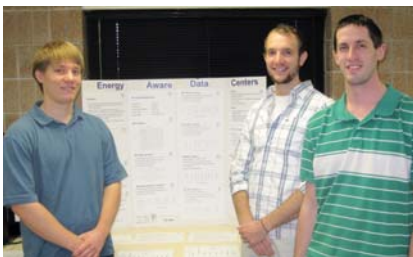
**CAPSTONE DESIGN PROJECTS**



There are currently 23 senior design projects, ten of which are ECE 405 Design III projects that were recently demonstrated at the Senior Design Final Product Demo Day.

The ECE 405 projects involved a wide variety of topics that included optimization in power distribution and energy management, voice modification and emulation, antenna impedance matching, asynchronous circuit design, and switching-mode amplifier design.

Some projects involved potential intellectual property including an intelligent restaurant paging system, an advanced cardiac pacing system and an advanced stud finder and digital level device. Most of these groups intend to file a patent application as well as contemplate the feasibility



of mass producing their devices. The cardiac pacing system group intends to submit a small business technology transfer (STTR) grant application.

Dr. Khan developed his two groups (PMU Power Grid Coverage and

Energy-aware Data Centers) with a focus on research. His two groups will submit three papers that they hope will be accepted for publication in prominent journals.

There are also a number of interesting projects that just started this semester in the ECE 403 class. One of these is an international project involving NDSU, Stanford and an organization in India that makes the Jiapur foot, one of the most commonly used prosthetic devices in India. Through this joint effort, the various groups hope to contribute to the device by incorporating various

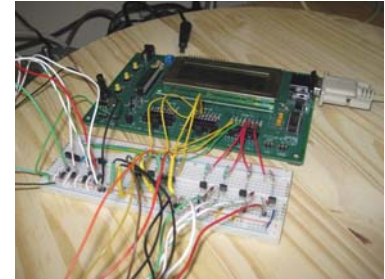


electromechanical sensors and actuators to enhance the overall performance.

Another group is investigating the wireless transfer of energy over distances of a few meters. This is a relatively new technology that will likely be used to power numerous devices in homes and buildings in the near future. The group hopes to further the state of the art and apply their findings to marketable devices.

Other projects involve a wireless calendar system, a miniature electromyography biofeedback device, wireless sensor network systems for the elderly and disabled, an FPGA-based hardware accelerator, an RFID project, and an ASIC design project.

You can access more detailed



information about many of the design activities and projects mentioned here at the department's wiki site located at: [http://saturn.ece.ndsu.nodak.edu/ecewiki/index.php/ECE\\_Senior\\_Design\\_Groups](http://saturn.ece.ndsu.nodak.edu/ecewiki/index.php/ECE_Senior_Design_Groups).

The ECE department encourages individuals and companies to sponsor student design projects. Sponsorship is \$3,000 per two-semester project and is a great way to develop a closer relationship with the ECE department and graduating students, provide skill-set development for students, obtain preliminary designs and prototypes, and help support student design activities within the

department. If you would like to sponsor a project or have questions, please can contact Prof. Mark Schroeder at (701) 231-8049 or [mark.j.schroeder@ndsu.edu](mailto:mark.j.schroeder@ndsu.edu).



## INTERNATIONAL AGREEMENTS

The Electrical and Computer Engineering (ECE) Department is being recognized for research, mentorship, and leadership by two foreign universities, namely, the University of Luxembourg (UL) and COMSATS Institute of Informational Technology (CIIT). The recognition comes in the form of a memorandum of understanding (MoU) that will enable exchange of students, staff, and faculty between NDSU and the two foreign universities. As early as Fall 2010, the ECE Department may induct PhD students from UL and CIIT to carry out cutting-edge research with ECE faculty. The PhD students from UL and CIIT will be fully funded by their originating institutions. The two MoUs will provide a base for long-term educational and research partnerships. The ECE Department is looking forward to work with the students, staff, and faculty of both UL and CIIT.

UL (<http://www.eni.lu/>) established in 2003 offers



bachelors, masters, and doctoral degrees in 12 disciplines. Located in the heart of Europe the goal of UL is to establish itself as a modern research university. The university is structured around research units that host over 200 permanent researchers.

Currently, around 13,239 students attend CIIT (<http://www.ciit-isb.edu.pk/>) that was established in 2000. CIIT is offering 41 different degree programs in the fields of Information and Communication Technology, Management Sciences, Electrical Engineering, Chemical Engineering, Mathematics, Physics, Biosciences, Development Studies, Environmental Science, Meteorology, and

Architecture and Design.

The formal signing of the two MoUs is expected by the first quarter of 2010. For more information on the MoUs, please send queries to: [samee.khan@ndsu.edu](mailto:samee.khan@ndsu.edu).

## A MESSAGE FROM DR. DAVID ROGERS

This year Dr. David A. Rogers served as joint advisor with Dr. Robert Nelson (University of Wisconsin-Stout) of two Ph.D. students who finished in May (Dr. Benjamin Braaten and Dr. Mike Reich). This fall Braaten and Rogers traveled to Belem, Brazil in November to attend the 2009 International Microwave and Optoelectronics Conference (IMOC) where Rogers was chair of a conference session on new developments in antennas. He was also a co-author with Drs. Braaten and Nelson of an invited paper that was presented at the conference by Dr. Braaten: "Current Distribution of a Printed Dipole with Arbitrary Length Embedded in Layered Uniaxial Anisotropic Dielectrics." Rogers and Braaten also served as reviewers of technical papers for IMOC. Rogers serves regularly on the technical program committee for the conference. At the conference Professors Rogers, Braaten, and Ivan Lima met with NDSU Computer Engineering exchange student Brandon Hacker who spent the fall semester at the Universidade Federal do Para in Belem as part of a U.S. Department of Education program for which Dr. Lima serves as director. Braaten and Rogers then flew



to Sao Paulo to visit the Universidade Estadual de Campinas (UNICAMP) as guests of the School of Electrical and Computer Engineering (FEEC). FEEC is one of the best known ECE programs in Latin America.

Currently it has 1100 undergraduate students and 700 graduate students. The Director of the School is Dr. Max Costa who was Rogers' M.S. student in the 1970's. Rogers was a UNICAMP faculty member during the period 1972-1980. Braaten and Rogers visited the ailing Dr. Attilio Giarola, Rogers' colleague and well-known researcher in microwave and electromagnetic theory. They also spent several hours talking to colleagues at UNICAMP about common research interests. Dr. Braaten gave a seminar for the School entitled "Metamaterial-Based

Antenna Designs for Applications to RFID." Rogers and Braaten also visited with Cody Dienslake, NDSU exchange student in Electrical Engineering, who spent fall semester at UNICAMP. Rogers and Braaten are thankful for the warm welcome they received wherever they were in Brazil.



## PUBLICATIONS, PRESENTATIONS AND REPORTS

- ▶ **C. Ababei**, "Parallel Placement for FPGAs Revisited," IEEE ACM/SIGDA Int. Symposium on Field Programmable Gate Arrays (FPGA), Monterey, CA, Feb. 2009.
- ▶ **C. Ababei, R. S. Katti**, "Achieving Network on Chip Fault Tolerance by Adaptive Remapping," IEEE Int. Parallel & Distributed Processing Symposium (IPDPS), Reconfigurable Architectures Workshop (RAW), Rome, Italy, May 2009.
- ▶ **C. Ababei**, "Speeding up FPGA Placement via Partitioning and Multithreading," Hindawi Int. J. of Reconfigurable Computing, 2009.
- ▶ V. de Paulo, **C. Ababei**, "A Framework for 2.5D NoC Exploration using Homogeneous Networks over Heterogeneous Floorplans," IEEE Int. Conference on Reconfigurable Computing and FPGAs, Cancun, Mexico, Dec. 2009.
- ▶ **C. Ababei, R. Kavasseri**, "Efficient Random Walks Based Power Flow Solution for Radial Power Distribution Systems," Submitted to *IEEE Int. Symposium on Circuits and Systems (ISCAS)*, Paris, France, Sep. 2009.
- ▶ **C. Ababei, S. Yuvarajan, D.L. Schulz**, "Toward Integrated PV Panels and Power Electronics Using Printing Technologies," Submitted to *Solar Energy Journal*, Oct. 2009.
- ▶ **C. Ababei**, "Efficient Synthesis for Congestion Optimization of Heterogeneous Networks on Chip," Submitted to *ACM/IEEE Design Automation Conference (DAC)*, Anaheim, CA, Nov. 2009.
- ▶ **C. Ababei, R. Kavasseri**, "Efficient Extreme Event Screening for Power Systems Using Constrained and Unbalanced Partitioning," Submitted to *IEEE PES General Meeting*, Minneapolis, MN, Nov. 2009.
- ▶ **B. D. Braaten, M. Reich and J. Glower**, "A Compact Meander-Line UHF RFID Tag Antenna Loaded with Elements Found in Right/Left-Handed Coplanar Waveguide Structures," *IEEE Antennas and Wireless Propagation Letters*, vol. 8 pp. 1158-1161, 2009.
- ▶ **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," *Applied Computational Electromagnetics Society Special Journal Issue on Computational and Experimental Techniques for RFID Systems and Applications*, Accepted May 15, 2009.
- ▶ G. J. Owen, **B. D. Braaten, R. M. Nelson, D. Vaselaar, C. Bauer-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," 2009 IEEE Antennas and Propagation Symposium, Charleston, SC, June 1-5, 2009.
- ▶ **B. D. Braaten, R.M. Nelson and D. A. Rogers**, "Properties of a Printed Dipole in Stratified Uniaxial Anisotropic Dielectrics," *IEEE Antennas and Wireless Propagation Letters*, vol. 8, 2009, pp. 806-810.
- ▶ **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.
- ▶ **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.
- ▶ **B. D. Braaten, G.J. Owen and R.M. Nelson**, "Designing Space-filling Antennas for UHF RFID Applications," Book Chapter to appear in *Radio Frequency Identification Fundamentals and Applications*, IN-TECH Publishing, December 2009.
- ▶ **B. D. Braaten and R.P. Scheeler**, "Metamaterial-Based Antennas for UHF RFID Applications," Book Chapter to appear in *Radio Frequency Identification Fundamentals and Applications*, IN-TECH Publishing, December 2009.
- ▶ **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 dielectric." *IEEE Antennas Wireless Propag. Lett.*, Vol. 8, 2009, pp. 806-810.
- ▶ A. Black, N. Grenz, N. Schaible, P. Arndt, J. Lucht, K. Nesvig, **D. Ewert, L. Mulligan**, "Assessment of  $d\sigma^*/d\Gamma_{max}$ , a Load Independent Index of Contractility, in the Canine," published online: 23 May 2009, © Springer Science+Business Media, LLC 2009.
- ▶ McGuirk, S, Barron, D, **Ewert, D**, Coote, J Calibrating volume measurements made using the dual-field conductance catheter J. Biomedical Science and Engineering, 2009, 2, 484-490 Published online November 2009 (<http://www.SciRP.org/journal/jbise/>)
- ▶ McGuirk S, **Ewert DL**, Barron DJ, Coote, JH Electrocardiographic interference and conductance volume measurements, J. Biomedical Science and Engineering, 2009, 2, 491-498 Published Online November 2009 (<http://www.SciRP.org/journal/jbise/>)
- ▶ Patent - NDSU Invention Disclosure: Latitude Independent Equatorial Platform, NDSU Invention Report, June 12, 2009. **J. Glower, J. Bakke, K. Johnson, A. Agasti, A. Ratan.**
- ▶ **R. S. Katti and S. K. Srinivasan**, "Efficient Hardware implementation of a new pseudo-random bit sequence generator." Invited Paper. *The IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, May 2009.
- ▶ **R. S. Katti and S. K. Srinivasan**, "Verification of desynchronized circuits." *The IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, May 2009.
- ▶ **R. S. Katti and A. Ghosh**, "Security using Shannon-Fano-Elias Codes." *The IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, May 2009.
- ▶ **R. S. Katti, K. Iverson, and J. Vreugdenhil**, "Image encryption using dynamic shuffling and XORing processes." *The IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, May 2009.
- ▶ **R. S. Katti and R. G. Kavasseri**, "Nonce generation for the Digital Signature Standard", *International Journal of Network Security*, (accepted) Vol.11. No.1, pp: 15-24.
- ▶ S. M. Brahma, P. L. De Leon and **R. G. Kavasseri**, "Investigating the Option of Removing Anti-Aliasing Filter from Digital Relays," (accepted) *IEEE Trans. Power Delivery*.
- ▶ L. Fan, **R. Kavasseri, H. Yin, C. Zhu, and Q. Hu**, "Control of Doubly Fed Induction Generator for Rotor Current Harmonics Elimination," *Proc. IEEE Power & Energy Society General Meeting 2009*.
- ▶ R. Aghatehrani, L.Fan, **R. Kavasseri**, "Coordinated Reactive Power Control of DFIG Rotor and Grid Sides Converters," *Proc. IEEE Power & Energy Society General Meeting 2009*.
- ▶ L. Fan, Haiping Yin, and **Rajesh Kavasseri**, "Negative Sequence Compensation Techniques of DFIG-based Wind Energy Systems under Unbalanced Grid Conditions", *Proc. IEEE Symposium on Power Electronics and Machines in Wind Applications (PEMWA)*, 2009.
- ▶ **S. U. Khan and I. Ahmad**, "A Pure Nash Equilibrium based Game Theoretical Method for Data Replication across Multiple Servers," *IEEE Transactions on Knowledge and Data Engineering*, vol. 20, no. 3, pp. 346-360, 2009.
- ▶ **S. U. Khan and I. Ahmad**, "A Cooperative Game Theoretical Technique for Joint Optimization of Energy Consumption and Response Time in Computational Grids," *IEEE Transactions on Parallel and Distributed Systems*, vol. 21, no. 4, pp. 537-553, 2009.
- ▶ **S. U. Khan and C. Ardil**, "A Frugal Bidding Procedure for Replicating WWW Content," *International Journal of Information Technology*, vol. 5, no. 1, pp. 67-80, 2009.
- ▶ **S. U. Khan and C. Ardil**, "A Weighted Sum Technique for the Joint Optimization of Performance and Power Consumption in Data Centers," *International Journal of Electrical, Computer, and Systems Engineering*, vol. 3, no. 1, pp. 35-40, 2009.
- ▶ **S. U. Khan and C. Ardil**, "On the Optimal Number of Smart Dust Particles," *International Journal of Information Technology*, vol. 5,

- no. 2, pp. 93-96, 2009.
- ▶ **S. U. Khan**, "On the Resilience against Passive Attacks in Wireless Sensor Networks," in *6th International Symposium on Defense, Security, and Sensing*, Orlando, FL, USA, April 2009.
  - ▶ **S. U. Khan**, "Countering the Active Attacks in Wireless Sensor Networks," in *6th International Symposium on Defense, Security, and Sensing*, Orlando, FL, USA, April 2009.
  - ▶ **S. U. Khan**, A. A. Maciejewski, and H. J. Siegel, "Robust CDN Replica Placement Techniques," in *23rd IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, Rome, Italy, May 2009.
  - ▶ **S. U. Khan**, "A Multi-Objective Programming Approach for Resource Allocation in Data Centers," in *International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, Las Vegas, NV, USA, July 2009, pp. 152-158.
  - ▶ **S. U. Khan**, "On a Game Theoretical Methodology for Data Replication in Ad Hoc Networks," in *International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, Las Vegas, NV, USA, July 2009, pp. 232-238.
  - ▶ **S. U. Khan**, "A Frugal Auction Technique for Data Replication in Large Distributed Computing Systems," in *International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, Las Vegas, NV, USA, July 2009, pp. 17-23.
  - ▶ **S. U. Khan**, "A Game Theoretical Resource Allocation Technique for Large Distributed Computing Systems," in *International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, Las Vegas, NV, USA, July 2009, pp. 48-54.
  - ▶ **S. U. Khan** and C. Ardil, "A Fast Replica Placement Methodology for Large-scale Distributed Computing Systems," in *International Conference on Parallel and Distributed Computing Systems (ICPDCS)*, Oslo, Norway, July 2009, pp. 121-127.
  - ▶ **S. U. Khan** and C. Ardil, "A Competitive Replica Placement Methodology for Ad Hoc Networks," in *International Conference on Parallel and Distributed Computing Systems (ICPDCS)*, Oslo, Norway, July 2009, pp. 128-133.
  - ▶ **S. U. Khan** and C. Ardil, "On the Joint Optimization of Performance and Power Consumption in Data Centers," in *International Conference on Distributed, High-Performance and Grid Computing (DHPGC)*, Singapore, August 2009, pp. 660-666.
  - ▶ **S. U. Khan** and C. Ardil, "Energy Efficient Resource Allocation in Distributed Computing Systems," in *International Conference on Distributed, High-Performance and Grid Computing (DHPGC)*, Singapore, August 2009, pp. 667-673.
  - ▶ **S. U. Khan**, "A Self-adaptive Weighted Sum Technique for the Joint Optimization of Performance and Power Consumption in Data Centers," in *22nd International Conference on Parallel and Distributed Computing and Communication Systems (PDCCS)*, Louisville, KY, USA, September 2009, pp. 13-18.
  - ▶ **S. U. Khan**, "A Goal Programming Approach for the Joint Optimization of Energy Consumption and Response Time in Computational Grids," in *28th IEEE International Performance Computing and Communications Conference (IPCCC)*, Phoenix, AZ, USA, December 2009.
  - ▶ J. Li and **S. U. Khan**, "MobiSN: Semantics-based Mobile Ad Hoc Social Network Framework," in *52nd IEEE Global Communications Conference (GLOBECOM)*, Honolulu, HI, USA, December 2009.
  - ▶ J. Li and **S. U. Khan**, "On How to Construct a Social Network from a Mobile Ad Hoc Network," Department of Computer Science, North Dakota State University, Technical Report, NDSU-CS-TR-09-009, 2009.
  - ▶ **H. Li**, *Multicarrier Spread Spectrum Communications with Phase Noise*, VDM Publisher, 2009 (ISBN: 978-3-639-18624-6)
  - ▶ **H. Li**, "OFDMA Resource Allocation in Hybrid Wireless Network", IEEE Vehicular Technology Conference 2009, Anchorage, Alaska, Sept. 20-23, 2009
  - ▶ **H. Li**, M. Matolak "Performance Analysis of Multitone Direct-Sequence Spread Spectrum in the Presence of Carrier Frequency Offset", IEEE ChinaCom'09, Xi'an, China, Aug. 26-28, 2009.
  - ▶ **H. Li**, L. Liu and W. Zhang, "Cooperative Transmission – From Single Network to Hybrid Network," International Journal of Digital Multimedia Broadcasting, accepted and to appear, Nov, 2009.
  - ▶ **H. Li**, **S. U. Khan** and H. Liu, "Broadcast Network Coverage with Multi-cell Cooperation," International Journal of Digital Multimedia Broadcasting, accepted and to appear, October, 2009.
  - ▶ **I. T. Lima Jr.** and V. R. Marinov, "Volumetric display based on two-photon absorption in quantum dot dispersions," accepted for publication in the *IEEE/OSA Journal of Display Technology*. Acceptance notification received on October 15, 2009.
  - ▶ V. R. Marinov and **I. T. Lima Jr.**, "Volumetric display based on two-photon absorption in quantum dot dispersions," provisional patent application submitted to the U.S. Patent Office in July 30, 2009.
  - ▶ V.R. Marinov and **I. T. Lima, Jr.**, "Quantum dot dispersions: a new material for true volumetric displays." to appear in Proceedings of the Three-Dimensional Imaging, Visualization, and Display 2010, Symposium: DSS10, SPIE Defense, Sensing, and Security Conference, Orlando, Florida, 5-9 April, 2010.
  - ▶ **I. T. Lima Jr.** and A. M. Oliveira, "Optimum receiver filters for optical fiber systems with polarization mode dispersion," *IEEE/OSA Journal of Lightwave Technology*, Vol. 27, No. 14, pp. 2886–2891, July 2009
  - ▶ **I. T. Lima Jr.**, "Advanced Monte Carlo methods applied to Optical Coherence Tomography," (invited) to be presented in the 2009 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference, Belém, Brazil, November 3-6, 2009.
  - ▶ **I. T. Lima Jr.**, Short Course "Polarization Effect in Optical Fiber Communication Systems," (invited) to be held in the 2009 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference, Belém, Brazil, November 3-6, 2009.
  - ▶ D. Peterson, Jr., T. Dennis, and **I. T. Lima Jr.**, and P. Williams, Short Course: "Hands-on polarization measurement workshop" (invited), Optical Fiber Communication Conference & Exposition and National Fiber Optic Engineers Conference (OFC/NFOEC) 2009, SC210, Short Course Notes pp. 1–54, San Diego, California, USA, March 22-26, 2009.
  - ▶ **I. T. Lima Jr.** and A. M. Oliveira "Receiver Optimization for 40 Gbit/s Optical Fiber Systems with Polarization Mode Dispersion," to appear In Proceedings of the SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference, Belém, Brazil, November 3-6, 2009.
  - ▶ A. M. Oliveira and **Ivan T. Lima Jr.**, "Electrical Mitigation Techniques for Polarization Mode Dispersion in Optical Fiber Systems," to appear In Proceedings of the SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference, Belém, Brazil, November 3-6, 2009.
  - ▶ V. Kultaveewuti, **I. T. Lima Jr.**, and A. Major, "Development of a widely tunable pulsed excitation source for laser microscopy," in 36<sup>th</sup> Annual Meeting 2009 of the Microscopical Society of Canada, Winnipeg, Manitoba, Canada, June 16-29, 2009.
  - ▶ A. M. Oliveira, and **I. T. Lima Jr.**, "Implementation of an international multidisciplinary engineering education consortium," in Proceedings of the 2009 ASEE Annual Conference & Exposition, paper AC 2009-57, Session 1360, no. 1, Austin, Texas, June 14–17, 2009.
  - ▶ O. F. Swenson, **D. A. Rogers**, and **I. T. Lima Jr.**, "Laboratory Emphasis in Interdisciplinary Photonics Related Courses," in Topical Conference on Advanced Laboratories, Ann Arbor, Michigan, July 23-25, 2009.
  - ▶ O. F. Swenson, **D. A. Rogers**, and **I. T. Lima Jr.**, "Optics for Scientists and Engineers Laboratory Syllabus," in Topical Conference on Advanced Laboratories, Ann Arbor, Michigan, July 23-25, 2009.

- ▶ **Schroeder MJ**, A Kottsick, J Lee, M Newell, J Purcell, and RM Nelson. Experiential Learning of Electromagnetic Concepts Through 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.
- ▶ **Schroeder MJ**, E Alvarez, M Steele, P Malhotra, and M Mbipeh. Cardiac Arrest Alert System, *Journal of Medical Devices*, 3(2), June 2009.
- ▶ **Schroeder MJ**, E Alvarez, M Steele, P Malhotra, and M Mbipeh. Cardiac Arrest Alert System, Design of Medical Devices Conference, Minneapolis, MN, April 2009.
- ▶ Book Chapter: P. Manolios and **S. K. Srinivasan**. "Verifying Pipelines with BAT" in the book "Design and Verification of Microprocessor Systems for High-Assurance Applications," edited by David Hardin, publisher: Springer.
- ▶ **S. K. Srinivasan**. Automatic Refinement Checking of Pipelines with Out-of-Order Execution. Accepted to appear: IEEE Transactions on Computers.
- ▶ **S. K. Srinivasan**, Koushik Sarker, and **R. S. Katti**. Verification of Synchronous Elastic Processors. Accepted to appear: Journal of Electrical and Computer Engineering, 2009.
- ▶ **S. Srinivasan**, K. Sarkar and **R. Katti**. "Verification of Synchronous Elastic Processors," Accepted by the IEEE Embedded Systems Letters, 2009.
- ▶ **S. Srinivasan**, K. Sarkar and **R. Katti**. "Token-Aware Completion functions for Elastic Processor Verification," Accepted by the Research Letters in Electronics, 2009 and "International Journal of network Security," 2009.
- ▶ Z. Miao, L. Fan, D. Osborn, and **S. Yuvarajan**, "Control of DFIG based Wind Generation to Improve Inter-Area Oscillation Damping," IEEE Transactions on Energy Conversion, Vol. 24, No. 2, pp. 415-422, June 2009.
- ▶ C. Roshau, **S. Yuvarajan**, and D. Schulz, "Modeling and Hardware Implementation of VMPPT for a PV Panel with a Reference Cell," Proceedings of IEEE PVSC Conference, Washington DC, June 2009.
- ▶ M. Kaderbhai and **S. Yuvarajan**, "Hybrid rotor injection scheme for a doubly fed induction generator," Proceedings of the Symposium on Power Electronics and Machines in Wind Applications (PEMWA), Lincoln, Nebraska, June 2009.
- ▶ L. Fan, Z. Miao and **S. Yuvarajan**, "A unified model of doubly fed induction generator for simulating acceleration with rotor injection and harmonics," Proceedings of IEEE PES General Meeting, Calgary, Aug. 2009.
- ▶ L. Fan, **S. Yuvarajan** and **R. G. Kavasseri**, "Harmonic Analysis of a DFIG for Wind Energy Conversion System", accepted *IEEE Trans. on Energy Conversion*.
- ▶ **S. Yuvarajan**, "High efficiency dc motor drive powered by a PEM fuel cell," Accepted for presentation at IEEE Vehicle Power and Propulsion Conference (VPPC), Dearborn, Michigan, September 2009.

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