STEVEN MICHAEL HIETPAS, Ph.D., PE

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EDUCATION

Ph.D. Electrical Engineering, Montana State University, 1994
Dissertation: *Identification and Robust Control Methods Using Ellipsoidal Parametric Uncertainty Descriptions*
M.S. Electrical Engineering, Montana State University 1991
B.S. Electrical Engineering, Montana State University 1984

EMPLOYMENT HISTORY

Professor	2003 –	South Dakota State University
Assoc. Professor	1998 – 2003	South Dakota State University
Asst. Professor	1994 – 1998	South Dakota State University
Technical Staff	1996 (Summer) – Strategic Defense Division, TRW	
Graduate Student	1989 – 1994	Montana State University, Bozeman, MT
Engineer	1984 – 1989	General Dynamics, Space Systems Division, Space Energy Group, San Diego, CA

- Conducted research and development on high frequency power switching DC-DC converters for the Shuttle-Centaur Program
- Conducted research and development on high frequency power switching resonant DC-AC inverters for the International Space Station Program

PROFESSIONAL SUMMARY

Since joining SDSU in 1994, Dr. Hietpas has been the involved in the development of the power and energy program at SDSU. Assuming the position of coordinator for the Center for Power Systems Studies (CPSS) in 1997, he has worked with the regional power industry strengthening SDSU's involvement in power systems research and education. Through a National Science Foundation grant and with contributions from members of the CPSS a 2000 ft^2 state-of-the-art energy conversion laboratory was commissioned in August of 2002. This lab was completely designed, fabricated, and tested by electrical engineering students. This laboratory has supported research in the area of power electronic converters and machine drives as well as in photovoltaics. The new facility is also used to teach electromechanical systems to senior electrical engineering students. Other CPSS activities include chairing the South Dakota Biannual Regional Power Conference, administering student scholarships, and providing opportunities to students such as power-technology tours and senior design projects. In 2002 Hietpas assumed the position of the Undergraduate Electrical Engineering Program Coordinator, coordinating program assessment, new-student orientation; graduate teaching assistant selection and supervision; course scheduling and curriculum management efforts, among other duties.

Hietpas has served as the advisor to the Electrical and Computer Engineering student honors society (Eta Kappa Nu – HKN) since 1998, helping to strengthen their involvement in promotion of electrical engineering and outreach to local schools. Regionally and nationally, Hietpas has served on various committees, including IEEE Siouxland Section, South Dakota Electrical Council, and the IEEE Rural Electrical Power Conference. Hietpas was invited to conduct a workshop CoEV (Watertown, SD), give a presentation (ONR/NSF Faculty Workshop), and serve on panels (NSF – Restructuring Power and Energy Curriculum). Dr. Hietpas became an ABET Program Evaluator in 2010 and has successfully completed four accreditation visits.

Administrative Experience

Dr. Hietpas has been the Coordinator for the Center for Power Systems Studies since 1997. He has had opportunity to work closely with numerous engineers and managers from industry and has addressing the needs of the power industry. This program was established in 1968 by Junis Storry and Wayne Knabach. Since his installment, he has strengthened the scholarship funding and graduate student support. He has established a consistent Biennial South Dakota Regional Power Conference that is convened on even years, and it has consistently been rated very high among its participants. Recently, he encouraged the membership to establish the Wayne Knabach Award for Excellence in Power. The first award went to Wayne Knabach in 2009. The committee for nominating an industry person for this award is comprised of CPSS Members and Associate Members along with the most recent recipient. The CPSS also hosts its own website, cpss.sdstate.edu, and boasts a secure Who's Who in Power from SDSU database, wherein members are able to access and edit it at will. While serving as the coordinator, he has maintained a strict budget, having never exceeded expenses with respect to revenues and existing assets.

In 2000, Dr. Hietpas assumed the role of electrical engineering assessment coordinator. As coordinator, he formed a committee early on, whose work ultimately produced a comprehensive ABET-quality assessment plan for the program. These efforts resulted in two successful ABET Accreditations (2004 and 2010).

In 2002, Dr. Hietpas assumed the position of Undergraduate Coordinator for the Electrical Engineering Program. During this time, he strived to bring enhanced efficiencies and quality to various operational aspects within the program, including assessment, advising, and graduate teaching assistant training and teaching quality. Improvements were made in the methods for hiring and monitoring of EE graduate teaching assistants. Working with the graduate coordinator, an improved online application form and process was developed, leading to a significant increase in the quality of graduate teaching assistants. One particular action proved beneficial to the entire program wherein teaching assistants maintain an engineering notebook for the lab they teach and are required to meet with their instructor to review their work and to verify they have properly prepared.

Teaching Experience

Dr. Hietpas teaching pedagogy strongly revolves around project-based learning. While he follows a more traditional lecture-style teaching approach, he fully embraces all forms of technology to enhance the learning environment. With deep concern for those students active in extracurricular activities (such as collegiate athletes who periodically miss class) and for his

international students (who are working hard in dealing with the natural language), he has been recording his in-class lectures and posting online for over 10 years. Since 1994, Dr. Hietpas has taught at both the undergraduate and graduate levels, covering topics in circuits, electronics, magnetics, continuous and digital controls, electromechanical systems, power electronics, and power systems.

A sample of the project-based learning activities include:

- Modeling of and control design for
    - Robotic Finger Joint
    - Unmanned Arial Vehicle
    - Regulated Power Supply.
    - Walt Disney World "Twilight Zone Tower of Terror" ride
- DC-DC Converters and PMDC Motor Drives
- Power electronic choke inductors and flyback "coupled" inductors
- Electronic sensor and display system for measuring hail damage.

Of the many and varied senior design capstone projects advised, the largest project spanned 5 years and five different senior design teams – this multi-year project to the development of a one-of-a-kind electromechanical systems laboratory, commissioned in 2002. This lab is completely automated and has worked extremely well for over 13 years. The lab is used by sophomores through graduate students in the study of circuits, electromechanical systems, power electronics and power systems.

Research Experience

Dr. Hietpas primary research focus is in power systems, power electronics, and controls. As a result of the state-of-the-art Electromechanical Systems Laboratory (just described) he developed electric drives for DC, AC Induction, and AC Synchronous machines. With the advances in electric drive technology over the last 25 years, including the proliferation of FPGA integration within these systems, he has developed drives that have also been used for instructional purposed in both under and graduate level courses. He has also conducted research in the area of power-electronic-based distribution transformers. For many years, he served on paper review committees for the IEEE Rural Electric Power Conference, the IEEE Transactions on Industrial Electronics, and the IET (Institute of Engineering Technology) Power Electronics Journal.

Service Experience

Dr. Hietpas has served on various college and university committees since 1994, including the Academic Affairs Committee, Research Advisory, College of Engineering's scholarship committees, the Intercollegiate Advisory Board for SDSU. IEEE Siouxland Executive Committee, where I served as the Treasurer. Since 1997, I have served on the Executive Board for the South Dakota Electric Council. In this capacity I have helped in organizing conventions and securing speakers. Nationally, I have been serving on the paper review committee for the IEEE Rural Electric Power Conference. Each year, I review approximately 30-50 papers and

help narrow this to about 20-25 papers for the conference. Furthermore, I help in selecting 2-4 papers for submission to the IEEE-IAS Transactions on Industry Applications. In 1998 I assumed the role of Advisor to the departments Gamma Rho Chapter of the Electrical and Computer Engineering Honor Society, Eta Kappa Nu (HKN). Through my work with the Eta Kappa Nu (HKN) honor society, the students designed and developed a Faraday Flashlight that can be assembled by 6th grade students, which meets one of South Dakota State 6th Grade Curriculum requirements dealing with magnetism and energy conversion. For the last three years we have worked with the Sioux Valley Middle School Science Teacher, Amy Schlimmer, wherein each student (at a low cost of $12 per student) constructs a Faraday Flashlight. This has been a very popular activity for the students and Ms. Schlimmer has asked for our continued participation in this activity.

PROFESSIONAL IMPROVEMENT

Selected to attend ABET Program Evaluator Training (July 2010)
SDSU TLC Course – "Engaging Students" (Spring 2010)
Professional Engineer – State of South Dakota, License # 8748 (2005 – present)
ONR/NSF Workshops (1997 – 2011)
IDEAL Scholar – ABET (2007)
Essential Teaching Seminar – ASME/AICHE/IEEE (2003)
NETI – ASEE (1995)

ADMINISTRATION

Department Head (2010-Present)

- Supervise 23 faculty and two staff
- Develop strategic planning and set priorities
- Faculty teaching assignment
- Conduct annual professional staff evaluations and complete salary enhancement schedules
- Work closely with two industry advisory boards (16 members/each) in the continued development and improvement of our programs
- Oversee and direct EE and CS Program Assessment Plans
- Work closely with SDSU Foundation in fund raising projects

Program Coordinator for Electrical Engineering (2002 – 2010)

- High School/Parent Visitations
- Orientation
- Wrote Undergraduate Student Handbook
- Revised/Developed spreadsheet Plan of Study for Advising
- Developed and administered the EE Program Assessment Plan
- Assisted our new Software Engineering program develop its Assessment Plan
- Wrote the majority of two successful ABET self-study reports
- Coordinated the development of a new department website (2006)
- Established the requirement of all GTAs to keep and maintain engineering notebooks for their lab in an effort to improve the quality of our students' undergraduate lab experience
- Hired and supervised all Graduate Teaching Assistants

Coordinator for the Center for Power Systems Studies (1997 – present)

- 11 Members (Utilities in SD, ND, MN, IA, NE, MT)
- 19 Associate Members
- Established the Bi-Annual South Dakota Regional Power Conference
- Increase funding support
- Increase student internships
- Developed an on-line (secure) Who's Who database of SDSU Power Engineering graduates

COURSES TAUGHT

Circuits I/II
Electronics I/II/III
Control Systems
Electromechanical Systems
Completely redesigned labs to include power electronic and electric drive components
Senior Design I and II
Organized and chaired first two Senior Design Conferences, 1995/1996
Engineering Economics
Power Systems Analysis
Power Electronics
Advanced Digital Control Systems (Graduate)
Advanced Power Systems (Graduate)

INVITED PRESENATIONS/PANELS/WORKSHOPS

- ONR/NSF Workshops on Education and Workforce (Power/Energy/Machines/Drives)
- Power Electronics Workshop, CoEV (Watertown, SD)

SERVICE

Member of IEEE-CEAA (2017 – Present)
Provost Leadership Task Force (2011-Present)
IEEE PES Scholarship Initiative Region Board Member (2010-2016)
Intercollegiate Athletic Board (officer, 2008-2011)
Alternative Power Technology (APT-SDSU) Search Committee (member)
Assessment Coordinator for Electrical Engineering (2002-2010)
CPSS/EE/COE Scholarship Committee (chair, 1998-2010)
EE Program Curriculum Review Committee
IEEE Paper Review Committees (Rural Electric Power Conference, Transactions on Industrial Applications, Transactions on Education, 1998 – 2010)
IET-PES Journal (Institution of Engineering and Technology – Power Electronics) Paper Review Committee (2005-present)
ASEE Campus Representative (2007-2011)
Advisor to the Eta Kappa Nu (HKN, 1998 - 2016)
Initiated the SDSU Robotics Program (2009-2010)
Research Advisory Council (1997-1999)
Faculty Search Committees, EE and SE

Academic Affairs Committee (1996-1998)
NSF-CCLI Review Panel (1999)

RECOGNITIONS

Outstanding Chapter, Gamma Rho/Eta Kappa Nu, Electrical and Computer Engineering Honor Society, Faculty Advisor (2008-2014, a national recognition)
College of Engineering Outstanding Academic Advisor of the Year (2006)
Senior Member of the IEEE
"Jackrabbit Top Program – Thanking Outstanding People" (2008)
ASEE Outstanding Zone Representative (2009)

RESEARCH and DEVELOPMENT

Distribution Fault Detection and Location

Funding support through Cooper Power Systems, Inc.

Modeling A Distribution System for Wind Turbine Integration

Funding support through Otter Tail Power Company

AC-AC Power Converter

Funding from the Demonstration of Energy-Efficient Developments (DEED) and American Public Power Association (APPA) program

DC and AC Motor Drives – Undergraduate EE Program/Laboratory

Funding support through the National Science Foundation

GRADUATE STUDENTS

Madhab Paudel, 2009, *Development of a Fault Location Algorithm Based on Distributed Neutral-to-Ground Current Sensor Measurements*

Monish Chitrakar, 2009, *FPGA-based V/Hz Drive for a 3-Phase 3-hp Induction Motor*

Ankur Singhal, 2005, *Scalar Control of a 3-Phase 3-hp Induction Motor using Simulink and dSPACE Prototyping Platform*

Vijay Kambhammettu, 2004, *Design of New Energy Laboratory Power Processing Systems*

Sudeep Kumar Pyakuryal, 2003, *A Computer Model of Otter Tail Power Company (OTPC) Power System using ATP – A comparison of SDSU'ATP Model to OTPC's PSS/E Model*

Kala Meah, 2003, *Rapid Control Prototyping of a Permanent Magnet DC Motor Drive using dSPACE and Mathworks Simulink*

Md. Abdus Sattar, 2002, *Design and Construction of a 3-phase 3-hp Variable Speed Induction Motor Drive*

Mark Naden, 1999, *Voltage Sag Correction using an AC Voltage-Voltage Converter*

Udaya Kumar Tejwani, 1996, *Modified PWM Technique for Reduction of Voltage Harmonic Distortion*

PUBLICATIONS

[1] Sun, Wei; Chambers, Reece; Kleinjan, Ryan; Nelson, Jeremy; Hietpas, Steven; Johnson, Rick; Johnson, Toby; Strube, Todd, "Design and implementation of IEC 61850 in communication-assisted protection strategy," *T&D Conference and Exposition, 2014 IEEE PES* , vol., no., pp.1,5, 14-17 April 2014

[2] M. Paudel and S. Hietpas, "A Fault Location Algorithm Based on Distributed Neutral-to-Ground Current Sensor Measurements", accepted to *IEEE-PES General Meeting*, Minneapolis, MN, July 25-29, 2010.

[3] R. Haub, R. Fourney, and S. Hietpas, "Integrating Microcontrollers into a Modern Energy Conversion Laboratory Course," *Proceedings of the 2007 ASEE Annual Conference & Exposition*, Honolulu, HI, June 24-27, 2007.

[4] K. Meah, S. Hietpas and S. Ula, "Rapid Control Prototyping of a Permanent magnet DC Motor Drive Using dSPACE and Mathworks Simulink," *IEEE Applied Power Electronics Conference (APEC)* , February 2007.

[5] S. M. Hietpas, "A State-of-the-Art Energy and Electric Drives Laboratory Designed and Implemented by Undergraduate and Graduate Students," the *Proceedings of the 2004 ASEE Annual Conference & Exposition*, Salt Lake City, UT, June 20-23, 2004.

[6] Steven Hietpas, "A New Energy Conversion and Electric Drives Laboratory at South Dakota State University," Proceedings of the 2003 NSF Faculty Workshop on Power Electronics and Electric Drives, Tempe, AZ, Jan. 5-7, 2003.

[7] S. M. Hietpas, "An efficient pedagogical approach for integrating power electronics, drives and the PMDC motor into the traditional energy conversion course," *Proceedings of the 2002 American Society for Engineering Education Annual Conference & Exposition*, Montreal, Quebec, Canada (June 2002).

[8] S. M. Hietpas and M. Ropp, "Incorporating Electric Drives into the Electrical Machines Course: A Systems Level Approach," *Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition*, Albuquerque, NM (June 2001).

[9] S. M. Hietpas and M. Naden, "Automatic Voltage Regulator Using an AC Voltage-Voltage Converter, " *IEEE Trans. on Industry Applications, Vol. 36, No. 1, January/February 2000, pp. 33-38.*

[10] S. M. Hietpas, "Using Multimedia Tools For Teaching Electric Drives," presented at *National Science Foundation Workshop, Multimedia Delivery of Power Electronics Education*, Orlando, FL. S. M. Hietpas and M. Naden, "Automatic Voltage Regulator Using and AC Voltage-Voltage Converter," *The Proc. of the IEEE 1999 Rural Electric Power Conference*, May 1999.

[11] S. M. Hietpas and R. Pecan, "Simulation of a Three-Phase AC-AC Boost Converter to Compensate for Voltage Sags," *The Proc. of the IEEE 1998 Rural Electric Power Conference*, April 1998.

[12] U. K. Tejwani and S. M. Hietpas, "Modified PWM Technique for Reduction of Voltage Harmonic Distortion Using AC-AC Converter," *The Proc. of the 29th Annual Frontiers of Power Conference*, Oct. 1996.

[13] S. M. Hietpas, "Senior Design Conference: An Important Program for Every Engineering Curriculum," *The Proc. of the 58th Annual ASEE North Midwest Section Meeting*, Oct. 1996.

[14] S. M. Hietpas and D. A. Pierre, "Discrete Prony System Identification for Power Systems," *The Proc. of the 27th Annual North American Power Symposium*, pp. 24-29, Oct. 1995.

[15] S. M. Hietpas and D. A. Pierre, "Two Algorithms for Minimax Control of Systems with Ellipsoidal Parametric Uncertainty," *The Proc. of the American Control Conference*, WM17, June 1995.

[16] S. M. Hietpas and D. A. Pierre, "System Identification Using Prony Methods For Digital Control Systems," *10th IFAC Symposium on System Identification*, vol. 2, pp. 619-694, July, 1994.

[17] B. J. Bujanowski, J. W. Pierre, S. M. Hietpas, T. L. Sharpe, and D. A. Pierre, "A comparison of several system identification methods with application to power systems," *The IEEE Midwest Symposium on Circuits and Systems*, Aug., 1993.

[18] D. A. Pierre, J. R. Smith, M. H. Nehrir, R. M. Johnson, P. A. Emmanuel, S. M. Hietpas, T. A. Short, Robust Adaptive Transient Damping in Power Systems: Damping Controller in AC/DC Power Systems -- Routines for Simulation, Computer Requirements for Implementation, DC Controllers, and Robust Control, EPRI TR-101097, Research Project 2665-01, Vol. 2, Final Report, Electric Power Research Institute, Sept., 1992.