Alexis Kwasinski

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EDUCATION

Ph.D. in Electrical Engineering • August 2007
University of Illinois at Urbana-Champaign • Urbana, IL.
Dissertation title: "A Microgrid Architecture with Multiple-Input dc/dc Converters: Applications, Reliability, System Operation, and Control"
Advisor: Dr. Philip Krein.

M.S. in Electrical Engineering • May 2005
University of Illinois at Urbana-Champaign • Urbana, IL.
Thesis: "Combined Inverter Design and Motor Selection to Meet 42-V Automotive System Targets"
Advisor: Dr. Philip Krein.

Graduate Studies, Engineer Specialist in Telecommunications • December 1997
University of Buenos Aires • Buenos Aires, Argentina.

Electrical Engineer degree (equivalent to an advanced B.S. degree in power systems) • February 1993
Buenos Aires Institute of Technology • Buenos Aires, Argentina.

ACADEMIC EXPERIENCE

Assistant Professor • The University of Texas at Austin • 2007 - Present

- **Research activities**: Interested in power electronics, energy conversion and electromechanical systems; especially distributed generation (microgrids), nonlinear and advanced power electronics controls, efficient electrical energy conversion and storage, renewable and alternative energy, ultra-available fault tolerant and flexible power systems, cost-effective and reliable converter topologies, and motor drives.

  Relevant projects: Datacenter power infrastructure and efficiency, multiple-input converters topology and control for distributed generation integration, effects of natural disasters on power infrastructure, development of highly available microgrids, power electronics interface for magnetohydrodynamic generators, and control of constant-power loads.

  Developing the power electronics program at The University of Texas at Austin (UT).

  Developing the Power Electronics Research Laboratory at UT.

  Received the Best Technical Paper Award in INTELEC 2007.
- **Research supervisions**: Supervising the research of 3 PhD students and 4 Masters students

  Graduated two Masters students.
- **Teaching experience**: EE394V Advanced topics in power electronics (Fall 2007)—Course developer and instructor.

  EE362L Power Electronics (Spring 2008)—Instructor

  EE411 Circuit Theory (Summer 2008)—Instructor

  EE394V Distributed Generation Technologies (Fall 2008)—Course developer and instructor.
- **Additional Activities**: Reviewer for the IEEE Transactions on Power Electronics, IEEE Transactions on Industry Applications, the IEEE Transactions on Power Delivery, the IEEE Power Electronics Letters, and the Applied Power Electronics Conference.

  Member of the ECE "Unified Qualifying Exam Committee."

  Member of the IEEE Power Electronics Society Technical Committee on Power Electronics in Distributed Generation and Renewable Energy Systems.

Graduate Research Assistant • **University of Illinois at Urbana-Champaign** • **2002 - 2007**

- Research in stabilization and control of constant-power loads, analysis of highly reliable distributed architectures, topology design of multiple-input dc-dc converters, study of microgrids applications, analysis of distributed generation resources, system integration of energy storage devices, distributed generation grid interconnection, operation of autonomous components for power budgeting, inverter modulation schemes, and electromechanical system design integration.
- Leading co-writer of the most thorough and comprehensive analysis to-date about damage caused by Hurricane Katrina on telecommunications' power systems (project funded by the NSF).
- Received the 2005 Joseph J. Suozzi INTELEC Fellowship for research in telecommunications power systems applications of microgrids.
- Wrote Ph.D. dissertation on an ultra reliable and flexible dc microgrid using multiple-input converters.
- Wrote Masters Thesis on a low-cost ancillary services system for a 42V PowerNet automotive application.
- Active member of the Modular Inverter team.
- Active member of the Power Supplies' Efficiency Challenge 2004 team (winners Class A1 – Open Category).
- Active member of Illinois Solar Decathlon team.
- Reviewer for the IEEE Transactions on Power Electronics, IEEE Transactions on Industry Applications, the IEEE Power Electronics Letters, the Power Electronics Specialists Conference, and the Applied Power Electronics Conference.

Instructor • **Buenos Aires Institute of Technology (ITBA)** • **1999 - 2002**

- Instructor in charge of the telecommunications laboratory.
- Designed the experiments for the Digital Communications course lab session. This course is for senior undergraduate students.
- Guided and supervised students while they were performing the experiments.
- Evaluated student progress in the lab by grading quizzes and lab reports.
- Taught two lectures in each semester about telecommunication systems technology and digital signals transmission through standard telephony copper cables.
- Maintained the laboratory.

Teaching Assistant • **University of Illinois at Urbana-Champaign** • **Spring 2005 and Fall 2006.**

- Fall 2006: Supervised the experiments of senior undergraduate and graduate students in one of the power electronics laboratory course sessions.
- Spring 2005: Supervised the experiments of junior and senior undergraduate students in one of the electric machinery course laboratory sessions.
- Evaluated student progress by grading lab reports and other homework material in both courses.
- Taught a short lecture at the beginning of each class as an introduction to the experiment.
- Guided the students in building a power supply as part of the final project for the power electronics laboratory course.
- Nominated for the 2006 Olesen Award for Excellence in Undergraduate Teaching, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign.

Teaching Assistant • **Buenos Aires Institute of Technology (ITBA)** • **1991 – 1992.**

- Graded homework and prepared the class notes for the courses of basic electric circuit theory and electric machines (sophomore and junior levels, respectively)

PUBLICATIONS and PRESENTATIONS

Journal Papers

- **A. Kwasinski** and P. T. Krein, "An Integrated 42-V Drive Design for Automobile Loads with a Low-Distortion Overmodulation Strategy," in *IEEE Transactions on Power Electronics*, vol. 21, no. 3, pp. 648 - 658, May 2006.
- **A. Kwasinski**, P. T. Krein and P. Chapman, "Time domain Comparison of Pulse-Width Modulation Schemes," in *IEEE Power Electronics Letters*, vol. 1, no. 3, pp. 64-68, Sep. 2003.
- **A. Kwasinski,** "Identification of Feasible Topologies for Multiple-Input dc-dc Converters," accepted for publication in *IEEE Power Electronics Letters*.
- **A. Kwasinski**, W. Weaver, P. Chapman, and P. T. Krein, "Telecommunications power plant damage assessment caused by Hurricane Katrina - Site survey and follow-up results," submitted to *IEEE Systems Journal*.

Conference Papers

- **A. Kwasinski** and P. T. Krein, "An integrated approach to PWM through 3-dimensional visualization," in *Proc. of the 35th Annual IEEE Power Electronics Specialists Conference*, vol. 6, June 2004, pp. 4202 - 4208.
- **A. Kwasinski** and P. T. Krein, "Combined inverter design and motor selection to meet 42V automotive system targets," in *Proc. of the 5th International Electric Machines and Drives Conference*, May 2005, pp. 1311 - 1318.
- **A. Kwasinski** and P. T. Krein, "A microgrid-based telecom power system using modular multiple-input dc-dc converters," in *Proc. 2005 International Telecommunications Energy Conference (INTELEC)*, Sept. 2005, pp. 515 - 520.
- **A. Kwasinski** and P.T. Krein, "Optimal configuration analysis of a microgrid-based telecom power system," in *Proc. 2006 International Telecommunications Energy Conference (INTELEC)*, Sept. 2006, pp. 602 - 609.
- **A. Kwasinski**, W. Weaver, P. Chapman, and P. T. Krein, "Telecommunications power plant damage assessment caused by Hurricane Katrina - Site survey and follow-up results," in *Proc. 2006 International Telecommunications Energy Conference (INTELEC)*, Sept. 2006, pp. 388 - 395.
- **A. Kwasinski** and P. T. Krein, "Multiple-input dc-dc converters to enhance local availability in grids using distributed generation resources," in Rec. *Applied Power Electronics Conference (APEC)*, pp. 1657-1663.
- **A. Kwasinski** and P. Krein, "Passivity-based control of buck converters with constant-power loads," in *Rec. PESC*, 2007, pp. 259-265.
- **A. Kwasinski** and P. T. Krein, "Stabilization of Constant Power Loads in Dc-Dc Converters Using Passivity-Based Control," in *Rec* 2007 *International Telecommunications Energy Conference (INTELEC)*, pp. 867-874.
- **A. Kwasinski** and P. T. Krein, "Telecom Power Planning for Natural and Man-Made Disasters," in *Rec.* 2007 *International Telecommunications Energy Conference (INTELEC)*, pp. 216-222 **– Best Paper Award –**
- **A. Kwasinski**, "Analysis of Electric Power Architectures to Improve Availability and Efficiency of Air Conditioning Systems," in *Rec.* 2008 *International Telecommunications Energy Conference (INTELEC), 10-2 pp. 1-8*.
- B. Le and **A. Kwasinski,** "Analysis of a Flexible and Rugged Photovoltaic-based Power System," in *Rec.* 2008 *International Telecommunications Energy Conference (INTELEC), 19-5 pp. 1-7*.
- S. H. Choung and A. **Kwasinski,** "Multiple-Input DC-DC Converter Topologies Comparison," presented at *IECON 2008*.

Technical reports and additional publications

- **A. Kwasinski**, " A Microgrid Architecture with Multiple-Input dc/dc Converters: Applications, Reliability, System Operation, and Control," Ph.D. dissertation, University of Illinois at Urbana-Champaign, Urbana, IL, USA, 2007.
- **A. Kwasinski**, "Combined Inverter Design and Motor Selection to Meet 42-V Automotive System Targets," M.S. thesis, University of Illinois at Urbana-Champaign, Urbana, IL, USA, 2005.
- J. Kimball, M. Amrhein**, A. Kwasinski**, J. Mossoba, B. Nee, Z. Sorchini, W. Weaver, J. Wells, and G. Zhang, "Modular Inverter for Advanced Control Applications," Technical Report UILU-ENG-2006-2504, CEMETR-06-01, May 2006.
- **A. Kwasinski**, W. Weaver, P. Chapman, and P. Krein, "Hurricane Katrina: Damage Assessment of Power Infrastructure for Distribution, Telecommunication, and Backup," Technical Report UILU-ENG-2006-2511, CEME-TR-06-05, August 2006.

Selected presentations and additional conference participation

- **IECON 2008:** Session co-chair—Session 45 Advances in Alternative Energy Systems.
- **October 2008 Clean Texas Forum:** Supercharging Data Centers. Panelist and presenter.
- **October 2008 US Deparment of Energy Roadmap Workshop on Routing Telecom and Datacenters Toward Efficient Energy Use:** Participant and presenter of "Academic Research in Datacenters and Telecommunications Power."
- **INTELEC 2008:** Presenter at Katrina Panel.
- **EPRI PQA/ADA 2008 Conference:** Presenter "The prospect of dc power distribution: stability issues and solutions in dc microgrids."

PROFESSIONAL EXPERIENCE IN INDUSTRY

Member • DC Power Architectures, LLC • 2007-Present

- Company co-founder.

Senior Technical Consultant • Tyco Electronics (formerly Lucent) Power Systems • 2000-2002

- Led Tyco Electronics Power Systems Services Group in Latin America and the Caribbean. This group dealt with engineering, technical support and installation of telecom power plants.
- Interviewed and selected candidates for positions in the Services Area.
- Sized, configured, quoted and sold telecommunication power systems to South American customers.
- Met with customers to present new products and determine their needs.
- Assisted with logistics of shipments including importation assistance.
- Planned and developed the services structure in Latin America and the Caribbean.

Senior Technical Support Engineer • Lucent Technologies Power Systems • 1997 - 2000

- Maintained, troubleshot and repaired a large installed base of batteries, rectifiers and other Lucent Power Systems' products in South America.
- Provided technical support and recovery assistance during central offices' outages.
- Performed power plants acceptance tests and evaluation.
- Added significant contributions to technical features of Lucent's power plants such as integrating monitoring capabilities into Lucent's 5ESS switch operations and maintenance platform.
- Supported installation teams by writing job methods and procedures, and by solving problems during the installation.
- Participated in the sites power engineering and layout design.
- Coordinated the implementation of change notices and the recall of pieces of equipment.
- Took several training courses in the factory located in Mesquite, TX.

- Built Lucent's Technical Support structure in South America and the Power Systems' office in Argentina in less than a year.
- Helped the sales team to achieve their objectives by proactively selling maintenance services. As a result, was the only technical person to receive an award from the global sales team.
- Managed the Microelectronics Group business in Argentina.
- Represented the Microelectronics Group in Lucent Argentina's Directing Council.
- Organized 1999 Power System's Bell Labs technical seminar.

Planning Engineer and Network Designer • Telefónica of Argentina • 1993 - 1997

- Designed the outside plant network of several existing and new central offices in Buenos Aires as part of the modernization program of Telefónica after its privatization.
- Led the first implementation project of fiber optics in the subscriber loop in Argentina.
- Pioneered the use of cable TV networks to transmit telephone signals.
- Led groups of six engineers and technicians in design projects with a budget of 2 Million dollars.
- Awarded with several management courses as part of the Young Executives Program for outstanding engineers.
- Developed a system to optimize the investment by measuring and forecasting the demand in a central office. The basis of the system is still in use throughout the company.
- Planned the outside plant network of Telefónica in many Buenos Aires City central offices.

OTHER PROFESSIONAL AND ACADEMIC SERVICE

Chair • U. of Illinois at U-C IEEE Joint PELS/PES Student Chapter • 2005 - 2006

- Led the student chapter in the highest Executive Committee position.
- Organized seminars and students advising meetings.
- Obtained initial funding to support the group activities.

Executive Committee Member • Argentina Electrotechnical Association (AEA) • 1994 - 1995

- Participated in AEA's highest decision group, which rules all executive and administrative matters including policy shaping. AEA's practices are the basis for Argentina's national laws and regulations related with electricity generation, transmission, distribution and use.

Buenos Aires Hands-on-Science Museum • 1998 - 1999

- Co-designed and led the installation of the telecommunications hall.
- Assisted ITBA's students with their exhibits.

Temporary positions • 1991, 1992 and 1993

- ERTEC (rubber manufacturer for the automotive industry) and Elecond (Capacitor Manufacturer).

AWARDS

2005 Joseph J. Suozzi INTELEC Fellowship.

2007 INTELEC Best Technical Paper Award: "Telecom Power Planning for Natural and Man-Made Disasters,"

Tau Beta Pi Engineering Honor Society: member.

Eta Kappa Nu Electrical Engineering Honor Society: member.

2006 Olesen Award for Excellence in Undergraduate Teaching, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign: Nominee.

The Chancellor's List (2005 and 2006)

Marquis Who's Who in America (2006 and 2007)

PROFESSIONAL AFFILIATIONS

IEEE and IEEE's Power Electronic Society (PELS) • **2001 - Present**
- Member.

IEEE and IEEE's Power and Energy Society (PES) • **2007 - Present**
- Member.

IEEE and IEEE's Industry Applications Society (PELS) • **2007 - Present**
- Member.

Professional Council of Mechanical and Electrical Engineers of Argentina • **1993 - Present**
- Member, registered professional engineer.

LANGUAGE AND COMPUTER SKILLS

Language skills

- **Spanish:** Native
- **English:** Near Native
- **French:** Fluent

Computer skills

Matlab, Mathcad, Mathematica, Dymola, Autocad, Inventor, Powerworld, Eagle, PSIM, PSPice, C++.