PRADEEP S. SHENOY

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EDUCATION

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN · Urbana, IL
Ph.D. in Electrical Engineering, May 2012
Advisor: Philip T. Krein
Research Area: Power Electronics
Dissertation: "Improving Performance, Efficiency, and Reliability of DC-DC Conversion Systems by Differential Power Processing"

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN · Urbana, IL
M.S. in Electrical Engineering, May 2010
Advisor: Philip T. Krein
Research Area: Power Electronics, Control
Thesis: "Local Control of Multiple Module Converters with Ratings-Based Load Sharing"

ILLINOIS INSTITUTE OF TECHNOLOGY · Chicago, IL
B.S. in Electrical Engineering, May 2007, *Magna cum Laude*
Advisor: Ali Emadi

RESEARCH AND PROFESSIONAL EXPERIENCE

TEXAS INSTRUMENTS – DC Solutions — Aug. 2014 – Present
Lead Systems Engineer
- Define, simulate, analyze, test, and evaluate HF (3-30MHz) voltage regulator products
- Create datasheets, application notes, evaluation boards, user manuals, etc.
- Engage with customers, field reps, component suppliers, and research collaborators

TEXAS INSTRUMENTS – Kilby R&D Lab — May 2012 – July 2014
Energy Systems Research Engineer
- Research, analyze, simulate, design, and test next generation power converters
- Collaborate with TI business units, university researchers, suppliers, and customers

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN – Elec. & Comp. Eng. Dept. — Aug. 2007 – May 2012
Graduate Research Assistant — Urbana, IL
- Led several research projects on power electronics; published and presented findings
- Designed, built, and tested experimental hardware; analyzed results
- Hired, mentored, and directed undergraduate research assistants

TEXAS INSTRUMENTS, Systems and Applications R&D Lab — June – Sep. 2011
R&D Engineering Intern — Dallas, TX
- Evaluated control techniques of microprocessor voltage regulator for Intel VR 12.5
- Developed modeling and simulation framework for microprocessor power delivery

NATIONAL SCIENCE FOUNDATION, East Asia and Pacific Summer Institutes — June – Aug. 2008
Fellow — Tsinghua University
- Created a digital controller for AC-AC matrix converters at Tsinghua University — Beijing, China
- Toured electric machines factories and power electronics companies in Shanghai

CATERPILLAR, INC., Electric Power Division, Current Products Group — May – Aug. 2005
Engineering Intern — Griffin, GA
- Addressed problem reports on electric power generator sets (1-2 MW)
- Assisted with prototype builds and general shop support

TEACHING EXPERIENCE

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN, Elec. & Comp. Eng. Dept. — Spring 2009, Fall 2009, Fall 2010, Fall 2011
Graduate Teaching Assistant — Urbana, IL
ECE 464 Power Electronics, ECE 469 Power Electronics Lab, ECE 431 Electric Machines
Course Director: Philip T. Krein

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN, College of Engineering — Spring 2011
Instructor — Urbana, IL
ENG 333 Creativity, Innovation, and Vision
Course Director: Bruce Litchfield

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN, Center for Teaching Excellence — Jan. 2011
Invited Instructor, Graduate Academy for College Teaching — Urbana, IL

ILLINOIS INSTITUTE OF TECHNOLOGY, Academic Resource Center — Jan. – May 2007
Electrical and Computer Engineering Tutor — Chicago, IL

ILLINOIS INSTITUTE OF TECHNOLOGY, Elec. & Comp. Eng. Dept. — Aug. – Dec. 2006
Undergraduate Teaching Assistant — Chicago, IL
ECE 100 Introduction to the Profession
Course Director: Donald Ucci

PUBLICATIONS

[1] K.A. Kim, **P.S. Shenoy**, and P.T. Krein, "Converter Rating Analysis for Photovoltaic Differential Power Processing Systems," *IEEE Trans. Power Electronics*, vol. 30, no. 4, pp. 1987-1997, April 2015.

[2] **P.S. Shenoy**, M.G. Amaro, J. Morroni, and D. Freeman, "Comparison of a 12V, 10A, 3MHz Buck Converter and a Series Capacitor Buck Converter," in *Proc. IEEE Applied Power Electron. Conf.*, March 2015.

[3] **P.S. Shenoy** and M.G. Amaro, "Improving Light Load Efficiency in a Series Capacitor Buck Converter by Uneven Phase Interleaving," in *Proc. IEEE Applied Power Electron. Conf.*, March 2015.

[4] **P.S. Shenoy**, M.G. Amaro, J. Morroni, and D. Freeman, "Comparison of a Buck Converter and a Series Capacitor Buck Converter for High Frequency, High Conversion Ratio Voltage Regulators," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, *Accepted*.

[5] E. Candan, **P.S. Shenoy**, and R.C.N. Pilawa-Podgurski, "A series-stacked power delivery architecture with isolated differential power conversion for data centers," in *Proc. IEEE Telecommun. Energy Conf.*, Sept.-Oct.2014.

[6] J. McClurg, R.C.N. Pilawa-Podgurski, and **P.S. Shenoy**, "A series-stacked architecture for high-efficiency data center power delivery," in *Proc. IEEE Energy Conversion Congr. Expo.*, Sept. 2014.

[7] M.J. Chen, **P.S. Shenoy**, and J. Morroni, "A series-capacitor tapped buck (SC-TaB) converter for regulated high voltage conversion ratio DC-DC applications," in *Proc. IEEE Energy Conversion Congr. Expo*., Sept. 2014.

[8] **P.S. Shenoy**, K.A. Kim, B. Johnson, and P.T. Krein, "Differential Power Processing for Increased Energy Production and Reliability of Photovoltaic Systems," *IEEE Trans. Power Electronics*, vol. 28, no. 6, pp. 2968-2979, June 2013.

[9] **P.S. Shenoy** and P.T. Krein, "Differential Power Processing for DC Systems," *IEEE Trans. Power Electronics*, vol. 28, no. 4, pp. 1795-1806, April 2013.

[10] S. Kapat, **P. S. Shenoy**, and P. T. Krein, "Near Null Response to a Large-Signal Transient in an Augmented Buck Converter: A Geometric Approach," *IEEE Trans. Power Electronics*, July 2012.

[11] A.M. Bazzi, Z. Klein, M. Sweeney, K. Kroeger, **P.S. Shenoy**, and P.T. Krein, "Solid-State Solar Simulator," *IEEE Trans. Industry Applications,* July-Aug. 2012.

[12] **P.S. Shenoy**, K.A. Kim, and P.T. Krein, "Comparative analysis of differential power conversion architectures and controls for solar photovoltaics," in *Proc. IEEE Workshop Control Modeling Power Electron.*, June 2012.

[13] K.A. Kim, **P.S. Shenoy**, and P.T. Krein, "Photovoltaic differential power converter trade-offs as a consequence of panel variation," in *Proc. IEEE Workshop Control Modeling Power Electron.*, June 2012.

[14] **P. S. Shenoy**, K.A. Kim, P.T. Krein, and P.L. Chapman, "Differential Power Processing for Efficiency and Performance Leaps in Utility-Scale Photovoltaics," in *Proc. IEEE Photovoltaics Spec. Conf.*, June 2012.

[15] **P. S. Shenoy**, "Improving Performance, Efficiency, and Reliability of DC-DC Conversion Systems by Differential Power Processing," Ph.D. dissertation, Electrical Comp. Eng. Dept., U. Illinois at Urbana-Champaign, May 2012.

[16] T.J. Neyens, **P.S. Shenoy**, S. Kapat, and P.T. Krein, "Implementation of an augmented boost converter for improved load transient response," in *Proc. IEEE Power Energy Conf. Illinois*, February 2012.
[17] **P.S. Shenoy**, B. Johnson, P.T. Krein, "Differential Power Processing Architecture for Increased Energy Production and Reliability of Photovoltaic Systems," in *Proc. IEEE Applied Power Electron. Conf.*, February 2012.
[18] **P. S. Shenoy**, I. Fedorov, T. Neyens, and P.T. Krein, "Power Delivery for Series Connected Voltage Domains in Digital Circuits," in *Proc. IEEE Int. Conf. Energy Aware Computing*," November 2011.
[19] **P. S. Shenoy**, S. Zhang, R.A. Abdallah, P.T. Krein, and N.R. Shanbhag , "Overcoming the Power Wall: Connecting Voltage Domains in Series," in *Proc. IEEE Int. Conf. Energy Aware Computing*," November 2011.
[20] R. A. Abdallah, **P. S. Shenoy**, N. R. Shanbhag, P. T. Krein, "System Energy Minimization via Joint Optimization of the DC-DC Converter and the Core," in *Proc. IEEE Int. Symp. Low Power Electron. Design*, August 2011.
[21] **P. S. Shenoy**, S. Kapat, and P. T. Krein, "Beyond Time-Optimality: Energy-Based Control of Augmented Buck Converters for Near Ideal Load Transient Response," in *Proc. IEEE Applied Power Electronics Conf.*, March 2011.
[22] A. M. Bazzi, Z. Klein, M. Sweeney, K. Kroeger*, **P. S. Shenoy**, and P. T. Krein, "Solid-State Light Simulator with Current-Mode Control," in *Proc. IEEE Applied Power Electronics Conf.*, Fort Worth, TX, March 2011.
[23] O. Kumar, **P. S. Shenoy**, S. Kapat and P. T. Krein, "Augmented Boost Converter for Near Null Load Transient Response," in *Proc. IEEE Power Energy Conf. Illinois*, Urbana, IL, Feb 2011.
[24] **P. S. Shenoy** and P. T. Krein, "Power Supply Aware Computing," in *Proc. IEEE Int. Conf. Energy Aware Computing*, Cairo, Egypt, December 2010.
[25] **P. S. Shenoy**, V. T. Buyukdegirmenci, A. M. Bazzi, and P. T. Krein, "System Level Trade-offs of Microprocessor Supply Voltage Reduction," in *Proc. IEEE Int. Conf. Energy Aware Computing*, Cairo, Egypt, December 2010.
[26] **P. S. Shenoy** and P. T. Krein, "Local Control of Multiple Module DC-DC Converters," in *Proc. IEEE Workshop Control and Modeling of Power Electronics*, Boulder, CO, June 2010.
[27] **P. S. Shenoy**, "Local Control of Multiple Module Converters with Ratings-Based Load Sharing," M.S. thesis, Dept. Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, April 2010.
[28] **P. S. Shenoy** and P. T. Krein, "Local Control of an ISOP Push-Pull Converter with Uneven Load Sharing," in *Proc. IEEE Power Energy Conf. Illinois*, Urbana, IL, Feb 2010.

INVENTIONS

- **P.S. Shenoy**, "Current Sensing using Capacitor Voltage Ripple in Hybrid Capacitor/Inductor Power Converters," Invention disclosure TI-5907, Texas Instruments, Mar. 6, 2015.
- J. Khayat, M. Amaro, and **P.S. Shenoy**, "A Switched Reference MOSFET Drive Circuit and Methodology", Invention disclosure TI-74651, Texas Instruments, Dec. 16, 2013.
- J. Khayat, M. Amaro, **P.S. Shenoy**, R. Ramani, and S. Carlo-Rodriguez, "Vout Prebias-safe Transfer Capacitor Precharge Architecture", Invention disclosure TI-74571, Texas Instruments, Nov. 22, 2013.
- J. Morroni, M. Seeman, M. Chen, and **P.S. Shenoy**, "A Series Capacitor, Tapped Buck Converter for Improved Efficiency at High Frequency", Invention disclosure TI-74498, Texas Instruments, Oct. 31, 2013.
- **P.S. Shenoy**, "Peak Switching to Reduce Losses in High Frequency DC-DC Converters", Invention disclosure TI-74419, Texas Instruments, Oct. 11, 2013.
- **P. S. Shenoy** and P. T. Krein, "System and Method for Optimizing Solar Power Conversion," U.S. Patent 8,508,074, Aug. 13, 2013.
- **P.S. Shenoy** and M.G. Amaro, "A Method to Improve Light Load Efficiency in Multiphase Switched Capacitor Buck Converters", Invention disclosure TI-73959, Texas Instruments, July. 1, 2013.
- **P.S. Shenoy**, "Non-invasive Monitoring of a Photovoltaic System", Invention disclosure TI-72690, Texas Instruments, Sept. 4, 2012.
- **P. S. Shenoy** and M. Direnzo, "Phase Management for Reduced Parameter Variation in Multi-Phase DC-DC Converters," Invention disclosure TI-71234, Texas Instruments, July 19, 2011.
- **P. S. Shenoy** and P. T. Krein, "Differential Power Processing for Optimizing Power from Solar Cell or Panel Arrays," Invention disclosure TF10176, University of Illinois, Dec. 1, 2010.

AWARDS AND HONORS

Jack Kilby Innovation Award, 2014 – top technical award at Texas Instruments, *Finalist*
Illinois International Graduate Achievement Award, 2010 – for "innovative and sustained international research or service abroad that has had the greatest impact or greatest potential impact" (sole recipient)
Lemelson-MIT Illinois $30,000 Student Prize for Innovation, 2012 – *Finalist*
IEEE Power Electronics Society Best Chapter Award, 2010 – served as *Vice President,* University of Illinois IEEE PES/PELS joint student chapter
Foreign Language and Area Studies Fellowship, 2009 –Advanced Mandarin, Center for East Asian and Pacific Studies, Beijing, China
Foreign Language and Area Studies Fellowship, 2009-2010 – Advanced Mandarin, Center for Global Studies
Camras Scholarship, 2003-2007 – full tuition and room, merit-based scholarship, Illinois Institute of Technology
National Science Foundation Graduate Research Fellowship, 2007 – *Honorable Mention*
Best Presentation Award, IEEE Applied Power Electronics Conference, 2011
Best Poster Award, IEEE International Conference on Energy Aware Computing, 2011
Best Poster Award, IEEE Photovoltaics Specialist Conference, 2012 – *Nominated*
Grainger Power Engineering Award, 2009
Messinger Scholarship, 2007 – one of two recipients, Elec. & Comp. Eng. Dept., Illinois Institute of Technology
Clinton E. Stryker Distinguished Service Award, 2006 – for leadership and service, Illinois Institute of Technology
List of Teachers Ranked as Excellent by Their Students, 2009 – University of Illinois at Urbana-Champaign
PSMA Student Travel Grant, 2011 – for the IEEE Applied Power Electronics Conference
Harold L. Olsen Award for Excellence in Undergraduate Teaching by Graduate Students, 2009 – *Nominated*
1st in Sustainability, 2010 – served as *Director*, Engineering Open House, Power and Energy Exhibit
NAIA National Cross Country Scholar Team Member, 2008

SERVICE

- IEEE Power Electronics Society (PELS) Administrative Committee (AdCom) Member-at-Large, 2015-2017
- IEEE Power Electronics Society (PELS) Young Professionals Chair, 2013 - present
- IEEE Power Electronics Society (PELS) Student Member Chair, 2011-2013
- IEEE Power and Energy Conference at Illinois – *Co-Director*, 2011
- IEEE Power and Energy Society/Power Electronics Society Joint Student Chapter at Illinois – *Vice President*, 2009 – 2010, Received PELS Best Chapter Award
- Reviewer for IEEE journals: Transactions on Power Electronics, Journal of Emerging and Selected Topics in Power Electronics, Transactions on Industrial Applications, Journal of Photovoltaics
- Reviewer for IEEE conferences: APEC, ECCE, PVSC, COMPEL, ISCAS, PECI, ICEAC
- Session chair for IEEE conferences: ECCE, PECI, APEC
- TI Innovation Challenge Judge, 2014
- Encana Plano ISD Secondary District Science Fair – Engineering Judge, 2013-2014
- Engineering Open House Power and Energy Exhibit – Director; Awarded 1st in Sustainability, 2010
- Engineering Open House Power and Energy Exhibit – Graduate Leader, 2008, 2009, 2011
- Camras Student Advisory Board – President, 2005-2006
- IIT Student Activities Finance Board – Clerk, 2006

PROJECTS AND SKILLS

- IEEE & SAE Hybrid Electric Formula Car Competition – *Electrical Team Leader*, 2006 – 2007
- Inter-Professional Project 342: Hybrid Electric Bus Design and Simulation – *Project Leader*, Spring 2006
- Electric Motor Drives Lab Assistant, Illinois Institute of Technology, 2005-2007
- Undergraduate Research 491: Analysis of formula hybrid drive train, 2007
- Familiar with Matlab, Simulink, SimPowerSystems, Mathematica, Mathcad, Dymola, PLECS, PSIM, VHDL, Altera DSP Builder, EAGLE, Altium, CCS, Cadence, Simplis